

Investigation into the Causes of Poor Academic Performance in Mathematics among Nigerian Undergraduate Students

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Abstract This study was aimed at investigating the causes of poor academic performance and to establish the strategies that can be adopted to improve performance in Mathematical Methods I among undergraduate students in Obafemi Awolowo University, Nigeria. Descriptive research design in form of an ex post facto approach was used. Sample was randomly selected from among students in four faculties that took the course in their second year. The data was collected using questionnaire. Descriptive statistics in form of simple percentages were used to analyze the obtained data. Factors attributed to poor performance include poor infrastructure, emotional problems, and weakness in Mathematics background among others. Remedial counseling involving cognitive restructuring and achievement motivation were recommended. It is hoped that the findings of this study will be very useful to school psychologists, university administrators, counselors and educators who are concerned about the rising rate of poor performance among Nigerian undergraduates.

Keywords: *mathematical methods, performance, causal attributions, affective reactions*

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1. Introduction

In Nigeria, Mathematics is a powerful tool in achieving the Millennium Developmental Goals. The Millennium Developmental Goals (MDGs) were adopted in the United Nations headquarters in the year 2000, with Nigeria as a signatory. The goals comprise eight major issues which include ; halving extreme poverty and hunger ; achieving Universal Basic Education; promoting gender equality and women empowerment; reducing child mortality ; improving maternal health ; combating HIV/AIDS, malaria and other diseases ; ensuring environmental sustainability and developing a global partnership for development [1]. Nigeria as a nation has put in much effort in achieving these goals especially in proving the Universal Basic Education and in the promotion of gender equality.

However, the role of Mathematics in achieving these goals cannot be overemphasized as Mathematics has been identified as an indispensable tool in many other disciplines, which have been developed because of their importance to modern life. Such disciplines apart from the physical sciences, include economics, sociology, biology, linguistics, computer sciences, information theory, cybernetics, among others [3]. It is no exaggeration therefore to assert that Mathematics has become an

important social factor. This is why at a time as this, when the achievement of the MDGs has become a national task, that the teaching of Mathematics with improving innovation has become necessary as Badmus in [3] opined that a basic Mathematics education for all children is not a luxury but absolute necessity. Ukeje [5] described the importance and the attention given to Mathematics as stemming from the fact that without Mathematics, there is no science, without science, there is no modern technology and without modern technology, there is no modern society.

As important as Mathematics is, in Obafemi Awolowo University, students of science education, faculty of technology and physical sciences in 200 level do perform poorly in Mathematical Methods I (MTH 201). It is a compulsory course and a pre-requisite to all the courses in the faculty of technology, physical sciences, environmental design and management such as Building and Education chemistry, Mathematics and Physics. Table 1 below demonstrates how poorly the performance of students in the course has been for the past seven years.

With respect to Table 1, it is evident that most of the students performed poorly in the course. Consequently, one may ask several questions at this juncture pertaining to what may be the causes of this poor performance. Students are fond of attributing their low academic performance to several factors. It is a common phenomenon to hear students say that 'my lecturer gave

me 32F or 24F' instead of saying 'I failed the course' suggesting that the lecturer was just distributing scores and he/she was unfair in his/her distribution.

Table 1. Performance in Mathematical Methods 1 (MTH 201).

Academic Session	Total Number of Candidates	Poor performance (Grades D – F)	Good performance (Grades A – C)
2003/2004	1506	1492 (99.1 %)	14 (0.9 %)
2005/2006	1139	905 (79.5 %)	234 (20.5 %)
2006/2007	1128	808 (71.6 %)	320 (28.4 %)
2007/2008	2072	1166 (56.3 %)	906 (43.7 %)
2008/2009	1776	1553 (87.4 %)	223 (12.6 %)
2009/2010	1523	1135 (74.5 %)	388 (25.5 %)
2011/2012	1051	739 (70.3%)	312 (29.7%)

Source: Mathematics Department, Obafemi Awolowo University (2013).

Some students tend to attribute failure to external causes only but success to themselves. It is also common to associate failure to other causes including defective teaching [4], poor preparation, difficult questions, emotional problems, lack of necessary facilities and epileptic power supply making studying very difficult. External causes meaning the factors the students do not have control over such as poor infrastructures while internal causes are self-induced factors such as emotional problems. Whatever may be the case since students are at the receiving end of all educational plans and programmes, this study was aimed at finding out some of the factors that actually determine students' success or otherwise in this course MTH 201 when offered by part two students of Obafemi Awolowo University.

1.1. Theoretical Background to the Subject

Mathematics is simply a way of describing relationships between numbers and other measurable quantities. It can express simple equations as well as interactions among the smallest particles and the farthest objects in the known universe. Mathematics allows scientists to communicate ideas using universally accepted terminology. It is truly the language of science. The benefits and outcomes of mathematical researches on our everyday lives are immeasurable. In Obafemi Awolowo University, MATH 201 is a mathematical methods I that contains topics such as Limits, Continuity and Differentiability, Sequence and Series, Partial Derivatives, Numerical Methods, Differential Equations, etc. It is a 4-unit course that is compulsory and a pre-requisite to all the courses in the faculty of technology, physical sciences, environmental design and management such as Building and Education chemistry, Mathematics and Physics. This course is offered by the department of mathematics being taught by five main faculty every year. Apart from the regular classes, the department also divides the whole set of students into tutorial groups. Each group usually meets with the assigned tutor which is also a faculty every week. Despite the resources and the commitments of the department and the students to make the course a great one the result is always woeful year in year out. Among the students this MATH 201 is referred to as "Tsunami"

course due to its associated annual mass failure. The pressing concern for the poor performance in this course calls for this study.

1.2. Statement of the Problem

Mathematical methods I is a compulsory course and a pre-requisite for all courses in the faculty of technology, physical sciences, environmental design and management such as Building and Education Chemistry, Mathematics and Physics. It is one of the courses that cause students to change from the department they were admitted to other departments where MTH 201 is not offered and others to run extra semesters.

The trend of students' achievement in MTH 201 results was studied and it was observed that a great percentage of students (above 50%) who sat for the examination got grades below average (50/100 marks) and therefore calls for this study.

1.3. Objectives of the Study

The objectives of this study were to;

1. Determine the actual causes of students' low academic performance
2. Determine the reactions of students to low academic performance
3. Establish strategies that can be adopted to improve performance in Mathematics by students in Obafemi Awolowo University.

1.4. Research Questions

From the above research problem, the following research questions were generated;

1. To what factors do students attribute low academic performance?
2. How often does each of these causes of low performance occur among students?
3. What are the attitudes of students towards the low academic performance?

1.5. Significance of the Study

This study was embarked upon to bring about progress in Mathematical Methods I, since different factors affect students' performance in the course. The findings of this study will help the students to identify the factors that actually cause poor performance in Mathematical Methods I and make use of the suggested solutions to prevent failure. It would be very useful to school psychologists, university administrators, counsellors and educators who are concerned about the rising rate of low academic performance among Nigerian undergraduates.

2. Methodology

Keeping in mind, the adaptability of the proposed design with respect to the type of study, variables under consideration, size of respondents and phenomenon to be studied, the ex post facto was selected as an appropriate research design. The factors (causal attributions) were studied in their natural form without the researcher manipulating any of the variables. The researcher simply collected the data using the instruments described under

instrumentation and analyzed the data to provide an objective description of the phenomenon.

2.1. Sample and Sampling Procedure

The target population for this study consists of undergraduate students of Obafemi Awolowo University. The sample consisted of 300 students who offered MTH

201 between 2007/2008 and 2011/2012 academic sessions. This sample was selected through stratified random sampling procedure. The stratification spanned four faculties which are Technology, Environmental Design and Management (EDM), Science and Education and across the respective departments in the university as shown in Table 2 below:

Table 2. Sample of the study

Gender	Education				Technology				Science				EDM			
	II	III	IV	V	II	III	IV	V	II	III	IV	V	II	III	IV	V
MALE	4	6	5	-	55	20	-	17	15	-	20	-	-	-	-	7
FEMALE	5	5	5	-	55	19	-	18	16	-	20	-	-	-	-	8
TOTAL	30				184				71				15			

2.2. Instrumentation

The instrument used for data collection was a questionnaire titled ‘‘Students’ Questionnaire on the Causes of Low Performance in MTH 201’’ which has three sections. Section A requires demographic data such as course of study, department and gender. Section B is a 20 item scale measuring causal attributions of academic low performance in MTH 201. Respondents are required to simply tick as many factors as those considered as causes of his / her performance. There was also a space for respondents to write other causes of their academic low performance not included in the list. Section C contains 10 item measuring affective reactions to academic low performance. Respondents are also required to simply tick as many as those reactions he / she often put up whenever he / she performance is low.

2.3. Reliability and Validity of the Instrument

The reliability coefficient of the instrument was calculated to be $KR_{20} = 0.89$. The instrument was validated using face validity by two senior lecturers in the department of special education and curriculum studies, Obafemi Awolowo University.

2.4. Data Collection Procedure and Analysis

The instrument was administered on the respondents immediately after their lectures in some major courses. Participants were asked to wait after classes and were given the questionnaires to fill after they have been briefed about the objectives of the study. They were encouraged to be factual and objective in their responses as they were assured that all responses will be treated with utmost confidence and used only for research purposes. Descriptive statistics in form of simple percentages were used to analyze the obtained data.

3. Results and Discussions

This is the summary of the data obtained from the responses of the completed and returned questionnaire. The analysis of the data helps the researcher in the interpretation of the information collected. Copies of the questionnaires were distributed to three hundred respondents. To answer the research questions, frequency counts and percentage distributions were used.

3.1. Research Question One

To what factors do students attribute low academic performance?

Table 3. Causal Attributions of Low Academic Performance

Causal Attribution	Frequency	Percentage (%)	Rank
Poor infrastructure e.g. power outage, congested lecture theatres , etc	237	79.0	1 ST
Emotional problems e.g. exam tension and anxiety	233	77.7	2 ND
Weakness of the students in Mathematics background	219	73.0	3 RD
Phobia of the students for Mathematics	195	65.0	4 TH
Poor quality of teachers’ methodology and marking	191	63.7	5 TH
Poor study habits	191	63.7	5 TH
Instructional materials e.g. appropriate textbooks	183	61.0	6 TH
Difficulty of the exam questions	175	58.3	7 TH
Teacher-Student interpersonal relationship	171	57.0	8 TH
Students’ subsequent academic performance	153	51.0	9 TH
Absolute dependence on some external tutorials	152	50.7	10 TH
Phobia of the students for some mathematics lecturers	151	50.3	11 TH
First Semester registration and accommodation problems	144	48.0	12 TH
Lack of concentration of students in MTH 201 classes	143	47.7	13 TH
Low level of preparation of the students	139	46.3	14 TH
Low academic ability of the students e.g. low retention	133	44.3	15 TH
Wrong timing and schedule of exams on the course	94	31.3	16 TH
Parent and peer influences on the students	91	30.3	17 TH
Too many religious devotions of the students	80	26.7	18 TH
Too many social outings of the students	66	22.0	19 TH

Table 3 revealed the ranking order in which majority of the respondents attributed low academic performance in MATH 201 with “Poor infrastructures” as the main course.

3.2. Research Question Two

How often does each of the causes of low academic performance occur among students?

Table 4. Rate of Causal Attributions of Low Academic Performance

Causal Attribution	Frequency	Rate	Rank
Poor infrastructure e.g. power outage, congested lecture theatres , etc	237	0.79	1 ST
Emotional problems e.g. exam tension and anxiety	233	0.78	2 ND
Weakness of the students in Mathematics background	219	0.73	3 RD
Phobia of the students for Mathematics	195	0.65	4 TH
Poor quality of teachers’ methodology and marking	191	0.64	5 TH
Poor study habits	191	0.64	5 TH
Instructional materials e.g. appropriate textbooks	183	0.61	6 TH
Difficulty of the exam questions	175	0.58	7 TH
Teacher-Student interpersonal relationship	171	0.57	8 TH
Students’ subsequent academic performance	153	0.51	9 TH
Absolute dependence on some external tutorials	152	0.51	9 TH
Phobia of the students for some mathematics lecturers	151	0.50	10 TH
Harmattan registration and accommodation problems	144	0.48	11 TH
Lack of concentration of students in MTH 201 classes	143	0.48	11 TH
Low level of preparation of the students	139	0.46	12 TH
Low academic ability of the students e.g. low retention	133	0.44	13 TH
Wrong timing and schedule of exams on the course	94	0.31	14 TH
Parent and peer influences on the students	91	0.30	15 TH
Too many religious devotions of the students	80	0.27	16 TH
Too many social outings of the students	66	0.22	17 TH

Table 4 revealed the rate at which each of the causes of low academic performance occurs among Obafemi Awolowo University students. The order of ranking shows that Poor infrastructure e.g. power outage, congested lecture theatres, etc, is the most frequent cause of low

academic performance while too many social outings of the students, the least.

3.3. Research Question Three

What are the attitudes of students towards the low academic performance?

Table 5. Affective Reactions

Affective Reactions	Frequency	Percentage (%)	Rank
Feel very bad	247	82.3	1 ST
Feel there is always another chance	209	69.7	2 ND
Emotionally disturbed	178	59.3	3 RD
Maintains normal self	173	57.7	4 TH
Feel that one is cheated	121	40.3	5 TH
Feel inferior	98	32.6	6 TH
Blame oneself	96	32.0	7 TH
Hate oneself	79	26.3	8 TH
Regretting choosing the course	71	23.7	9 TH
Feel like leaving the school	68	22.7	10 TH

Table 5 revealed students’ affective reactions to low academic performance in order of ranking. Many of the students; feel very bad, feel there is always another chance, emotionally disturbed, maintains normal self, feel that one is cheated, feel inferior, blame oneself , hate oneself, regretting choosing the course and feel like leaving the school. The order of ranking suggested that students do not feel pleased with the low academic performance.

the least. While Table 5 revealed students’ affective reactions to low academic performance in order of ranking which suggested that the students do feel displeased with it. This study corroborated the works of Adeogun and Osifila [1], who opined that the extent to which an organization like educational institution attains her objectives is directly proportional to the educational resources available and their utilization.

4. Discussions

The results in Table 4 indicated that majority of the respondents attributed low academic performance to Poor infrastructure e.g. power outage, congested lecture theatres, etc, as the most frequent cause of low academic performance while too many social outings of the students,

5. Conclusion

The conclusion drawn from this study was that students often attribute their low academic performance to external factors and feel very bad about it. This phenomenon is common to both male and female students.

6. Recommendations

In light of the findings of this research, the following recommendations are made;

1. School authorities should ensure provision of basic infrastructure such as regular supply of electricity so that students could be encouraged to study.
2. Lecturers should also be encouraged to attend seminars, workshops and sandwich programmes to update their knowledge for efficiency and effectiveness in their jobs.
3. Lecturers should develop positive relationship with students and stress classroom activities, which will involve active teaching- learning process and students' participation in the class.
4. Students are encouraged to set-up functional tutorial groups among themselves as this will help them to understand the concepts of the course and further expose them to the right way of answering questions in the examinations.

7. Limitation of the Study

In **Table 1** above, it is observed that two academic sessions were missing. This was as a result of long internal strike that led to the merging of two sessions and some logistic problems.

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