



Teachers' Mathematics Self-Concept as a Correlate of Primary School Pupils' Performance in Mathematics in Oyo, Oyo State, Nigeria.

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Abstract

This study examined teachers' Mathematics self-concept as a correlate of primary school pupils' performance in Mathematics in Oyo, Oyo State. Two hypotheses were tested in the study. The study adopted descriptive survey and correlational research design. A total number of 100 teachers was selected using simple random sampling technique from Oyo East Local Government Area of Oyo State. The instruments used were a questionnaire to collect data for the study tagged 'Teachers Mathematics Self-concept Questionnaire (TMSCQ)' and 'Primary School Pupils' Performance Test (PSPPT)'. The reliability coefficient of the TMSCQ was found to be 0.73. Data were analysed using Pearson's Product Moment Correlation coefficient and t-test analysis. The findings among other things revealed a low correlation between teachers' Mathematics self-concept and primary school pupils' performance in Mathematics. It also revealed that there was no significant difference between teachers' Mathematics self-concept and the learning of Mathematics based on gender. The paper recommended that educational programme developers and designers should make teachers' Mathematics self-concept an educational aim as important as academic achievement.

Keywords: Teachers, Mathematics, Self-concept, Primary school, Gender.

Introduction

Education is one of the key components of human and national development. The manifest function of education for a developing country is for the citizens to acquire literacy and numeracy, which emphasises computational skills and particularly Mathematics is very important. Mathematics has a direct relationship with other subjects that are scientific in nature. Daniel, Benjamin and Eric (2020) submitted that Mathematics is the bedrock and a tool for scientific,

technological and economic advancement of a country, which prepares the individual for the future irrespective of the work of life he/she has chosen. It relates to everything in the universe which is connected to the daily life of individuals and remains the subject that education and human cannot function meaningfully without. Despite the relevance and usefulness of Mathematics in science and technology and realisation of national development, poor performance of pupils in Mathematics has been



observed in primary schools which is the foundation of education on which other level of education is build which has caused a lot of concern to Mathematics educators and other stakeholders. Educators have been investigating on the possible factors responsible for the low academic performance of pupils. Looking at the relevance of Mathematics in the lives of pupils and the economy as a whole, it is likely that some factors might have caused primary school pupils poor performance in Mathematics. It is against this background that the study has become necessary to explore Teachers' Mathematics self-concept as one of the factors that causes low performance in Mathematics of primary school pupils.

The term self is generally used in reference to the conscious reflection of one's own being or identity as an object separate from others or from the environment. Self-concept is a cognitive or descriptive component of one's self which is made up of one's self-schemas, interaction with self-esteem, self-knowledge, and the social self to form the self as a whole. It includes the past, present and future selves, where future selves represent individuals' ideas of what they might become, what they would like to become or what they are afraid of becoming. One self-concept is also called self-construction, self-identity, and self-perspective or self-structure. Primary school teachers' perception of Mathematics self-concept influence pupils' learning and performance in Mathematics.

Self-concept is an important construct in education because of its linkage to academic achievement (Ayodele, 2011 & Wang, 2007). Self-concept is often considered as the cognitive or thinking aspect of self (related to one's self-image) (Huitt, 2011). A positive self-concept (the set of beliefs we hold about who we are) is a desirable outcome in many educational settings and is frequently posited as a mediating variable that facilitates other desired outcomes such as academic achievement. In the context of this study, self-concept is defined as the way an individual thinks, feels, acts, values and evaluates himself or herself in relation to performance in Mathematics. Academic self-concept is a person's perception of self with respect to achievement in school and once self-perceptions are more firmly established, the relationships between self-concept and achievement are likely to be reciprocal. Researchers have reported a positive relationship between academic self-concept and academic achievement (Ross, Scott and Bruce, 2012 & Sarouphim & Charrtouny, 2017).

In the study of Kung and Lee, (2016) a positive self-concept is posited as a variable that facilitates academic achievement. Cvencek, Meltzoff and Greenwald, (2011) found that boys outperform girls in Mathematics achievement, reinforcing the continuing stereotype that girls lack Mathematical ability which call for up-to-date information about gender differences in Mathematics self-concept and Mathematics



achievement. Rubie-Davies & Lee, (2013) found no significant gender difference in the assessment of self-concept between males and females but have found significant gender differences in specific domains of self-concept, specifically in self-concept for Mathematical problem-solving, where male reported higher Mathematical self-concept than females. Mathematical self-concept is studied by psychologists, Mathematicians, methodologists and others, from various aspects. In particular, teachers' Mathematics self-concept refers to the perception or belief in his or her ability to perform well in teaching Mathematics or confidence in teaching and is recognized as a key component of Mathematical literacy. Mathematics self-concept is defined as teaching Mathematics concepts, teaching the topics easily, being successful in teaching, self-evaluation of teachers in terms of their interest and skills in teaching, and their perceptions about these skills (Yildtz & Fer, 2013).

Several studies have examined the relationship between self-concept and academic achievement or performance in Mathematics. Obilor (2012) found that Mathematics self-concept is significantly related to Mathematics achievement, general academic achievement of students and general academic self-concept. Erdogan & Sare (2014) found that there was a significant difference in elementary school students' Mathematics self-concept levels points of view gender. Ching and Hsin (2018) found out that

Mathematics self-concept significantly predicts Mathematics achievement and also shows significant gender variation with respect to Math self-concept and Mathematics achievement where boys had significantly higher Math self-concept than girls, whereas girls exhibited higher Mathematics achievement than boys.

By contrast, Nagy, Watt, Eccles, Trautwein, Ludtke and Baumert (2010) examined gender differences in Mathematics self-concept and reported that gender was not significantly related to self-concept. Nagy et al. (2010) concluded that gender-related differences in Mathematics self-concept should be questioned. Timmerman, Sylke, Van Luit (2017) found a significant positive correlation between Mathematics self-concept and Mathematics achievement in all four Mathematics domains (measurement, relations, numbers and scale) as well as automatized Mathematics skills and Mathematics self-concept was the only variable that accounted for a significant unique proportion of variance in Mathematics scores. Most of these studies support the belief that self-concept is a strong facilitator of academic performance in Mathematics and that a positive or negative change in self-concept tends to produce a commensurate change in academic achievement or performance (Ayodele, 2011). In Mathematics performance, Mathematics self-concept is a powerful variable that influence Mathematics performance.



This paper focuses on the importance of teachers' Mathematics self-concept and the consequential importance of providing school teachers with enough professional background to improve the performance of primary school pupils in Mathematics. It is necessary to identify the academic components that are most important for increasing academic performance.

Statement of the Problem

Poor performance of pupils' in primary Mathematics as observed by the researcher has generated a lot of concern to parents, teachers and other stakeholders in education. This poor performance in Mathematics seems to have been attributed to psychological variables of which self-concept is one. It appears little attention has been given to the fact that teachers' Mathematics self-concept influence pupils performance in Mathematics. This fact shows the need to conduct new researches to determine the influence of teachers' Mathematics self-concept on primary school pupils' performance in Mathematics. Based on the above, this study intends to find out the relationship between teachers' Mathematics self-concept and pupils performance in Mathematics.

Research Hypotheses

The following hypotheses were generated for the study:

1. There is no significant relationship between teachers' Mathematics self-concept and pupils' performance in Mathematics.
2. There is no significant difference between teachers' Mathematics

self-concept and the learning of Mathematics based on gender.

Methodology

Research Design

The study adopted descriptive research design of the survey and correlational type. The descriptive survey method was employed because it will describe systematically the facts and the opinion of a given sample in the area of interest, conclusion and generalization can be made on contemporary issue.

Sample and Sampling technique

The sample of the study comprised 100 primary school teachers randomly picked from Oyo East Local Government Area of Oyo State.

Instrumentation

The instruments used were researcher's constructed questionnaire tagged 'Teachers Mathematics Self-concept Questionnaire (TMSCQ)' and 'Primary School Pupils' Performance Test (PSPPT)'. The TMSCQ was divided into two sections. Section A elicited information on the personal data of the respondents i.e. demographic data such as sex, age, qualification and years of teaching experience while Section B comprised of 15 items on the impact of teachers' Mathematics self-concept on primary school pupils' performance in Mathematics graduated on a four point Likert scale of Strongly Agree (SA), Agree (A), Strongly Disagree (SD) and Disagree (D). The PSPPT contained test items solved by pupils to test their performance in Mathematics.



Validity and Reliability

The instrument were validated by specialists in the field of Teacher Education. After vetting the TMSCQ, some items were added while some

were restructured. Cronbach Alpha coefficient was used to test reliability of the instrument and the reliability coefficient of 0.72 was obtained.

Results

Hypothesis 1: There is no significant relationship between teachers' Mathematics self-concept and pupils' performance in Mathematics.

Table 1: Teachers' Mathematics self-concept and pupils' performance in Mathematics

		Self- concept	Performance
Self- concept	Pearson Correlation	1	.034
	Sig. (2-tailed)		.735
	N	100	100
Performanc e	Pearson Correlation	.034	1
	Sig. (2-tailed)	.735	
	N	100	100

** . Correlation is significant at the 0.05 level (2-tailed).

Hypothesis 1 was to test whether there is any significant relationship between teachers' Mathematics self-concept and performance of primary school pupils' in Mathematics. From table 1 above, the calculated value of 0.034 was statistically low, significant at p

>.05 two tailed testing. It was established that there was a low correlation between teachers' mathematics self-concept and primary school pupils' performance in Mathematics.

Hypothesis 2: There is no significant difference between teachers' Mathematics self-concept and the teaching of Mathematics based on gender.

Table 2: Teachers' Mathematics self-concept and learning of Mathematics based on gender

Group	N	Mean	SD	Df	tcal-value	P-value
Male	26	2.88	0.252	98	0.78	0.05
Female	74	3.02	0.241			



The result in table 2 showed that the t-cal was 0.78 compare with p-value of 0.05, this means that there is no significant difference between teachers' Mathematics self-concept and the learning of Mathematics based on gender; therefore the null hypothesis is not rejected.

Discussion

It was revealed in table 1 that teachers' Mathematics self-concept has a low significant relationship on pupils performance in Mathematics in the study area. This confirms the assertions that teachers' Mathematics self-concept may not determine the performance of primary school pupils in Mathematics. The result is not in line with the study of Timmerman, Sylke, Van Luit (2017) who found a significant positive correlation between Mathematics self-concept and Mathematics achievement. The result shows that teachers' Mathematics self-concept does not influence the performance of pupils' in Mathematics. The result also shows that there is no significant difference between teachers' Mathematics self-concept and the learning of Mathematics based on gender which is not in consonance with Ching and Hsin (2018) who found that Mathematics self-concept significantly predicts Mathematics achievement and also shows significant gender variation with respect to Math self-concept and Mathematics achievement where boys had significantly higher Math self-concept than girls, whereas girls exhibited higher Mathematics achievement than boys which calls for

more information about gender differences in Mathematics self-concept and Mathematics achievement.

Recommendations

Based on the findings the following recommendations were made:

- Educational programme developers and designers should make teachers' Mathematics self-concept an educational aim as important as academic achievement;
- Mathematics teachers and students should be encouraged and motivated to develop Mathematics self-concept so as to improve their teaching and performance respectively.



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