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ACHIEVEMENT MOTIVATION AND ACADEMIC ENGAGEMENT OF PUPILS IN MATHEMATICS CLASSROOM

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Abstract
The study investigated impact of achievement motivation and academic engagement of pupils in mathematics classroom in Imo State of Nigeria. Based on the purpose of the study three research questions and three hypotheses guided the study. Quasi experimental research design was adopted for the study. The population of the study comprised the entire primary 6 pupils in the three education zones of Imo State. A sample size of 540 pupils was selected using Multi – stage sampling technique. The instruments used for data collection was Achievement Motivation Questionnaire (AMQ) and Academic Engagement Test (AET). The validity of the instruments was done by experts in mathematics education and measurement and Evaluation. The reliability coefficient of 0.76 and 0.86 was determined using Cronbach alpha reliability method. Data collected were analyzed using mean and standard deviation for the research question while the hypotheses were tested using t-test and ANOVA at 0.05 level of significant. The results showed that level of achievement motivation has a significant impact on academic engagement of pupils. A greater number of pupils in the study were moderately motivated (294), some were highly motivated (180), while the least number (66) were lowly motivated. In addition, pupils who were highly motivated were the most academically engaged in the group, followed by those who were moderately motivated and lastly by those who were lowly motivated, gender has a significant influence on achievement motivation of pupils, with males being more highly motivated than females and also indicated a significant influence of age on achievement motivation of pupils, with older pupils being more achievement motivated than others

Keywords: Achievement motivation, Academic engagement and mathematics classroom

Introduction

Globally, there has been an increasing concern in the education sector on how to ensure that learners learn optimally at school and achieve academic excellence in their academic pursuit. In Nigeria, there has been a nationwide cry on the fallen standards of education and poor performance of pupils in examinations. Various factors have been identified for low academic achievement among learners and these include poor study habit, laziness, ineffective classroom instructions, and inadequate provision of instructional resources and among others (Akpan, 2000). Also Jones (2008) opined that lack of motivation is a big hurdle in learning and a pertinent cause in the deterioration of education standards and poor performance of learners especially in mathematics.

Motivation is a strong force in achievement. Moula (2010) observes that motivation is one of the factors that contribute to academic success; that parents and teachers should strive to understand the importance of promoting and encouraging academic motivation early in life. Feldman (2005) refers to motivation as factors that direct and energize the behaviour of humans and other organisms, while Wood (2002) sees motivation as a process that initiates, directs, and sustains behaviours to satisfy physiological or psychological needs. Motivation is also seen as what gets one going, keeps one going, and determines where one is going (Slarin, 2006). Motivations are of two major types, intrinsic and extrinsic.

Intrinsic motivation is an inner force that motivates learners to engage in academic activities, because they are interested in learning and they enjoy the learning process as well (Schiefele, 1991). Harter (1978) explained that intrinsic motivation is the true drive in human nature, which drives learners to search for and to face new challenges. Their abilities are put to the test and they are eager to learn even when there are no external rewards to be won. Pupils with learning goals of seeking understanding for mastery of science content and skills are said to be intrinsically motivated (Cavallo, Rozman, Blinkenstaff, & Walker, 2003).

Csiksezentmihalyi and Nakamura (1989) stated that intrinsically motivated learners possess the following characteristics: They engage in both mental and physical activities holistically, they remain highly focused throughout these activities with clearly defined goals, they are self-critical, they self-reflect on their own actions realistically, and they are usually relaxed and not afraid to fail during learning. A research study done by Stipek (1988) concluded that intrinsically motivated pupils learn independently and always choose to do challenging tasks.

They persevere to complete the tasks they have undertaken. They integrate their knowledge acquired in school with their experiences gained from outside school. They often ask questions to broaden their knowledge and learn regardless of any external push factors or help from teachers, and they take pride in their work and express positive emotions during the learning process. Highly intrinsically motivated pupils are able to learn new concepts successfully and show better understanding of the subject matter (Stipek, 1988).Unlike intrinsic motivation; extrinsic motivation drives learners to engage in academic tasks for external reasons.

Extrinsic motivators include parental expectations, expectations of other trusted role models, earning potential to enroll in a course later and good grades. According to Benabou and Tirole (2003), extrinsic motivation promotes effort and performance with rewards serving as positive reinforcement for the desired behavior. Extrinsic motivation typically produces immediate results and requires less effort in comparison to intrinsic motivation (Ryan & Deci, 2000). The down side of it is that extrinsic motivators can often distract learners from true independent learning. Another problem with extrinsic motivators is that they typically do not work over the long term. Once, the rewards are removed, pupils lose their motivation (DeLong & Winter, 2002). As extrinsically motivated, learners tend to focus on earning higher grades and obtaining rewards, Biehler and Snowman (1990) believed that extrinsic motivational factors can diminish pupils' intrinsic motivation. Such observation has also been reported by Bain (2004) who concluded that extrinsic rewards have negative impacts on intrinsic motivation**.**

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 (Mc Clelland, 1985). Individuals with high achievement motives usually act in ways that will enable them to outperform others, meeting or surpassing some standards of excellence or do something unusual (Schmidt & Frieze, 1997).

All students are influenced by a need to achieve to a certain degree (Awan, Noureen & Naz, 2011). Those pupils, who had a high desire of success, work hard to achieve (Zenzen, 2002). Achievement motivation could be seen as self- determination to success in whatever activities one engages in, be it academic work, professional work, sporting events, among others (Tella, 2007). Gestinde (2000) points out that the urge to achieve varies from one pupil to another while the need to achieve is very high in some learners, it may be very low for others based on socialization processes and learning experiences. Moula (2010) links academic to achievement motivation and

sees this as the need or desire to excel in academic work as pupils who are motivated are likely to perform well in their examinations. It has been observed in the primary school that teacher don't engage the learners in a meaningful task (Seidman & French, 1997).

Furrer and Skinner (2003) see engagement as referring to active, goal-directed, flexible, constructive, persistency and focused interactions with the social and physical environments. Engagement in school (academic engagement) is said to be an important academic outcome in its own right as it improves performance and validates positive expectations about academic abilities, as well as a good predictor of children's long-term academic achievement (Skinner, Zimmer-Gembeck & Connell, 1998); Student engagement is an important study field of education psychology. Engagement requires not only being active but also feeling and sense making (Harper & Quaye, 2009). Bomia and colleagues (1997) define academic engagement as learners' willingness, needs, desire motivation and success in the learning process. Hu and Kuh (2001) and Kuh (2009a) refer to academic engagement as the time allocated by learners to educational activities to contribute to the desired outcomes and as the quality of their related efforts. According to Stovall (2003), academic engagement includes not only the time pupils spend on tasks but also their willingness to take part in activities. Krause and Coates (2008) associated academic engagement with the high quality in learning outcomes. All these definitions could be said to have common points for each school level.. In this respect, academic engagement was defined by Gunuc and Kuzu (2014) as "the quality and quantity of students' psychological, cognitive, emotional and behavioral reactions to the learning process as well as to in-class/out-of-class academic and social activities to achieve successful learning outcomes." Academic engagement involves pupils' cognitive, emotional and behavioral responses to in-class and out-of-class activities.

Cognitive engagement includes investment in learning, value given to learning, learning goals, self-regulation and planning. Cognitive engagement has an important relationship with learning motivation. Cognitive engagement refers to learners who invest in their own learning, who accordingly determine their needs and who enjoy the mental difficulties (Gunuc & Kuzu, 2014; Fredricks et al. 2004). Emotional engagement involves learnerss' responses to the teacher, peers, course content and to the class which all include attitudes, interests and values (Bryson & Hand, 2007; Gunuc & Kuzu, 2014). In addition, such emotions as sense of belonging to school, loving the school and feeling oneself to be a member of a group are also examined within the scope of emotional engagement (Fredricks et al. 2004). Behavioral engagement includes learners'

participation in academic, their efforts, their attendance in classes and their participation in class (Gunuc & Kuzu, 2014). The basic of behavioral engagement could be said to be related to class activities. The campus (out-of-class) and social activities are also examined within the scope of behavioral engagement (Fredricks et al. 2004).

In a study on impact of motivation on students' academic achievement and learning outcomes in mathematics among secondary school students in Nigeria, Tella (2007) discovered that gender difference were significant when impact of motivation on academic achievement was compared in male and female students. In addition, other result indicates significant difference when extent of motivation was taken as variables of interest on academic achievement in mathematics based on the degree of their motivation. Cheung (1998) carried out a study in which he hypothesized that conceptions of success of achievement goal affect both inclination to and actual performance. A sample of 673 Chinese adolescents was used in testing the hypothesis. The result indicated sex differences in the conception of success. As part of larger project concerned with motivation factors in educational attainment of Asian girls, Siana, Ligthbody, Stock, and David used 985 secondary school students in London and England as their sample. They found that Asian students of both sexes rated parents and friends as more important in contributing to academic success.

In another study, Skaalvik and Skaalvik (2006) revealed significant relationship between academic performance and motivation. In Nigeria, a study carried out by Ajayi (1999) on achievement motivation using 276 students revealed that there is an agreement between academic performance and motivation.

Awan, Noureen and Naz (2011) examined achievement and its relationship with achievement motivation and self-concept. The sample consisted of 336 secondary schools (146 males and 172 females). The results revealed that achievement motivation and self-concept are significantly related to academic achievement. Significant gender differences were discovered which were in favour of girls.

In line with this proposition, the study is carried out to investigate the impact of achievement motivation on academic engagement of pupils in mathematics classroom. The influence of gender and age on achievement motivation of pupils was also determined.

Purpose of the study

The main purpose of the study is to examine the impact of achievement motivation and academic engagement of pupils in mathematics classroom. Specially it seek to determine the

i. Pupil's achievement motivation on academic engagement in mathematics classroom.

ii. Male and female pupils achievement motivation on academic engagement in mathematics classroom

iii. Age of pupil's achievement motivation on academic engagement in mathematics classroom.

Research questions

1. What are the mean scores of pupils' achievement motivation on academic engagement in mathematics classroom?

2. What are mean scores of male and female pupils achievement motivation on academic engagement in mathematics

3. What are mean scores age of pupils' achievement motivation on academic engagement in mathematics.

Hypotheses

The following research hypotheses were tested at 0.05 level of significance.

Ho_1: Achievement motivation has no significant impact on academic engagement of pupils in mathematics classroom.

Ho_2: Gender has no achievement motivation of pupils in mathematics classroom

Ho_3: Age has no significant influence on achievement motivation of pupils in mathematics classroom.

Methodology

The study was a quasi-experimental research type adopting pre-test, post-test, non-equivalent control group design. The population for this study comprised of all the 7,343 primary

four, five and six pupils in all the public primary school in Imo State. The sample for this study consisted of five hundred and forty (540) pupils randomly drawn using multi-stage stratified random sampling technique from schools in Imo State. Three education zones are identified in the state and were used as the first stratum. From the three education zones, three local governments were each selected making a total of 9 and from each local government area, two schools were randomly selected. From the eighteen schools, one was selected from each class of primary 4, primary 5 and primary 6. The study includes males and females whose age ranged from 12 to 22 years. The instruments for the study were researcher's constructed questionnaire named Achievement Motivation Questionnaire (AMQ) and Academic Engagement Test (AET). Items in the instrument that measured achievement motivation were constructed by the researchers. The instrument was divided into two parts, the first part sought information on the respondents demographic data like sex, age, class, and school, while the second part consisted of two sections. Section 1 contained 15 items for measuring achievement motivation (e.g "I always have great satisfaction after a job well done"). The pupils rated each item on a 4 point type scale of very untrue of me 1, untrue of me 2, true of me 3, and very true of me 4. The second section contained 12 items that measured academic engagement. Pupils were instructed to evaluate their academic engagement using a four point scale, ranging from 1 (strongly disagreed) to 4 (strongly agreed). The instrument was face validated by experts in measurement and evaluation and was adjured to be content valid. The reliability of the instruments was determined by pre-testing it on 50 respondents who did not form part of the sampled respondents and internal consistency reliability using Cronbach alpha was calculated. The reliability coefficient of 0.92 and 0.88 were obtained for achievement motivation and academic engagement respectively. The researchers visited the participating schools and the pupils were asked to assemble in their assembly hall where the

questionnaires were distributed. With the assistance of the teachers in the various schools, instructions on how to respond to the questionnaire were read to the respondents. This was to ensure that the questionnaires were properly filled. After properly filing the questionnaire, it was collected on the spot from the respondents thus ensuring a 100% return rate

Results

Research Question1. What are the mean scores of pupils' achievement motivation on academic engagement in mathematics classroom?

Table 1. Summary of pupils mean scores and standard deviation.

Levels of Achievement Motivation	N	MEAN	SD
LOW MOTIVATED	66	20.74	2.20
MODERATE MOTIVATED	294	26.45	1.92
HIGH MOTIVATED	180	38.83	4.35

Result in table 1 reveals that highly motivated students (X = 34.83, SD=4.35) were more academically engaged followed by moderately motivated students(X=26.45; SD=1.92) while lowly moderated students (X=20.74; SD=2.20) were less academically engaged.

Research Question 2; what are mean scores of male and female pupils' achievement motivation on academic engagement in mathematics.

Table 2; summary of pupils mean scores on Achievement Motivation

GENDER	NUMBER	MEAN	SD
MALE	227	47.74	4.31
FEMALE	313	43.57	6.07

Result in table 2 further reveals that male students (X=47.74; SD=4.31) were more highly motivated than their female counterparts(X=43.57; SD=6.07).

Research Question 3; What are mean scores age of pupils' achievement motivation on academic engagement in mathematics.

AGE LEVELS	N	MEAN	SD
12-14	**94**	**40.13**	**6.29**
15-17	**263**	**45.03**	**5.15**
18 AND ABOVE	**183**	**48. 41**	**4.09**

Results table 3 further reveals that pupils aged between 18 and above were more achievement motivated (X=48.41; SD=4.09); Followed by those within the age limit of 15-17 years (X=45.03; SD=5.15) and those within the age limit of 12-14 years(X=40.13; SD=6.29) were less achievement motivated.

Testing the Hypotheses

Ho1: This hypothesis stated that achievement motivation has no significant impact on academic engagement of students in Nigerian classroom.

Table 4 .ANOVA on levels of Achievement Motivation.

SOURCE OF VARIANCE	SS	DF	MS	F	DECISION
Between Group	**2**	**12431.68**	**6215.84**		
Within Group	**536**	**4778.25**	**8.90**	**698.56**	**REJECT HO**
Total	**539**	**17209.93**			

Result as presented in table 4 reveals that there is a significant impact of levels of achievement motivation on students academic engagement [F (2, & 537) = 698.56; p< 0.05]. This result suggests that there are significant differences in academic engagement of highly motivated, moderately motivated and lowly motivated students.

HO2; Gender has no achievement motivation of pupils in mathematics classroom.

Table 5; T-test on gender Achievement Motivation

GENDER	**N**	**MEAN**	**SD**	**t-cal**	**t-crit**	**DECISION**
MALE	227	47.74	4.31	8,85	1.96	REJECT HO
FEMALE	313	43.57	6.07			

Table 2 presents the result of the analysis of the difference in gender on achievement motivation. The result clearly reveals that significant difference exists in the achievement motivation of male

and female students (t-cal=8.85; t-crit= 1.96;df = 538 at 0.05 alpha level). This leads to the rejection of the null hypothesis while the alternate hypothesis was upheld

HO3; Age has no significant influence on achievement motivation of pupils in mathematics classroom.

Table 6; ANOVA on Age Levels of Pupils Achievement Motivation

SOURCE OF VARIATION	SS	DF	MS	F	DECISION
BETWEEN GROUP	**4302.86**	**2**	**2151.43**	**84.49**	**REJECT**
WITHIN GROUPS	**13673.42**	**537**	**25.46**		**HO**
TOTAL	**17976.29**	**539**			

Results in table 6 indicated that F-ratio of 84.49 which was found to be significant at 0.05with 2 and 537 degrees of freedom. This led to the rejection of the null hypothesis and upholding the alternative hypothesis which states that there is a significant difference in achievement motivation based on age.

Discussion

The result shows that level of achievement motivation has a significant impact on academic engagement of pupils. A greater number of pupils in the study were moderately motivated (294), some were highly motivated (180), while the least number (66) were lowly motivated. In addition, pupilss who were highly motivated were the most academically engaged in the group, followed by those who were moderately motivated and lastly by those who were lowly motivated. This result is in agreement with previous studies Wormington et al., (2011); Skaalvik et al, (2006) and Awan et al., (2011). Wormington et al., (2011) also found out that pupils with high quantity and good quality motivation were equally successful, while Skaalvik et al. (2006) revealed a significant relationship between academic performance and motivation. Research findings of Awan et al. (2011) also revealed that achievement motivation and self-concept are significantly related to academic achievement. Academic success, academic performance and academic achievement are all indicators of academic engagement. 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.

It was also found out in the study that gender has a significant influence on achievement motivation of pupils, with males being more highly motivated than females. This result is in agreement with the study of Tella (2007) who discovered that gender differences were significant when impact of motivation on academic achievement was compared in male and female pupils.

Cheung (1998) also confirmed sex differences in the conceptions of success in achievement goal of Chinese adolescents. Moreover, Awan et al (2011) revealed that significant gender differences existed when achievement motivation and self-concept were related to achievement in English and Mathematics which were however in favour of the male gender as the preferred sex. This attracts more attention and care to the male child which also fosters achievement motivation.

Finally, the result of the study also indicated a significant influence of age on achievement motivation of pupils, with older pupils being more achievement motivated than others. This result is in line with the findings of Wormington et al. (2011) which revealed that motivational profiles may be differentially adaptive for different age groups. In the present study, pupils in the group of late adolescents were found to be the most achievement motivated, followed by those in the middle adolescence period and lastly, those in the early period of adolescence.

Conclusion

Based on the results of the study, it can be concluded that achievement motivation has a great impact on academic engagement, that when pupils are motivated, they become engaged in academic work, which eventually results in good academic performance, or success. Getting pupils achievement motivated to enable them deal with academic setbacks, stress and pressures is a major challenge in the Nigerian classroom.

Recommendations

The following recommendations are hereby made to increase the level of achievement motivation in pupils for proper academic engagement and subsequent achievement.

1. Parents and guardians should inculcate the desire to achieve early in the life of their children by providing adequately for their needs, as well as encouraging them both intrinsically and extrinsically to achieve their goals.

2. Teachers must show concern for pupils' low level of performance in the classroom. They must begin to reflect on the factors that contribute to pupils' engagement and use motivational strategies to involve pupils in academic activities for improvement of their levels of achievement.

3. Educators as well as policy formulators must re-examine grading policies both at the school wide and classroom level to ensure that the reward system provides a situation in which pupilss are encouraged to work hard.

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