

SELF-CONCEPT, A DETERMINANT TO SUCCESS IN MATHEMATICS ACHIEVEMENT AMONG RURAL IN NKANU EAST LGA, ENUGU STATE NIGERIAN.

¹ EZE, HYACINTH OSONDU & ² ONAH, FESTUS C.

¹ Deputy Provost, Enugu State College of Education (Technical), Enugu.

² Department of Social Science and Humanities, Institute of Management and Technology, Enugu.

Abstract

This study investigated self-concept as determinant of success of rural students in mathematics achievement in Nkanu East LGA of Enugu State, Nigeria. A descriptive survey method was adopted. The population was 2500 students from Nkanu Secondary Schools. Traro Yameni (1969) formula was used to pick sample size of 320 students, one research question and two hypotheses guided the study. The questionnaire adopted the modified Likert four point scales. Two lecturers, one from Department of Psychology, the other from Department of measurement and evaluation validated the instrument, using 100 students from Nike Grammar School. The reliability co-efficient was determined; using Crombach Alpha technique which yielded 0.89. The hypotheses was formulated and tested with Chi-square statistics at 0.05, level of significance. The findings showed that self concept significantly determine successes in mathematics achievement while gender also has such effect. The implications and recommendations were discussed.

Keywords: Self Concept; Determinant: Success Mathematics Achievement

Introduction

It has been a prevalent issue over the years that the level of student's achievement in mathematics has been considerably low among senior secondary schools in Enugu State and Nkanu East Local Government in particular. This problem has been attributed to obvious factors such as social, economic, religious and psychological under which self-concepts according to Eze (2004) and Shatiane (2002) finds expression.

The literature on psychological assessment is flooded with studies on self-concept; and its related construct designated as self-esteem, self-efficacy, self-image and others; (Roda, Sanchez (2007), Anastasia & Urbina (2007), Dambulzo (2005). Intriguingly, there seems to be diverse opinions on the definition of self-concept. While some authors refer to it as a construct closely related to personality, that is a relatively stable and destructive pattern of behaviour that characterizes an individual and his or her reactions; to the environment (Kaplan and Saccuzzo (2005), Anasti Urbina (2007), Olunatayo (2011) Some others view

it as domain-specific evaluations of self. Mcleod (1999) Myers/ (2009) Madcharyo (2004) opined that self-concept is the set of perception or referencepoints that the subject has about him/herself, the set of characteristics, attributes, qualities and deficiencies, capabilities and limits, values and relationships that the person knows to be .descriptive of him/herself, and which he/she perceives as data concerning his/her identity putting it in plain language. Self-concept has to do with social competence since it influences how a person feels, how he or she thinks learns values himself or herself, relates to others and ultimately, how he or she behaves.

Clark (2000) considered self-concept to comprise various dimensions, areas or facets in academic and non-academic components. Academic self-concepts is divided into self-concept in particular subject areas (Mathematics and English etc). While non -academic is divided into social, economical, and physical self-concepts, marsh (2000) latter test the academic self-concept portion of the Shavelson, Hubnor and Stanton (1976) model and concludes that the model is supported when it is limited to self-concepts in academic core subjects as mathematics and English Language.

However, in the context of this study, self-concept is defined as the way an individual thinks, feels, acts values and evaluates self in relation to achievement in Mathematics, It is upon this backdrop that this research studies the self-concept as a determinant to student's achievement in mathematics in Nkanu East Local Government Area of Enugu State Nigeria.

Statement of the Problem

It appears the question of whether relationship exists or does not exist between self-concept and achievement has not been concisely answered because existing theoretical and empirical studies have produced diverse and contradictory results. Similarly, the issue of gender differences in self-concept and achievement in mathematics has not been resolved and therefore subject to further studies. A large body of literature has also reported the relationship between gender and self- concept and consequently academic achievement. Some authors, Eze (2004), Obinna (2000) report that boys seem to have a more positive self-concept in a number of dimension such as mathematics and general self-esteem that do girls. Relatedly, others Ugo (2008), Bakare (2001) reported differences hi strengths of relationship between self-concept and achievements Johnson Smaragali and Johnson (1995). Furthermore, others found that boys showed significantly higher mathematics and self-concept than girls (Mango &Eikeland (1978). In recent research in Enugu, Anigbo (2016) identified teacher factor, student factor, instructional strategy to have significant relative effects on mathematics. In sum, therefore, the issue remains thus; does self-concept determine success in mathematics achievements? Does gender difference determine success in mathematics achievements? Does gender difference determine success in. mathematics achievements? The answers still remain ambiguous.

This ambiguity forms the worry of this research. The outcome of this study should provide concise answers to the questions raised.

Research Question

To what extent does self-concept determine success in mathematics achievement?

Hypotheses

HO₁: Self-concept does significantly determine success in mathematics achievement.

HO₂: Gender does not significantly determine success in mathematics achievement

Delimitation of the Study

This study was limited to students in Nkanu East Local Government Area Senior Secondary School (SSI) those who just passed out from external examination of Junior Secondary School Examination in Enugu State.

Methodology

This study adopted the descriptive survey research design. The population consisted of all the 2500 students in public secondary schools in Nkanu East Local Government of Enugu State Nigeria comprising Nike Grammar School (240), Abakpa Girls (300), St. Patrick's Emene (300), Ugwuogo Community (260), Trans-Ekulu Girls (320), New Haven Boys (28), Ugwuomu Community (240), Ubahu Community (200) and Command secondary school (28). The stratified random sampling technique was used to select sample for the study. The sample size of 320 was determined using Traro Yamane (1967) formula Eboh (2009) applying Bowley's Proportional allocation formula, the sample size for each category of the respondents was determined, Nike Grammar School (34), Abakpa Girls (51), St. Patrick Emene (48), Ugwuogo Community Secondary School (28), Trans-Ekulu Girls (46), New Haven Boys (36), Community Secondary School Ugwuomu (34), Ubahu Community Secondary School (22) and Command Secondary School (31). A total of 320 respondents were accessed through primary and secondary sources. Some students were also interviewed. A self-constructed questionnaire titled "Self-concept, a determinant of success in Mathematics questionnaire (SDSMG)" was used to elicit information from the respondents. The instrument consists of two sections - A and B. Section A consists of demographic information while section B contained 8 items on the extent to which self-concepts determine achievement in mathematics in Nkanu East Local Government Area of Enugu State Nigeria. The modified Likert scale format viz: To a very high extent (4 points), to a high extent (3 points), to a low extent (2 points) and to a very low extent (1 point). The questionnaire items were validated by experts in the Department of Educational Management and Measurement and Evaluation, using 100 students from Nike Grammar School of Enugu State, the reliability coefficient was determined using Cronbach's Alpha technique which yielded 0.85. A teacher in each school assisted in administering the questionnaire. The questionnaire was collected on the spot with T-test analysis of the

hypothesis of this study was formulated and tested at 0.05 level of significance and 2 degree of freedom.

Data Presentation and Analysis

The research Question: To what extent does self-concept determine success in Mathematics in secondary schools examination?

Table I; Respondents Responses on Self-concept as a determinant of success in Mathematics Examinations:

Items	No of Respondents (Very High Extent)	No of Respondents (High Extent)	No. of Respondents (Low extent)	No. of Respondents (Very Low Extent)	Total
1	44	112	116	92	320
2	55	120	108	92	320
3	39	138	109	34	30
4	34	242	98	47	320
5	56	278	86	--	320
6	48	129	97	46	320
7	50	133	86	57	320
Total	292	951	700	368	2240
Mean	36.5	118.9	87.5	46.00	

In table I above, the very high extent group had a mean score of 36.05 representing 12.6 percentage; the High extent had mean of 118.9 with 41,5%, The low extent had mean of 87.5 and a percentage of 30.29, while the very low extent mean is 46 and a percentage of 15.92.

Test of Hypotheses

HO: Self-concept does significantly determine success in Mathematics achievement.

HO: Gender does not significantly determine success in Mathematics achievement.

Hypothesis One

1. I feel bad about Mathematics
2. Mathematics subject is difficult
3. I fear Mathematics
4. Am usually anxious about Mathematics
5. I was not encouraged at home
6. My preference is Arts

7. Mathematics teachers are not friendly.

Hypothesis II

1. View Mathematics as male dominated Subject.
2. Mathematics is not good for girls
3. Mathematics lead to male jobs
4. Males are encouraged more to do mathematics.
5. In school I consider what I want to be in future in choice of subject.
6. Mathematics related jobs could affect my marriage
7. We hear that Mathematics could run one mad.

Hypothesis One

HO₁: Self-concept dose not significantly determine successes in mathematics.

S/NO.	VHE	HE	VLE	LE	TOTAL
1	44 (50.6)	112 (147.6)	92 (57.1)	116 (108.7)	364
2	55 (52.1)	120 (152/1)	02 (58/8)	108 (11-9)	320
3	39 (44.5)	138 (129.7)	34 (50.2)	109 (95/5)	320
4	34 (44.5)	141 (129.7)	47 (50.2)	98 (95.5)	320
5	56 (44.5)	178 (129.7)	(50.2)	86 (95.5)	320
6	48 (44.5)	129 (129.7)	46 (50.2)	97 (95.5)	320
7	50 (45.3)	133 (132.2)	57 (51.2)	86 (97.3)	326
TOTAL	362	951	368	700	2345

$$X^2_{cal} = \sum \frac{(O_1 - e_1)^2}{E_1}$$

$$X^2_{cal} = \frac{(44-50.6)^2}{50.6} + \frac{(112-147.6)^2}{147.6} + \frac{(112-147.692-57.1)^2}{57.1} + \frac{(116-108)^2}{107.8} + \frac{(355-52.1)^2}{52.1} + \frac{(120-152.1)^2}{152.1} + \frac{(92-58.8)^2}{58.8} + \frac{(108-111.9)^2}{111.9} + \frac{(39-44.5)^2}{129.7} + \frac{(141-129.7)^2}{50.2} + \frac{(34-50.2)^2}{95.5} + \frac{(109-95.5)^2}{44.5} + \frac{(34-44.5)^2}{129.7} + \frac{(141-129.7)^2}{50.2} + \frac{(47-50.2)^2}{95.5} + \frac{(98-95.5)^2}{44.5} + \frac{(48-44.5)^2}{129.7} + \frac{(129-129.7)^2}{50.2} + \frac{(46-50.2)^2}{95.5} + \frac{(97-95.5)^2}{44.5} + \frac{(50-45.3)^2}{132.2} + \frac{(133-132.2)^2}{51.2} + \frac{(57-51.2)^2}{97.3} + \frac{(86-97.3)^2}{45.3}$$

$$X^2_{cal} = 0.86+9.59+21.33+0.48 +0.16+6.77+18.75+0.14 +0.68+0.53+5.23+191 +2.48 +0.98 +0.20 +0.07 +2.97+17.99+50.2+0.95 +0.28+0.003+0.35+0.02 + 0.49+0.005+0.66+1.31$$

$$X^2_{cal} = 31.26 +25.82 +3.73 +72.11 0.653 +2.465$$

$-X^2_{cal} = 144.388$, d.f- $(r-1) - (c-1) = (7-1) (4-1) = 6 \times 3 = 18$ at 5% level of sign.

X^2 critical value =31.53

Decision Rule: if $x^2_{cal} > x^2$ critical value

Then Reject H_0

Conclusion: H_0 rejected, hence self-concept is significantly a determinant to successes in mathematics.

H_{02} : Gender does not significantly determine successes in mathematics.

S/N	VHE	HE	VLE	LE	TOTAL
1.	55(43.33)	120 (134)	64 (55.67)	81 (86.67)	320
2.	39(45.33)	138 (134)	34(55.67)	109 (86.67)	320
3.	34(45.33)	141 (134)	47 (55.67)	98 (86.67)	320
4.	50 (45.33)	100(134)	50(55.67)	60 (86.67)	320
5.	50(45.33)	133(134)	57 (55.67)	80 (86.67)	320

6.	44(45.33)	102(134)	JJ2(55.67)	92(86.67)	320
TOTAL	272	804	334	520	1920

$$X^2_{cal} = \sum \frac{(O_1 - E_1)^2}{E_1}$$

$$X^2_{cal} = \frac{(55-45.33)^2}{45.33} + \frac{(120-134)^2}{134} + \frac{(64-55.67)^2}{67} + \frac{(81-86)^2}{57.1}$$

$$+ \frac{(39-45.33)^2}{45.33} + \frac{(138-134)^2}{134} + \frac{(34-55.67)^2}{55.67} + \frac{(109-86.67)^2}{86.67}$$

$$+ \frac{(34-45.33)^2}{45.33} + \frac{(160-134)^2}{134} + \frac{(50-55.67)^2}{55.67} + \frac{(80-86.67)^2}{86.67}$$

$$2.06 + 1.46 + 1.25 + 0.37$$

$$X^2 = 0.88 + 0.12 + 8.4 + 5$$

$$+ 2.83 + 0.37 + 1.35 + 1.48$$

$$+ 0.48 + 5.04 + 0.58 + 8.21$$

$$+ 0.048 + 0.01 + 0.03 + 0.51$$

$$+ 0.05 + 7.64 + 12 + 45 + 0.33$$

$$X^2_{Cal} = 5.14 + 15.18 + 6.03 + 14.31 + 1.03 + 20.47$$

$$X^2_{cal} = 62.14$$

$$X^2 \text{ critical value} \ll 27.49$$

Decision Rule: if $x^2_{cal} > x^2 \text{ critical value}$

Reject H_0 , otherwise accept.

$$D.F = (r-1)(c-1) = (6-1)(4-1) = 5 \times 3 = 15 \text{ at } 5\% \text{ level of significant} = 62.14 > 27.49$$

We then reject H_0 and then accept alternative.

Conclusion: gender does significantly determine successes in mathematics.

Results

The table one presents the result of the hypothesis which postulated that self concept does no significantly determine success in Mathematics was rejected. Hence, self-concept is significantly a determinant to success in mathematics. The result implies that the way student perceive self-influences then success in Mathematics. The results supports Eze (2004), Hassan (2000), Banyard and Grayson (2000), Anastasia and Urbi (2007) Bowing (2000). This is mainly because many youths tend to fear Mathematics (Ugo, 2007), Marsh (2000). Hypothesis two, which states that gender does not significantly determine success in mathematics. The analysis of the data showed that the Hypothesis was rejected, then the analysis of the data showed that the hypothesis was rejected, then the alternative upheld, that Gender significantly determine Success in Mathematics. The Result confirmed recent studies by Ezewu, 2002) using Nigeria Secondary Students that is male students to achieve higher in Mathematics than the Females. A possible

explanation for this result could be that the sex of the learner per se, after all has something to do with learner's achievement on a given subject. It appears that other factors than sex may not have significant role in determining success in mathematics. Though this result did not support Wozencraft, which stated that whether girl scores better or boy scores better would depend on which boy or which girl we are talking about.

This finding has indicated that sex of the learner per se, after all significantly determine success in Mathematics. If other factors are studied, it could be given a clearer picture, but this study has shown that success in Mathematics could be attribute to physiological sex make up of the learner.

This implication is that Nigerian teachers should engage in meaningful orientation, counselling and awareness campaign that will lead to development of positive self-concept and gender inclination that the much talked about technology can be achieved. This is because Mathematics is fundamental to technology development.

Conclusion

The importance of research in the academic achievement of students specifically Mathematics cannot be over-emphasized. Most of the new product and services that people are enjoying at present were research in mathematics, and its usage could provide a breakthrough in development of the country. The study reveals that achievement in Mathematics depends on self-concept and gender. The core consequences of this -concept are low and self-esteem, misconception of the subject and failure in mathematics.

Recommendation

Based on the findings, of this study, the following recommendation arrived at improving achievement in mathematics was made,

1. Government should properly trained qualified teachers in Mathematics to help students.
2. People should engage in more researches that would feed the government and private sector with useful information for improvement in self-concept of the youths.
3. Institutions should enlighten teachers on the importance of self -concept on student achievements.
4. Teachers should be transparent in the teaching and examinations in Mathematic
5. Schools should be research inclined in order to come up with solutions to the numerous problem facing the country.

References

- Ahmed, I (1998): initial Development and Validation of Academic Self-Concept Public Report.
- Anastasia and Urbina (2007): Self-concept and Academic Achievement of Students at Higher School Level: *Journal of Education* 2(3) 33-36.
- Anigbo, L.C (2016): Factors Affecting Student Interest in Mathematics in Secondary School in Enugu State. *International Journal of Education and Evaluation* 2(1) 22-28
- Ayodele, O.J. (2011): Self-concept and Performance of Secondary School Students in Mathematics. *Journal of Education Development Psychology* 1(11) 176-183.
- Bakare G.M.C. (2001): Student Achievements in Secondary Schools: University of Ibadan Publishers LTD.
- Dambuzo, I.I. (2005): The Relationship between the Learner, Self-concept Achievement in Secondary Schools in Zimbabwe. Unpublished Ph.D. Thesis. University of South Africa Zimbabwe
- Marsh, H., Martin, Andrew J, (2001): Academic Self-Concept and Academic Achievement Relations and Causal ordering: *British Journal of Educational Psychology* 81(1) 59-77.
- McLeod, S.A. (2008): Self-Concept. Retrieved from [www. Simplepsychology. Org/selfconcept.html](http://www.simplepsychology.org/selfconcept.html).
- Myers, David (2009): *Social Psychology* (10th Edition), New York. McGraw-Hill Higher Education.
- Oluwatayo, J.A. (2011): Self-concept and Performance of Secondary School Students mathematics. *Journal of educational and Developmental Psychology* 1(1) 176-183.
- Sanchez, F.J.P. (2009): Relationship between Self-concept and Achievement in Primary Students Almeria Spain, p. 97.
- Shafique, A. (2002): Relationship between Academic Self-concept and Achievement among School Children: National Institute of Psychology. Quad-o-Azam University Islamabad Pakistan.