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RELATIONSHIP BETWEEN SELF-CONCEPT AND ATTITUDE TOWARDS SOLVING ALGEBRAIC PROBLEMS AMONG SECONDARY SCHOOLS STUDENTS IN SOKOTO STATE, NIGERIA

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ABSTRACT: Developing a positive self-concept is one of the most fundamental goal of success in life. This usually has to begin starting from early childhood to school years. This study therefore, investigated the relationship between self-concept and attitude towards solving algebraic problems among secondary school students in Sokoto state, Nigeria. Three research questions and three hypotheses guided the study. The study employed descriptive survey design. A sample of 377 senior secondary two (SSII) students was drawn from the population through proportionate random sampling technique. Two instruments were used in the study: self-concept scale (SCS) and Attitude towards Solving Algebraic Problem Scale (ASAPS). The instrument was content validated by Subject Matter Experts (SME). The reliability coefficients of SCS and ASPS were 0.77 and 0.79 respectively determined through Cronbach alpha technique for internal consistency. The findings of the study revealed that there was a significant relationship between students' self-concept and their attitude towards solving algebraic problems. Findings also showed that there was no significant difference in male and female students' attitude towards solving algebraic problems. It was therefore, suggested among others that teachers should give adequate and sufficient attention to developing positive self-concept in students.

KEYWORDS: Self-Concept, Problem Solving, Algebra, Secondary School, Students

INTRODUCTION

Study on self-concept has stirred increasing interest in psychology and other field of social science researches in recent years. Though, quite a large number of studies have been devoted to it, it is hard to find an agreed, accepted definition of the term self-concept, based on the fact that it has been looked at from different theoretical perspectives. Its importance is as result of its outstanding influence to personality formation. According to Marsh & Seeshing, (1997) Self-concept is the set of perceptions that the individuals has about himself; the set of characteristics, traits, potentials, abilities and restrictions, morals and associations that the individuals knows to be description of him/herself and which he/she perceives as data concerning his/her identity. Byrne & Shavelson, (1986) further defined self-concept self-perceptions about one's abilities and competences that influence the likelihood of success in a wide range of endeavours. However, Oyserman (2001) opined that self-concept relates to self-cognition, which implies that individuals could infer experiences such that it can obstruct their judgments and reactions towards academics and life generally. Hence, students' view of self affects the quantity and quality of life's output they acquire in schooling. Gargus, (2002) succumbed that when students inspire themselves with positive self-talk, on issues or areas that

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have been a encumbrance to them, they have an inclination to increase their level of willpower to succeed, in that particular area of concern. This helps the student to attain the desired level to achieve success.

However, success in accomplishing goals inspires students to develop a positive attitude towards issues and other problem solving activities. Problem solving is centered on the process of discovering solutions to a problem by using an organized thought process (Julius et al., 2018a). Thus, problem solving ability of learners not only influence learning from interactions but also play an important role in the way learners function in the society psychologically and socially. For instance, Patton et al. (1997) suggest that learning to solve problems is a prime objective in learning as problems are unescapable fact of life. According to Flewelling & Higginson (2005), Problem solving gives students' the opportunity to use their imagination and to get into the habit of doing so. The problem solving abilities are directed by the goal and perception of the essential relationship in the situation. It is worthy of note that the way students learn and deal with problem largely depends upon the link between personality and cognition. Students having higher abilities of problem solving displays attitudes that makes them very useful members of society. Students who can successfully solve a problem possess good reading skills, are able to compare and contrast, have the ability to identify important aspects of a problem, are able to estimate and to create analogies and are flexible in attempting various strategies (Salleh, 2004).

Algebra is a branch of mathematics that deals with symbol and the rules for manipulating those symbol (Coolman, 2015). Although mathematics is always emphasized in school, students' abilities to master the subject are always being questioned as well. In most cases, students are not in point of fact feeble in solving algebraic problems, but are deficient in the skill to marshal tactics that help to solve algebraic problems. In their study, Zakaria & Yussof, (2009) discovered that students always fails to simplify expressions, fails to change the form of expressions and end up committing careless errors in solving algebraic problems. They further submit that students also fails to use the information given to them in a problem to find a solution and as such many of them use trial-and-error technique that usually turns out not to satisfy the questions' requirements.

Attitude is an essential fragment of human identity. It is a learned predisposition of an individual to retort positively or negatively to some object, condition, concept or another person. Everyday people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade. Which are all as a result of the attitude of a person towards a particular object. Furthermore, attitude is vital for human existence, it is the feelings individuals have towards a particular object, events, phenomenon, people or places (Julius et al., 2018b). Attitude towards solving algebraic problems is a positive of negative liking of solving algebraic problems by the students.

Sharma (2007) piloted a study on problem solving ability and scientific attitude as determinant of academic achievement of higher secondary students and the result of the study revealed that higher secondary students have shown average problem solving ability. Bandhana and Darshana (2012) found that emotional intelligence and home environments have significant impact on the problem solving ability of adolescents. Ganandevan (2006) found out that the problem solving ability of higher secondary students is low. The male and female students and the students residing at rural and urban area differ significantly in their problem solving ability

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Previous researches have been conducted in relation to student attitude towards solving problem and their self-concept. For instance, Effandi & Yusoff, (2009) investigated on attitude and problem solving skills in algebra among Malaysian matriculation college students. The outcome of their findings indicated that there is a moderate relationship between students' attitude and problem solving skills in algebra, although they also recoded low attitude for some students which they believe may be due to those students unwillingness to solve problems and also lack the perseverance to solve the problems. Olagoke, (2016) in a descriptive survey, examined attitude, self-concept and achievement in basic science using 360 junior secondary two students of Ekiti state Nigeria. In the result of the study, it was revealed that there is a significant correlation between attitude, self-concept and achievement in basic science.

Furthermore, Ishak (2000) on his study on the relationship between problem solving achievement and learning style and associated factors among secondary school students, found that there was no significant difference in mean problem-solving achievement between male and female students. Similarly, Abd Kadir (2004) carried out a study on the relationship between basic knowledge and problem-solving skill in coordinate geometry. She found that students who have strong basics in coordinate geometry also have high problem-solving skills. The findings also showed that students' failure in solving problems began during the reading of the question: they could not understand certain words, sentences, concepts or terms. According to Fennema (1985), in her study explaining sex-related differences in mathematics, uncovered that males perform better than females when tasks involve the cognitive skills used in mathematics.

In Nigeria, mathematics is a most offered subject in primary (basic) through secondary schools. The subject is taught daily or at least four times in a week (Okafor & Anaduaku, 2013), but it is heart breaking to know that it is the least successful subjects in Nigerian schools, despite its importance and considering the time that is allocated to it in the school system. Problem solving is an important aspect of the mathematics and as such it is imperative that students are equip with the skills needed to solve problems. Problem solving is a component of mathematics that is refers as a goal directed sequence of cognitive, affective and conative operations geared towards finding the unknown for bridging the gap between the present and a goal state (James & Adewale, 2015). According to Bradshaw & Hazell, (2017) problem solving poses many difficulties to both students and grown person and does not seem to be a skill that is extensively experienced and fostered within classrooms. Most students give up so quickly, others shut down their heart seeing themselves as failures that are not just good at solving algebraic problems (McDougal & Takahashi, 2014) Hence students need to acquire this skills in other to succeed in mathematics generally and algebraic problems specifically.

Results of this type of study are likely to broaden our knowledge as to how we can influence students' attitude positively towards solving algebraic problems. Given the existing literature, more research needs to be done on attitudes towards problem solving in algebra relation to self-concept especially among secondary school students who are mostly at the adolescent age and have the likely hood of experiencing changes in the way they perceive issues and perform task on their own.

Research Objective

The main objective of this research is to investigate the relationship between students' attitudes towards solving problems and their self-concept.

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Research Questions

1. What is the significant relationship between students' attitude towards solving problems and their self-concept?
2. What is the significant difference in students' attitude towards solving problems based on gender?
3. What is the significant difference in students self-concept based on gender?

Research Hypotheses

Ho_1 There is no significance relationship between students' attitude towards solving algebraic problems and their self-concept

Ho_2 There is no significant difference in students' attitude towards solving algebraic problems based on gender

Ho_3 There is no significant difference in self-concept of students based on gender

METHODOLOGY

The study adopted a descriptive survey in order to examine the relationship between students' attitude towards solving algebraic problems and their self-concept.

Participants

The population for the study comprised of all the senior secondary school students in Sokoto state, Nigeria. The sample were selected students from senior secondary school two (SSII). There are 21,839 Students in senior secondary school all from six educational zone in Sokoto state. Using proportionate random sampling 377 students were selected form the six educational zones and using simple random sampling eight (8) schools were selected. From the sample, 210 are male and 167 are female. The students were within the average age of 13 to 17 years.

Instrument

Two instruments were used for this study. The Self-Concept Scale (SCS), Attitude towards Solving Algebraic Problems Scale (ASAPS) developed by the researcher through concept analysis and review of literature. The instruments were validated by Subject Matter Experts (SME) and based on their comments the content validity of the instrument was ascertain. The content validity was calculated using Lawshe, (1975) content validity ratio (CVR). The reliability of the instrument was ascertained through the utilization of the most common and the best index of internal consistency known as Cronbac's coefficient alpha (Stangor, 2011). The reliability index obtained for Self-Concept Scale (SCS) and Attitude towards Solving Algebraic Problems (ASAPS) was 0.77 and 0.79 respectively. A five-point Linkert scale was used, ranging from SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA= Strongly Agree. To ensure proper administration of the instruments, the Self-Concept Scale (SCS) and Attitude towards Solving Algebraic Problems Scale (ASAPS) questionnaires was administered to the students with the help of two research assistant and the subject teachers

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after taken permission from the school principals of the schools selected. Data collected were analyzed using Pearson's Product Moment Correlation and t-test statistics. Statistical Software for Social Sciences (SPSS) version 22 was employed for the analysis of the data.

RESULT

Table 1: The demographic characteristics of the Respondents

Type	N	Factor	Frequency	Percentage (%)
Age	377	11-15 years	197	52.3
		16-20years	179	47.5
		21 years above	1	0.30
Gender	377	Males	201	55.7
		Females	167	44.3
School Location	377	Urban	269	71.4
		Rural	108	28.6

Ho_1 There is no significance relationship between students' attitude towards solving problems and their self-concept. To test this hypothesis, Pearson's product moment correlation analysis was used to test the relationship between students' attitude towards solving problem and their self-concept.

Table 2: Pearson Correlation of students' attitude towards solving problems and their self-concept

Variable	N	Mean	SD	r	P
Attitude towards solving problems	377	51.19	5.04	0.471	0.000
Student self-concept	377	15.86	3.72		

The result in table 2 shows a low but positive and significant relationship between students' attitude towards solving problems and their self-concept. ($r = 0.471$, $p < 0.05$). Therefore, the null hypothesis which states that, there is no significant relationship between students' attitude towards solving problems and their self-concept was rejected. This invariably means there is a significant relationship between students' attitude towards solving problems and their self-concept.

Ho_2 There is no significant difference in the students' attitude towards solving problems based on gender. To test this hypothesis, t-test analysis was used to test the difference in male and female students' attitude towards solving problems.

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Table 3: Difference in students' attitude towards solving problem based on gender

Gender	N	Mean	SD	df	t-cal	t-crit	P-value
Male	210	56.2611	8.23612	375	0.901	1.96	0.376
Female	167	59.6492	5.70134				

*Significant; α at < 0.05

Table 3 revealed that the (p-value = 0.376 > α at 0.05) and the (t-cal < 1.96) this therefore means, there is no significant difference in the attitude of male and female students in solving problems. Thus, the hypothesis is not rejected.

Ho_3 There is no significant difference in the self-concept of students based on gender. To test this hypothesis, t-test analysis was used to test the difference in male and female students' self-concept.

Table 4: Differences in students' self-concept based on gender

Gender	N	Mean	SD	df	t-cal	t-crit	P-value
Male	210	44.2641	4.47781	375	5.317	1.96	0.003
Female	167	42.3099	6.32160				

*Significant; α at < 0.05

The results in Table 4 revealed that the (p-value = 0.003 < α at 0.005) while the (t-cal > 1.96) this therefore implies that, there is significant difference in the self-concept of male and female students. Thus, the hypothesis is rejected.

DISCUSSION

The findings of this study revealed a low but positive and significant relationship between students' attitude towards solving problems and their self-concept. The result indicated that most of the students have positive self-concept of themselves though still at a low level. The finding of the present study align with the findings of Wu & Hu, (2014) found significant correlation between skill learning attitudes with vocational self-concept. In a study they conducted among 270 Taiwanese junior high school students who study in the technical education program. The result is also consistent with the previous work of Olagoke, (2016) examined attitude, self-concept and achievement in basic science using 360 junior secondary two students of Ekiti state Nigeria. In that study, it was discovered that there is a significant correlation between attitude, self-concept and achievement in basic science. Furthermore, the findings of the study in in line with the findings Martin et al., (2000). However, the empirical evidence of relationship between self-concept and attitude towards solving problems in the

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findings of the current study implies that increase in students' self-concept will lead to an increase in their attitude towards solving problems.

The current study, also found no significant difference in the attitude of male and female students towards solving problems. This findings is in line with the findings Zakaria & Yusoff, (2009). Where they also found no significant difference in the attitude and problem solving skills of male and female student. This finding is parallel to those by (Salleh 2004; Ishak, 2000; Popoola, 2000) On the contrary Patterson et al,. (2003) discovered difference in male and female students' attitude towards solving problems.

Furthermore, the study also discovered that there is a significant difference in the self-concept of male and female students. This is consistent with the finding of Matovu, (2012) where he found significant difference in the academic self-concept of males and females, showing that, males and females possessing different beliefs about their academic competencies. Though the result is in contrast with the work of Pushpa & Yeshodhara, (2014) where self -concept scores of male and female group of B.Ed Students were compared and found that there was no significant difference between them. This is also same with the findings of Raeisoon et al., (2014) whom also could not find any significant difference between male and female students self-concept. The result in the study of Pushpa & Yeshodhara, (2014) and that of Raeisoon et al (2014) concurs with the result in the study of Akin & Folorunsho, (2014) who could not also find any significant difference in the self-concept of boys and girls among secondary school students in Ile-Ife, Nigeria.

Implication of the Study

The results of the study indicated that there was a positive and significant relationship between students' self-concept and their attitude towards solving algebraic problems. This implies, higher self-concept in students will lead to higher positive attitude towards solving algebraic problems. It also means that a change in their self-concept facilitates a change in their attitude towards solving algebraic problem. It was also revealed in the study that no difference exist between male and female students in their attitudes towards solving algebraic problems, which means gender does not play any role when it comes to attitude displayed by the students with regards to solving algebraic problems. Lastly, the result further showed a significant difference in male and female students' self-concept. The difference appeared in favour of males, implying that the male students have a stronger and positive self-concept compared to their female counterparts.

CONCLUSION

The main objective of this study was to examine the relationship between self-concept and problem solving among secondary school students in Sokoto state. From the findings of this study, it is concluded that a positive self-concept will lead to good problem solving ability. Therefore, teachers must assist their students in this direction to further develop good self-concept of themselves in order to improve their problem solving ability.

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