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Influence of Math anxiety and Math phobia as a manifestation for Basic General Mathematics (GSE) failure among NCE Students in Kano State College of Education and Preliminary Studies (KASCEPS) Kano

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Abstract

This research seeks to investigate the influence of Math anxiety and Math phobia as a manifestation for Basic General Mathematics (GSE) failure among NCE Students in Kano State College of Education and Preliminary Studies (KASCEPS) Kano. There is no important association between Math anxiety and Math phobia among NCE students in KASCEPS. Two research hypotheses were tested in this research, this include: There is no any significant relationship between Math anxiety and academic performance in GSE among NCE students in KASCEPS and there is no any significant gender difference in Math anxiety among NCE students in KASCEPS Kano State? Two research designs were used in this research, ex-post facto research design and correlational research design. The population of the study consists of all NCE II students in Kano State College of Education and Preliminary Studies KASCEPS. The population of NCE II in KASCEPS is 282 spread across the four schools in the college, which include: school of education, school of sciences, school of languages and school of arts. The subjects were randomly sample from the population and research advisers 2006 table for sample estimate was used to determine the sample size for the research, and this was done through hat and draw method. The questionnaire was used for data collection and two different instruments were used for collecting data for this research: the learning Mathematics Anxiety Test (L-MAT) and Mathematics Phobia Scale (MPS). The Learning Mathematics Anxiety Test (L-MAT) was adopted from the work of Yusuf Feyisara Zakariya in an article Submitted to the Journal of Pedagogical Research in 2018. While Mathematic Performance Test (MPT) was design to test the depended variable. The mathematic performance test were selected past question papers of GSE of 2017, 2018, and 2019 respectively. Two types of sampling techniques were used, i.e. the simple random and the Cluster sampling method. The items in the instrument were face and content validated by experts in the field of psychology and test and measurement. Test re test procedure were employed to determine the appropriateness and suitability of the instruments to the actual sample of the study. Pearson Product Moment Correlation (PPMC) and t test for independent samples were used to test hypotheses 1, and 2. The r value was .786 which is an indication of positive linear relationship between math anxiety and academic performance in GSE among NCE students in KASCEPS Kano. The P value of .000 is less than 0.05 level of significant; this is to say the relationship between the two bivariate variables is significant at 5% level of significance, therefore the null hypothesis rejected, while the second hypothesis found. A moderate P value of .456 indicating that the P value is greater than the level of significant of 0.05 and the t .746, the null hypothesis was accepted. Some recommendations were made which include: Appropriate measures should be taken by the government, educational policy makers, parent, teachers,

educational psychologist and educational councilors on encouraging students towards overcoming Math anxiety and Parent, teachers and guidance should treat both male and female students the same when teaching them mathematics, this will develop their academic performance in mathematics.

Keywords: Math anxiety, Math phobia, Academic performance, Correlation, KASCEPS

1. INTRODUCTION

Failure is bitter, while success is sweet, but there are always reasons for failure in every sphere of human endeavour. Empirical evidence has it that math-phobia and math anxiety are contributing factors to students' low marks in mathematics. Math setbacks among NCE students has become a phenomena and worrisome. Since the inception of NCE programme at this college in 2015 GSE math is one of the major course student's fear and failed Year in year out, where ever you see a massive failure in any course in KASCEPS is GSE Math, especially for non-science students. Students of this college don't have massive carry or spill-overs in other courses like they used to have in GSE Math courses. For example, according to results from Directorate of examination (2020) shows that in the 2019/2020 session, Inter science Biology Department has 78 students 19 successfully graduated, while 59 are with carryovers, out of this 59 with carry-overs, 37 students representing 63 percent are with carry-overs in either or all the GSE courses such as the GSE 113, 122, 212, 222, or 322, while only 22 students representing 22.2 percent are without carry-overs in either of the GSE Math courses.

This is a serious problem because this is a department that the students have background in science, by the time we go through other departments that don't have background in sciences such as the PES, ANF, ECE, Arabic, ISS, we may be shocked by the rate of failure in GSE Math courses. The GSE courses are general courses which every students must pass before graduating, these include: GSE 113 Basic general mathematics I, GSE 122 Basic general mathematics II, GSE 212 Basic general mathematics III, GSE 222 Basic general mathematics IV and GSE 322 Basic general mathematics. Without fear of exaggeration or overstatement Mathematic is among the major causes that give the students, the parent and teachers' headache, phobia and anxiety. The child is apprehensive, worried, upset, disturbed and tensed up whenever the name Mathematics is mentioned. This is even more worrisome when the child is faced with unqualified, unmotivated, unserious and unprepared Mathematics teachers in the class room, especially when the Math teacher himself or herself needs to be thought Mathematics.

Math is basically one of the most important subject or course in the world today, and this is why even our educational system has laid a lot of emphasis on the course, it has even become a policy that no University, tertiary institution or examination bodies like JAMB and IJMB will accommodate the child that doesn't have a credit in Mathematics. 'Although the researchers have not come across any law of the land that permits or enacts this policy' But how can the child have credit in Math? when the child is scared or have no interest in Mathematics and the teacher cannot make the child to have interest in Mathematics, when the child have low scores in

Mathematics, when Mathematics is thought under unconducive classrooms, when the teacher per students ratio is bad and un-accommodative and when the environment is not conducive enough for learning Mathematics.

This problem is more worrisome when student who don't have background in mathematics and are compelled and coerced to take courses in Mathematics as a prerequisite requirement for the award of NCE certificate. For example, a student of Primary Education Studies (PES), ANF, ECE, Social Studies, Arabic, Islamic studies etc acquiring NCE are compel and coerce to take Math as an elective course or as a GSE course, at times even as a core course, this is given the NCE students a lot of headache and anxiety as well as their teachers. It is a problem really, but as stake holders what do we do? If you cannot solve a problem what do you do? Do you allow the problem to consume you or you try and consume the problem? The NCE students are complaining and their Mathematics teachers are also complaining who is to be blame? The teachers or the students? It is only an empirical research that will find who is to be blame.

Mathematics is now consider as a language and a way of life because, Mathematics is the order of the day in today's world to the extent that it is now working as a tool and technique in virtually every aspect of human endeavour. That is why today we can easily call mathematics a "powerful force behind every success" the researcher take up this variables because of the too much emphasis that was laid on passing mathematics as a course in the NCCE minimum standard.

Many students are scared whenever the name math is mentioned, and many have developed phobias and anxieties as a result of this persistent and continual fear of math. One of the most worrisome issues is the constant failure in math among students of this college; could this be the fault of the teachers, poor background in math at secondary school level, math anxiety, math phobias or other factors? This is why the researchers felt it is good to investigating the problem at hand.

Research hypotheses

i- There is no important association between Math anxiety and Math phobia among NCE students in KASCEPS?

ii- There is no any significant gender difference in Math anxiety among NCE students in KASCEPS Kano State?

2. LITERATURE REVIEW

Math Anxiety

Several studies have discussed on Mathematical Anxiety for instance, Acevedo, et al (2020) argued that mathematical anxiety arises due to difficulty of easy learning of all ages at various level of education. Russell (2008) see mathematics unease is an emotive, relatively than an academic delinquent. Though, several investigators claim that mathematics apprehension may inhibit with a individual's aptitude to acquire mathematics and thus developed an academic delinquent. Disappointment understandings in arithmetic and dread of forthcoming letdowns remained also identified as the main causative issues to math anxiety and fear. Also the type of nervousness syndrome or a psychological complaint that makes somebody very

apprehensive and affects their life is identified as phobia. This involves an exciting terror of somewhat or unreasonable fear of a detailed situation, action and object or that indications to gripping desire to avoid it (American Psychiatric Association, 2013).
There are numerous reasons for the mathematics anxiety. Arem (2003) associates countless numbers of this with examination nervousness, and this include: bad examination-taking strategies, bad examination readiness and mental compressions. According to Perry (2004) most mathematics teachers would believe that mathematics nervousness is coming from students' worries of disappointment and sense of shortage of knowledge in the area. In most cases, mathematics nervousness is not much, however it continues to disturbs many students throughout their encounter with mathematics (Usop et al., 2001).

Symptoms of Mathematics Anxiety

The sign of mathematics nervousness include: absence of self-assurance, feelings of weakness, misperception and tiredness (Finlayson, 2014). Frequently, a student may need to get out of the classroom because of tiredness (Finlayson, 2014). Also, the intellectual sign of mathematics nervousness cause by mental ability and a penchant to mathematics, such as the incapacity to think, bad self-talk, and extreme disturbing (Taylor, 2017).

Math Phobia

Trujillo & Hadfield, (2007) defined mathematics phobia as the level of distress that occurs among students in reply to circumstances connecting mathematical responsibilities, which is seen as a risk to their self-ability. Math-phobia has been labelled to include intellectual and affective domains of teaching and learning. Harper & Daane, (2008); Hembree, (2009); Sloan, (2002) defined the concept as connected to character features, bad approaches toward mathematics, mathematics dodging, reduced mathematics related activities, success levels, absence of coolness and bad involvements in school. The negative attitude of the students stops them from focusing on the subject/problem which they are supposed to tackle in mathematics.

Causes of Math Phobia

The following ideas may be the reasons for mathematics phobia: Bad or fragile teaching method as well as weak mathematics upbringing, Trainers' hostile, worrying and irritating features, Incapability to resolve mathematics difficulties, poor or bad relationships between the tutors and the students, incapacity to answer too much home-based assignment, Not comprehending mathematics in the class during class lesson, Incapable of solving mathematical tasks, Usage of insulting language by teacher, bad behavior on the way to mathematics, unable to resolve mathematics problematic in time, Not a good child-friendly teaching environment etc.

Signs of Mathematics Phobia

Math phobia is a sensation of worry that happens due to the furiousness of performing various mathematical solutions. Certain persons sound mathematics fright as a tautness, fear, weakness, and intellectual incompetence. Phobia can have a long time effect on the student, hence any type of phobia should dealt with. The following are

some types of mathematics phobia. The child try to avoid numbers, the gets confused, the child feels anxious, the child feels depressed and fright, students having problems with breathing,

Ways to Overcome Math Phobia

It is good to note that not every one like mathematics as a subject. Many students always have that feeling of anxiousness whenever the name mathematics is mentioned. This negative feeling about the subject mathematics alone makes them to finds the subject difficult. Many students are suffering from mathematics phobia because of bad perception they have on the subject. All these negative feelings can reduced by: By adjusting mathematics nervousness, having a good skills of mathematics and increasing positive boldness towards mathematics, support the student's logic of astuteness and ability in mathematics, Make a good environment for learning mathematics, Inspire the students on how to solve mathematical problems, Elucidate to the child on developing good optimistic mind on mathematics, Acquaint the students into mathematics training aids etc.

3. METHODOLOGY

Two research designs were used in this research, ex-post facto research design and correlational research design. Ex-post facto research design was used because the independent variables of math phobia and math anxiety will not be inherently manipulated as they are already in existence. The population of the study consists of all NCE II students in Kano State College of Education and Preliminary Studies KASCEPS. The population of NCE II in KASCEPS is 282 spread across the four schools in the college, which include: school of education, school of sciences, school of languages and school of arts. The subjects were randomly sample from the population and research advisers 2006 table for sample estimate was used to determine the sample size for the research, and this was done through hat and draw method.

NCE II Population table

S/N	COURSE COMBINATION	MALE	FEMALE	TOTAL
1	ENG/IRS	18	20	38
2	ENG/HAUSA	13	12	25
3	ENG/ARABIC	03	03	06
4	SOS/DM	15	09	24
5	SOS/HAUSA	06	08	14
6	SOS/IRS	10	12	22
7	IRS/HAUSA	03	04	07
8	IRS/ARABIC	15	24	39
9	ANF	04	04	08
10	ECCE	01	13	14
11	PES	00	04	04
12	ISC/CHEM	07	16	23
13	ISC/MATH	02	03	05
14	ISC/BIOLOGY	07	08	15
15	MATH/CHEMISTRY	04	08	12
16	MATH/BIOLOGY	03	02	05
17	COM/MATH	07	09	16
18	COMP/CHEMISTRY	02	03	05
		120	**162**	**282**

Source: DEAR KASCEPS (2020)

Two questionnaires were used for data collection these are: the learning Mathematics Anxiety Test (L-MAT) and Mathematics Phobia Scale (MPS). The Learning Mathematics Anxiety Test (L-MAT) was adopted from the work of Yusuf Feyisara Zakariya1 in an article Submitted to the Journal of Pedagogical Research in 2018. The items on the (L-MAT) were scaled on Likert scale format in which respondents selected the most appropriate answer from response options ranging from (5) Strongly agree, (4) Agree, (3) Neither agree nor disagree, (2) Disagree, and (1) Strongly disagree. While the Mathematic Phobia Scale (MPS) was adopted from the work of Ihechukwu & Ugwuegbulam (2016) in an article submitted to Research on Humanities and Social Sciences.

Furthermore, Mathematic Performance Test (MPT) was design to test the depended variable. The mathematic performance test were selected from past question papers of GSE of 2017, 2018, and 2019 respectively.

In order to determine the sample size for this research two types of sampling techniques were used, i.e. the simple random and the Cluster sampling method. The items in the instrument were face and content validated by experts in the field of psychology and test and measurement. Test re test procedure were employed to determine the appropriateness and suitability of the instruments to the actual sample of the study. Pearson Product Moment Correlation (PPMC) was used to test hypotheses 1, and t test for independent sample was used to test hypothesis 2.

Hypotheses Testing

Test of Ho_1

i- There is no any significant relationship between Math anxiety and academic performance in GSE among NCE students in KASCEPS.

PPMC Correlation between Math anxiety and Academic performance test in GSE

Pearson correlation	M.A	P	N	df
Academic performance	.786	.000	282	280

The table above shows r = .786 which is an indication of positive linear relationship between math anxiety and academic performance in GSE among NCE students in KASCEPS Kano. The P value of .000 is less than 0.05 level of significant; this is to say the relationship between the two bivariate variables is significant at 5% level of significance.

Therefore the null hypothesis stated earlier that there is no significant relationship between Math anxiety and students' academic Performance test in GSE is hereby rejected, and conclude that there is significant relationship between the bivariate variables. This indicates that, as one variable increases, the other variable also increases.

Test of Ho_2

ii- There is no any significant gender difference in Math anxiety among NCE students in KASCEPS Kano State?

T-Test for Gender difference in Math anxiety among NCE students in KASCEPS, Kano

Groups	N	Mean	T-cal	Df	P value	LS
Male	120	50.57	.746	280	.456	0.05
Female	162	49.59				

T test for independent sample was used to compare gender difference in Math anxiety among NCE students in KASCEPS. A moderate P value was found at (t = 746, P = 456) indicating that the P value is greater than the level of significant of 0.05, this is to say gender does not significantly influence mathematic anxiety among NCE students in KASCEPS, Kano. Therefore the null hypothesis which states that, there is no any significant gender difference in mathematics anxiety among students in KASCEPS was accepted, this is to say there is no significant relationship or difference between the variables under investigation.

4. RESULTS

The primary reason for conducting this research was to investigate the Influence of Math anxiety and Math phobia as a manifestation for Basic General Mathematics (GSE) failure among NCE Students in Kano State College of Education and Preliminary Studies (KASCEPS) Kano. Two hypotheses were tested. The first Hypothesis was tested using Pearson Product Moment Correlations (PPMC). Therefore the null hypothesis stated earlier that there is no significant relationship between Math anxiety and students' academic Performance test in GSE was rejected, and conclude that there is significant relationship between the bivariate variables. This indicates that, as one variable increases, the other variable also increases.

Many of the literatures reviewed agreed with some of the findings while many equally disagreed with some of the findings of this study. For example. a research conducted by Acevedo et al (2020) found that the variables were not related and the Ho was accepted, meaning there is no relationship among anxiety and academic performance. This was contrary to the present study that found significant relationship between the variables under investigation. Regarding the analysis of the second hypothesis on gender difference it was found that gender does not significantly influence mathematic anxiety among NCE students in KASCEPS that is, there is no significant gender difference in mathematical performance. This findings contradicts the findings reported by other studies that found significant gender difference in mathematics anxiety Alvarez (2012) and others did not find any significant gender difference in mathematics anxiety (Arasanz, 2008). In another study conducted by Ballado (2014) which investigate Mathematics Anxiety and Academic Achievement of Junior Pre-Service Teacher Education Students. The study determine the difference in the level of mathematics anxiety and academic achievement among the male and female respondents. Using a 24-item Mathematics Anxiety Inventory. The study found that Females have higher level of mathematics anxiety, this was contrary to the study of the present research which accepted the null hypothesis there is no any significant gender difference in Math anxiety among NCE students in KASCEPS Kano State. This is to say there is no significant gender difference in Math anxiety.

5. CONCLUSION

In conclusion, it was concluded that there is relationship between math anxiety and academic performance in GSE among NCE students in KASCEPS Kano. The P value of .000 is less than 0.05 level of significant; this is to say the relationship between the two bivariate variables is significant at 5% level of significance. The research equally concluded that Gender does not significantly influence math anxiety among students in KASCEPS and Gender does not significantly influence math phobia among students in KASCEPS

Recommendations

The following recommendations were made based on the findings of this study.

i- Appropriate measures should be taken by the government, educational policy makers, parent, teachers, educational psychologist and educational councilors on encouraging students towards overcoming Math anxiety.

ii- Parent, teachers and guidance should treat both male and female students the same when teaching them mathematics, this will develop their academic performance in mathematics.

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