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ACHIEVEMENT MOTIVATION AS PREDICTOR OF STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS SUBJECT: A CASE STUDY OF SELECTED SECONDARY SCHOOLS IN OREDO LOCAL GOVERNMENT AREA, EDO STATE

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ABSTRACT

This study examined the influence of academic motivation on performance in Mathematics. Three hundred andTwenty-five (325) Senior Secondary 2 students in Edo State were used for the study. Mathematics motivation questionnaire was used to collect data from the students. Linear regression, Pearson product moment correlation and Fishers z statistics were used for data analysis. The results show that academic motivation significantly predicts students' achievement in Mathematics subject and there is a significant difference in the relationship between academic motivation and achievement of male and female students in Mathematics subject. The paper recommended that Mathematics teachers should device modern methods of teaching to arouse students' interest in learning Mathematics.

Keywords: *Motivation, Predict, Academic motivation, Performance in Mathematics and Gender Difference*

Introduction

Mathematics is one of the most essential subjects in secondary schools. The knowledge embedded in this subject is vital to every individual. That is why in the curriculum plans in Nigerian schools; this subject is put to the topmost priority. The importance of Mathematics is obvious in several aspects like in the public examinations, in the fields of engineering, business, technology and administration. Until now, students still have the perception that Mathematics is the most difficult subject. This is proven with the students' lack of confidence in their mathematical answers. They constantly seek for confirmation on their answers from the teachers and parents (Ozmen, 2014)). Therefore, a student's readiness is vital for a more effective teaching. Motivation is an individual's internal status toward something. It has power to enhance the strength of the relationship between the input and the output of human behavior. Motivation refers to the reasons for directing behavior towards a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the goal.

The factors that will influence the extents of an individual's motivation include the types and intensity of needs and psychological process (Kleinginna & Kleinginna,2011). Pintrich and De Groot (2010) proposed a motivation model named as social cognitive model of motivation. In this model, they asserted that the intensity of

an individual's motivation will trigger him or her to execute good or bad learning strategies. Both motivation and learning strategies affect student's learning performance (Lee & Anderson, 2013; Lee & Brophy, 2016). The components of motivation in this model are value, expectancy, and affect (Pintrich & Schrauben, 2012; Pintrich, Smith, Garcia, & McKeachie, 2016). The researcher believed that issues of value will be influenced by intrinsic goal orientation, extrinsic goal orientation, and the task value; issues of expectancy will be affected by self-efficacy for learning and performance and control beliefs for learning.

Achievement motivation has been defined as the extent to which individuals differ in their need to strive to attain rewards, such as physical satisfaction, praise from others and feelings of personal mastery (McClelland, 2015).The motivation to achieve, however may evidence itself only in behaviour that children value. Individuals' actual achievement behaviour depends not only on their motivation to achieve but also on whether they expect to achieve and whether they fear failure. People are more likely to work hard when they perceive a reasonable chance to succeed than when they perceive a goal to be out of reach (Atkinson, 2006).

Children's expectations of success can be measured by asking them to predict a certain grade, indicate how sure they are that they can solve a particular problem, and select the hardest task they think they can do from a collection of tasks varying by degree of difficulty (Philips, 2007).Children with high expectation for success on a task usually persist at it longer and perform better than children with low expectations (Eccles, 2008). Researchers like (Carr, Clark & Cheung, 2010) have found that children with high IQs and high expectations of success in school do, in facts get the highest grades.

Children with high IQs and children with low IQs and low expectations receive lower grades than children with low IQs and high expectations. In addition to childrearing practices, reviewed previously, teaching styles and communication pattern affect children's attributions. When teachers are caring and supportive and emphasize the teaching learning process over the performance outcomes, and when they give feedback, students tend to be motivated to achieve and to expect success (Daniels, Kalkman, & McCombs, 2014). Motivation experts have divided this concept into two main categories, namely intrinsic and extrinsic. Components of intrinsic motivation involve internal and personal incentives, creating sufficient attraction for performing an activity. In contrast, components of extrinsic motivational involve external incentives influencing the individuals to try and achieve an independent goal (Reeve, 2014).

Weiner (2016) has presented the most ambitious attribution theory of achievement motivation and emotions. This theory deals with the perceived causes of success and failure, the characteristics of causal thinking, and subsequent emotional experiences in relation to achievement behaviors. Another important leap in motivational research is goal orientation theory. The basic premise of achievement goal orientation theory (Elliot and McGregor, 2011) is that when students engage in academic tasks, they set various personal goals and the types of goals that students adopt can directly influence their academic achievement. Academic achievement refers to particular learning in a

particular setting which is defined by examination marks, teachers' given grades and percentiles in academic subjects (Chowdhury & Pati, 2016). School success depends upon the ability of the students to qualify such examinations. For present study Academic performance is defined as that which is indicated by the total marks in Mathematics subject obtained by the students out of100, in their examinations. Subramaniam (2009) examined the motivational effects of interest on student engagement and learning in physical education. The power of situational interest as key motivator in the enhancement of student engagement in meaningful learning process was emphasized. He posited that situational interest has the potential of influencing interest in learning and predicting future skills intention.

Lee, Chao and Chen (2011) used Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to ascertain the extent to which teacher's instructional attitude affects student learning outcomes through interaction with either students' interest in learning or the number of their learning hours in Taiwanese vocational colleges. Results revealed that when Taiwanese vocational college students have a satisfied attitude towards their teachers, both interest in learning and learning hours produce positive and significant interactive influence on the learning and their academic achievement. Ayub (2010) investigated the relationship between intrinsic and extrinsic motivation on the academic performance of 200 students (100 male; 100 female) and found gender difference ($t=4.324$, $p<.05$) on both motivation and academic performance. Specifically, the findings revealed that females were more intrinsically motivated, whereas, males were more extrinsically motivated.

Amrai, Motlagh, Zalani and Parhoon (2011) explored the correlation between academic motivation and academic achievement among Tehran University students. Two hundred and fifty-two (252) Tehran University students were required to fill the academic motivation questionnaire. This 43-item questionnaire measured 8 aspects of motivation. Criterion for academic achievement was a mark which students themselves reported. The result of the study indicated positive and significant correlation between Academic Motivation and Academic Achievement. Arbabisarjou1, Zare, Shahrakipour & Ghoreishinia(2016)investigate the relationship between academic achievement motivation and academic performance among medical students. The results showed that there is a significant relationship between academic achievement motivation and academic performance. This indicates that motivational factors play an important role in academic achievement. Firouznia, Yousefi and Ghassemi (2009) compared the means of two groups of students in academic motivation factors, revealing that boys had higher motivation, effort and competitiveness. The probable reason was that men had heavier responsibilities in the future such as housing, living costs and family or desire of career success. This could also be due to the need to take responsibility among boys in the future and finding a suitable job that requires more effort to be successful in education.

Statement of the Problem

It has become increasingly common to find youths who have written their Senior Secondary Certificate Examination (SSCE), conducted by the West African Examination Council (WAEC) but could neither fit into the tertiary institutions of learning nor the labour market in Nigeria because their academic achievement (performance in the SSCE) was poor, not up to the minimum required five credit passes that include English Language and Mathematics for admission. Mathematics is one of the most important branches in science and had been regarded as a difficult subject for young students by Mathematics teachers, researchers, and educators (Ozmen, 2014). Some students cannot score good results in Mathematics because they lack the motivations that will push them in learning Mathematics. The bulk of behaviors indicating the academic motivation involve insisting on doing difficult assignments, hardworking or effort into learning to reach mastery and choosing assignments which need great effort.

Motivation to learn Mathematics at the Senior Secondary School level is one of the most important predictors of Mathematics course success. Moreover, motivational damages on one hand caused a kind of pessimism, anxiety and depression and on the other hand resulted in academic performance failure in students (Askari, 2016). Consistent with these results, researchers argue that in order to create academic motivation, education should be presented in appropriate context with desirable facilities concerning the learners' needs (Javadi, Adhami, Haghdoost, 2016). In Nigeria, particularly in Edo State, attention has also been, more or less, paid to this phenomenon. However, a few researchers in the academic field have studied the role of academic motivation in student's performance. Concerning the existing gap in the academic motivation of students, this study examined the relationship between academic motivation and students' performance in Mathematics.

Research questions

To carry out this study, the following research questions were posed;

1. Does academic motivation predict students' performance in Mathematics subject?
2. Is there any difference in the relationship between academic motivation and achievement of male and female students in Mathematics subject?

Hypotheses

The research questions were hypothesized as follows:

1. Academic motivation does not significantly predict students' performance in Mathematics subject.
2. There is no significant difference in the relationship between academic motivation and achievement of male and female students in Mathematics subject.

Research Method

This research is an ex-post facto design in the sense that the researchers do not have direct control over independent variables because their manifestations have already occurred or because the independent variables were not manipulated. The investigators therefore examined the impact of motivation (independent variable) on public secondary schools students'

achievement in Mathematics. The target population for the study comprised 3,246 Senior Secondary 2 (SS2) students in Oredo Local Government Area, Edo Sate, Nigeria. There are 13 public secondary schools in Oredo Local Government Area, Edo State. The study's sample was 325 secondary school students drawn from 4 randomly selected public secondary schools in Oredo Local Government Area, Edo State. In carrying out this study, the investigators used Mathematics Motivation Questionnaire (MMQ). The MMQ instrument is an adapted version of Liu and Lin (2010). The Mathematics Motivational Questionnaire (MMQ) has six motivational components, each component has five-item five point scale and their associated items included intrinsic goal orientation, extrinsic goal orientation, task value, control beliefs for learning, self-efficacy and test anxiety. It consists of four point Likert type items (strongly disagree (1), disagree (2), agree (3), and strongly agree (4)). The Cronbach alpha coefficient of the Mathematics motivational questionnaire was 0.87. On the basis of the magnitude of the coefficient, the instrument was found to be adequate for testing purposes and was subsequently group administered by the researchers with the assistance of the various class teachers whose classes were used for the study. The completed questionnaires were collected and scored accordingly. Students' Mathematics achievement scores in their third term 2014/2015 sessions were collected from the Mathematics teachers of the selected schools; the students' scores were standardized by the researchers for uniformity.

Data Analysis and Results

Data collected on the study were analyzed using inferential statistics which includes; Linear Regression, Pearson Product Moment Correlation and Fisher's Z statistic.

Presentation of Results

Hypothesis One: Academic motivation does not significantly predict students' performance in Mathematics subject

Model		Sum of Squares	Df	Mean Square	F	Sig. (2-tailed)
1	Regression	892.718	1	892.718		
	Residual	53963.762	323	167.070	5.343	0.021
	Total	54856.480	324			

$\alpha = 0.05$; R= 0.128; R Square= 0.016

Table 1 shows an F value of 5.343 and a p value of 0.021. Testing the hypothesis at an alpha level of 0.05, the p value is less than the alpha level, so, the null hypothesis which states that academic motivation does not significantly predict students' performance in Mathematics subject is rejected. Consequently, academic motivation significantly predicts students' performance in Mathematics subject.

Hypothesis Two: There is no significant difference in the relationship between academic motivation and achievement of male and female students in Mathematics subject.

Table 2: Correlation of academic motivation and academic performance by gender

Variable	N	r	Zr	Zcal	Ztab
Male	122	0.886	1.4219		
	5.36	1.96			
Female	203	0.674	0.8107		

$\alpha = 0.05$

The Table 2 above shows the correlation of academic motivation and academic performance by gender. The coefficient values of males and females are 0.886 and 0.674 respectively, testing at an alpha level of 0.05, the calculated Z value of 5.36 is greater than the critical value of 1.96. With this, the null hypothesis is rejected. It is therefore concluded that there is a significant difference in relationship between academic motivation and academic performance by gender.

Discussion of Findings

Result from hypothesis one revealed that academic motivation significantly predicts students' performance in Mathematics subject. This finding is in agreement with the findings of Lee, Chao and Chen (2011) who found that interest in learning produces positive and significant interactive influence on the learning and academic achievement of students. Wormington, Corpus, & Anderson (2011) also found out that students with high quantity and good quality motivation were equally successful, while Skaalvik & Skaalvik (2006) revealed a significant relationship between academic performance and motivation. Research findings of Awan, Noureen, &Naz, (2011) also revealed that achievement motivation and self -concepts are significantly related to academic achievement. A child, who is successful in school, possesses a high academic performance or achievement must be academically engaged as academic engagement is required for success in school.

Result from hypothesis two revealed that there is a significant difference in relationship between academic motivation and academic performance by gender. Academic motivation may be the cause of the difference in academic achievement. This is consistent with previous research which found that gender difference was significant when the influence of motivation on academic achievement was evaluated in male and female students (Tella, 2007). Hence, it can be said that academic motivation of students plays an important role in determining their academic achievement. Sartawi, Alsaware, Dodeen, Tibi & Alghazo (2016) investigated the extent to which self-efficacy and motivation served as a predictor for Mathematics achievement of fifth grade students in United Arab Emirates (UAE) across gender and achievement levels. Self-efficacy was measured by two scales, which differed in levels of specificity—Category Specific and Task Specific. Motivation was measured through four sub-constructs of motivation—A motivation, External Regulation, Interjected Regulation, and Intrinsic Motivation. The multiple regression model showed that the six predictors were able to explain together high percentage (32%) of the variance of mathematics achievement. Also the results indicated that

the best three predictors were Task Specific, External Regulation, and Intrinsic Regulation. When conducting the regression model across gender, the results showed that 30% of the variance in mathematics achievement was explained by the six predictors for the male group while only 21% of the variance was explained for the female group. The regression model was not invariant across achievement levels. While the model predicted approximately 20% of the variance of mathematics achievement for each of the low and high achieving students, the model was not statistically appropriate for the medium achievement students as it predicted only 5% of the variance of mathematics achievement. Additionally, the performance of the six predictors varied according to the achievement level.

Conclusion

Based on the results of the study, it can be concluded that achievement motivation has a great impact on academic engagement, that when students are motivated, they become engaged in academic work, which eventually results in good academic performance, or success. It could also be concluded that school authorities especially counselors and teachers should be aware of the link between academic motivation and academic achievement in students. When the students understand that their failures are a result of effort rather than ability, they will probably exhibit a greater persistence to overcome their failures rather than developing an attitude of helplessness.

Recommendations

Based on the conclusion, the following recommendations are made:

1. Mathematics teachers should device modern methods of teaching to arouse students' interest in learning Mathematics. Inadequacy and inappropriateness of the instructional methods and materials used for teaching-learning interactions may only handicap academic performance by blocking students' interest in learning and worsening their attitude to school.
2. Teachers and parents should try and build self-confidence in their wards/students as it could boost students' interest in learning and improve their attitude towards school.
3. Students should be adequately motivated in their studies so as to do well not only in examinations but in the setting and attainment of excellent life-long goals.
4. Both Local Government Authority and school authority should organize debates and other competitions as this will help to motivate students.

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