RELATIONSHIP BETWEEN LOCUS OF CONTROL AND ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS IN MATHEMATICS

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Abstract
*The study examined the relationship between locus of control and academic achievement of students in Mathematics in Delta State, Nigeria. Three research questions were raised and two hypotheses were formulated and tested at the 0.05 level of significance. The study adopted correlational and expo-facto research designs. The population of the study comprised four thousand two hundred and seventy-five (4275) senior secondary schools (SSS2) students in Ethiope East Local Government Area of Delta State. A simple random sampling technique was used to select an arm of SS2 from each school sampled to give a sample size of one hundred and eighty-seven (187) students. The research instruments used to collect data were school terminal results and a structured questionnaire titled "Locus of Control Questionnaire (LCQ)". The reliability coefficient of the LCQ was 0.698 using Cronbach alpha statistic. The data were analyzed using mean, Pearson Product Moment Correlation Coefficient and independent t-test statistics. The major findings of the study are as follows: The mean achievement level of internal and external locus of control students in Mathematics is high. There is a strong positive and significant relationship between locus of control and academic achievement of students in Mathematics. There is a significant difference between internal and external locus of control students on their academic achievements in Mathematics in favour of internal locus of control students. It is concluded that there is a relationship between locus of control and academic achievement of students in Mathematics. It is recommended that schools should establish and promote counselling services to enable students to be conscious of the internal and external dimensions of locus of control that c*ould affect their academic achievement.
Keywords: Locus of Control, Internal Locus of control, External Locus of Control, Academic Achievement, Mathematics

Introduction

Locus of control is a theory in personality psychology referring to the extent to which individuals believe that they can control events that affect them. The

understanding of this concept was developed by Julian Rotter (Rotter,1954;1966; 1975), and has since become an aspect of personality studies. It involves the extent to which individuals believe their lives can be controlled by themselves or external factors. An individual can be classified as having either an internal locus of control or an external locus of control, and both evaluate successes and failures differently. Individuals with an internal locus of control believe that they can control their life events because their behaviour is determined by internal factors like hard work, decision-making, problem solving skills, effort, and persuasion. Students with an internal locus of control hold internal factors responsible for their success or failure and as a result, they become more self-reliant in achieving their goals. Hence, they are better at problem solving in Mathematics, due to believing in their ability to do so.

Conversely, students with an external locus of control believe their behaviour is the result of external factors like luck, fate, chance, and the people around them. Therefore, students with an external locus of control limit further improvement of their own skills, abilities, strengths, and weaknesses in solving Mathematics problems by relying on external factors. Towards this end, Shinole and Joshi (2011) believe that those with external locus of control often view life as uncontrollable and difficult to cope with by holding to superstitious beliefs. Locus of control of individuals determines that their expectations of specific pressures of a position depend on their visions about that position and not on the reality about it. Those with the internal locus of control try to have control over the possible consequences of their activities (Raamefar, 2017). Students ascribe most of their difficulty to certain control that is beyond them due to their interests, behaviours, experiences and pressures they find themselves, and which have affected their academic achievements. When environmental factors are not sufficient to explain individual student successes or failures in solving Mathematics problems, locus of control dimensions can help in explaining students' achievement in school Mathematics.

Rotter has four main components to his social learning theory model that predict behaviour. These are Mathematics behaviour potential, expectancy, reinforcement value, and the psychological situation. The Mathematics behaviour potential is the likelihood of engaging in a particular behaviour in a specific mathematics' situation. In other words, what is the probability that the person will exhibit a particular behaviour in a mathematics situation? The Mathematics expectancy is the subjective probability that a given behaviour will lead to a particular outcome, or reinforce in mathematics. How likely is it that the behaviour will lead to the mathematics outcome? Having high or strong expectancies means the students is confident the behavior will result in the mathematics outcome. Having low expectancies means the students believes it is unlikely that his or her behavior will result in reinforcement in mathematics. The Mathematics Reinforcement Value is another name for the outcomes of our behavior. Reinforcement value refers to the desirability of these mathematics outcomes. The Mathematics psychological situation represents Rotter's idea that each individual's experience of the environment is unique. Although the psychological situation does not figure directly

into Rotter's formula for predicting behavior, Rotter believes it is always important to keep in mind that different people interpret the same situation differently. Different people will have different expectancies and reinforcement values in the mathematics. Thus, it is people's subjective interpretation of the environment, rather than an objective array of stimuli, that is meaningful to them and that determines how they behave.

A strength of Rotter's social learning theory is that it explicitly blends specific and general constructs, offering the benefits of each. In social learning theory, all general constructs have a specific counterpart. For every situational specific expectancy there is a cross-situational generalized expectancy. Social learning theory blends generality and specificity to enable psychologists to measure variables and to make a large number of accurate predictions from these variables. This theory is relevant to academic achievement by taking the internal locus of control as being derived from the four main predicting behaviour components (Mathematics Behaviour Potential, Mathematics Expectancy, Mathematics Reinforcement Value, and Mathematics Psychological Situation); and the external locus of control relating from the variables of gender, school type and school location as examples of environmental factors.

Locus of control is assessed on a continuum, ranging from internal to external. Individuals at the internal end of this continuum are having internal locus of control, while those at the external end are those who have external locus of control. In this study, the internal and external dimensions were assessed on a four- point Likert-like scale with values of lower extreme as internal and those of the upper extreme as external. According to Weiner, as cited in Atibuni, Ssennyonga, Olema and Kemeza (2017), an internal locus of control is necessary for enhancing responsibility and academic success in the student, while an external locus of control accounts for students' excuses for failure.

Academic achievement is a term usually employed to describe a student's performance in subjects taught and tested in schools. Oguzie, Nwokolo, Mokwelu and Ezunu (2019) viewed academic achievement as students' scholastic ability and attainment, which signifies the overall level of knowledge they have acquired in school, a subject, or a particular learning activity, process or situation. Within the context of locus of control as a correlate of students' academic achievement in secondary school, Ozuome, Oguzie, Mokwelu and Anyamene (2019) took academic achievement to indicate the level of knowledge or learning experience a student has acquired in a particular course of study and their ability to communicate when examined.

Ozuome, Oguzie, Mokwelu and Anyamene (2020) investigated the relationship between locus of control and secondary school students' academic achievement in Mathematics and English Language. The correlation research design was adopted for the study. The multi+stage sampling technique was used to select 860 (420 make and 420 female) from a population of 8,463 Senior Secondary School two (SS2) students. The instrument used for the study was Trice's Academic Locus of

Control Scale (LOS). Results from the study indicated that majority of the students have external locus of control with high achievement in English Language and Mathematics. The further showed a significant low positive relationship between secondary school students' locus of control and their academic achievement in English Language and Mathematics respectively.

Nejati, Abedi, Agbaci and Mohammadi (2017) investigated the relationship between locus of control and the academic achievements of students by considering the role of life quality and satisfaction with life. The outcome of the study revealed that locus of control significantly correlated with the academic achievements of the student. They reported a strong relationship between locus of control and academic locus of control. Ogunmakin and Akomolafe (2013) investigated academic self-efficacy, locus of control and academic achievements of secondary students in Ondo State, Nigeria. A descriptive research design was used. A sample of 364 students who were randomly selected from 10 schools participated in the study. Using multiple regression analysis, it was found that self-efficacy and locus of control jointly predicted academic achievements.

Bereket, Zebdewos and Eskinder (2019) examined the relationship between locus of control and student's university academic achievement in Wolaita Sodo University. Emphasis was put on trying to establish the relationship between internal locus of control, external locus of control and academic achievement of graduating class university students at Wolaita Sodo University. The study employed the correlation design to establish the nature of the relationships. The validity and reliability of research instruments was established and data was collected from 313 respondents selected from three colleges and two schools in the university by using the simple random sampling technique. The t-test, Analysis of Variance (ANOVA) and Pearson Product Moment Correlation statistics were used the data and establish the difference and relationship between students' locus of control and their academic achievement. Findings revealed the existence of a significant difference in academic performance in students of different age groups and gender, and significant relationship between locus of control and academic achievements.

In Nigeria, different Mathematics curricula have been developed to cater for the needs and interest of the various students in secondary school levels of education (Federal Ministry of Education, 1979; 2007). However, these curriculum innovations have not yielded the much expected improvement in school Mathematics knowledge and overall understanding and appropriate applications of mathematical knowledge and skills in solving basic social problems (Idehen, 2015). These have brought about some misconceptions of the nature of school Mathematics as a hard subject to study and the resultant students' lack of interest and poor achievement in it. Students tend to be anxious and apprehensive studying Mathematics and may feel that success/failure in the subject is beyond their control. A student locus of control status might help to explain his/her achievement in Mathematics so that parents/guardians, teachers and schools will be able to address the internal or external factors that promote school Mathematics learning.

Academic success requires a good blend of internal and external locus of control dimensions. These together could enhance a high achievement of the student in Mathematics. Studies have shown that there are some relationship between locus of control and academic achievement. However, very few studies have been done on the internal and external locus of control dimensions and academic achievement in the Nigeria context particularly from the perspective of Delta State secondary schools. The trend in the extant academic performance of students in Mathematics may have suggested some variances in the dimensions of students' locus of control and academic achievement. Therefore, this study investigated the relationship between locus of control and academic achievement of secondary school students in Mathematics in Delta State.

Statement of the Problem

Mathematics is a compulsory subject and is one of the basic entry requirements into studying professional courses such as Medicine, Architecture, Engineering and Information and Communication Technology (ICT). Mathematics appears to be a necessity for people of all ages to be successful in life endeavours. Despite the usefulness of mathematics application in daily life, there are some identified factors that adversely affect the students' ability to understand and apply mathematics concepts (TIMSS, 2000). Students excel in general knowledge acquisition but fare considerably low in acquiring Mathematical knowledge and skills, and could hardly have control over the factors influencing their performance in Mathematics. This disappointing condition is evident in the achievement of students in national and international surveys on mathematics and science competencies.

Although factors relating to curriculum and pedagogy, teachers and environment had been variously identified as affecting students' achievement in Mathematics, one wonders if factors relating to locus of control level of the students are not also responsible. Unfortunately, there are few literatures on the relationship between locus of control and academic achievement in Mathematics in Delta State. Therefore, this study sought to examine the relationship between locus of control and students' achievement in Mathematics in Ethiope Local Government Area of Delta State.

Purpose of the Study

The main purpose of the study is to examine the relationship between locus of control and students' achievement in Mathematics in Ethiope Local Government Area of Delta State. Specifically, the study sought to examine:

i. the percentage of students of internal and external locus of control dimensions;
ii. the relationship between locus of control and academic achievements; and
iii. the difference between internal and external locus control of students on their academic achievements in Mathematics.

Research Question

What percentage of the students are of the internal and external locus of control dimensions?

Hypotheses

Two hypotheses were formulated as null hypotheses and tested at the 0.05 level of significance.

1. There is no significant relationship between locus of control and academic achievement of students in mathematics.
2. There is no significant difference between internal and external locus of control students on their academic achievements in mathematics.

Methodology

The study adopted the correlational and expo-facto research designs to determine the relationship between locus of control and academic achievement of students in Ethiope East Local Government Area of Delta State. The population of the study was four thousand two hundred and seventy-five (4275) senior secondary schools (SSS2) students from 39 public schools in Ethiope East Local Government Area. The simple random sampling technique was used to select an arm of SS2 from each of the 12 schools sampled. The sample size was one hundred and eighty-seven (187) students.

The instrument for the study were the school terminal results and a modified structured questionnaire, titled " Locus of Control Behaviour Scale"(LCBS) of Rotter (1966). Academic achievement was determined from students' end of term examination scores in Mathematics for the 2019/2020 academic session. The LCBS questionnaire contained the respondents' demographics while section B contained 17 items on a 4 -point rating scale of Strongly Agree, Agree, Disagree and Strongly Disagree. The Cronbach alpha statistic was used to determine the reliability of the LCBS that yielded a coefficient of 0.698.

The data were analyzed using frequency counts, percentage, mean, standard deviation, t-test and Pearson's Product Moment Correlation statistics. For the relationship between locus of control and academic achievement, the decision rule was based on r-value where any calculated r-value between 0 and 0.20 was regarded as very low correlation; 0.20 and 0.40 was regarded as low correlation; 0.40 and 0.60 was regarded as moderate correlation; 0.60 and 0.80 was regarded as high correlation: and 0.80 and 1.00 was regarded as very high correlation (Uzoagulu, 2011). Students scoring from 17 to 42.5 on the LBCS were taken as having low locus of control and those scoring above 42.5 to 68 as having high locus of control. The null hypotheses were tested at the 0.05 level of significance.

Results

Research Question

What percentage of students are of the internal and external locus of control dimensions?

Table 1: Percentage of students of internal and external locus of control dimensions (N=187)

Variable	N	Percentage
Internal Locus	103	55.1
External Locus	84	44.9
Total	187	100.00

Table 1 showed that 103 (55.1%) of the students have internal locus of control while 84 (44.9%) of the students have external locus of control. Therefore, the number of students of internal locus of control dimension is higher than those of external.

Hypothesis

H_o1: There is no significant relationship between locus of control and academic achievement of students in mathematics.

Table 2: Test of relationship between locus of control and academic achievements of students in Mathematics

Variables	N	r	p-value	Decision
Locus of Control				
	187	0.654	0.003	Significant
Academic achievement				

Results in Table 2 showed that the Pearson correlation co-efficient between locus of control and academic achievement of the students was 0.654. This indicates a strong positive significant relationship between locus of control and academic achievements of the students in mathematics. Furthermore, the test of relationship between locus of control and academic achievement of students in mathematics shows that the p value is 0.003. Thus, there is significant relationship between locus of control and academic achievements of students in Mathematics.

Hypothesis Two

H_o2: There is no significant difference between internal and external locus of control students and their academic achievements in mathematics.

Table 3: t-test of internal and external locus of control students on their academic achievements in mathematics

Variables	N	Mean	SD	df	t	p-value	Decision
Internal locus of control	103	72.4	3.332				
				185	1.051	0.295	Not Significant
External Locus of Control	84	70.5	2.89				

The results on table 3 showed that the mean for internal and external locus of control students was 72.4 and 70.5 respectively. The standard deviation for internal and external locus of control students were 3.32 and 2.89 respectively, and the p-value was -0.295. Thus, there is no significant difference in the internal and external locus of control of students and their academic achievements in mathematics.

Discussion of Findings

Findings from this study revealed that there is a positive relationship between locus of control and academic achievement of students in mathematics. Locus of control significantly predict academic achievements. This is consistent with the findings of Nejati, Abedi, Agbaci and Mohammadi (2017) that locus of control significantly correlated with the academic achievements of the students. It was further confirmed by Ozuome et al (2020) that there exists a low but significant positive relationship between academic achievements and locus of control in Mathematics. However, Dinçyurek, Guneyli, and Çalar (2012) found no significant relationship between locus of control and academic achievement of students.

The findings further showed that internal locus of control students had higher mean score than those with external locus of control. The t-test analysis showed that there was no significant difference between internal and external locus of control students and their academic achievement. The finding of higher mean score for internal locus of control is consistent with that of Abid, Kanwal, Nasir, Iqbal and Huda (2016) who found learning performance with internal locus of control students to be high. The results of no significant difference between internal and external locus of control is in contrast with the earlier work of Knowles and Kerman (2007) that students with internal locus of control tend to perform better in academic courses compared to those with external locus of control. This finding was further contrasted by that of Shepherd, Owen, Fitch and Marsall (2006) who found that internal locus of control students reported higher GPA score than those of external locus of control.

Conclusion

Based on the findings of the study, it can be concluded that there exists a significant positive relationship between locus of control and academic achievement of students in Mathematics in Ethiope East local government area of Delta State.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. School administrators and teachers should establish and promote counselling services in their schools to enable students to be conscious of the psychological factor of internal and external locus of control dimensions that could influence their academic achievements.
2. Students also should be sensitized through seminars and workshops on the benefits of identifying their locus of control status and developing them to improve on their mathematics learning outcomes.

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