Causes and Effects of Mass Failure of Mathematics in Junior Secondary School Certificate Examination

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ARTICLE INFO	ABSTRACT
Published Online: 20 November 2019 Corresponding Author: **Adamu Garba**	This study reviewed causes and effect of mass failure of Mathematics in Junior Secondary School Certificate Examination. Survey research design was adopted for the study. The sample of 230 respondents was used for the study. The researcher used both primary and secondary sources obtained by the use of a well structured questionnaire. The data collected were analyzed using inferential statistics while the relationship between the variables of the model was tested using Correlation Matrix analysis. The result of the correlation Matrix shows that Quality of Mathematics Teachers (QMT) is inversely related to mass failure in Mathematics. This means that an increase in quality of mathematics teacher will lead to a 12.0% reduction in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. Students socio-economic background is directly related to mass failure in Mathematics in the selected Secondary Schools in Benue State Nigeria. This means that a unit increase in Students socio-economic background will lead to a 23.9 % increase in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. The result of the correlation matrix indicates that Interest of Students is inversely related to mass failure in Mathematics. This means that an increase in interest of students will lead to a 24.5% reduction in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. This study concludes that there are mass failure in public examinations among secondary school students in the selected Secondary Schools in Benue State Nigeria. It recommended among others that teachers should develop positive relationship with students and stress classroom activities, that will involve active teaching-learning process and ignite their interest and students' participation in the class. Students should create enough time for personal practice of mathematics questions in order for it to be part of them.
KEYWORDS: Mass, Failure, Secondary School, Mathematics, Benue, Nigeria.	

1.0 INTRODUCTION

There is a general impression that mathematics is difficult by its very nature, and because of this impression, there is poor performance among Junior secondary school students. This poor performance in mathematics has been attributed to student's perception of the difficulty of the subject by the students. However, students reason that mathematics is highly structured and is so abstract and required special intellectual attitude. Thus; students see the subject as something esoteric. Scholars articulates the fact that inherent notion held by many Africans that mathematics is a very difficult subject which is capable of making one "mad" is at the centre of the phobia

which students exhibits for mathematics and which had claimed many causalities over the years. Nworgu (2017:16), therefore poses the question "how then would any person in fairness expect our poor and innocent children to be as courageous as to face something which is capable of making even an adult mad"? The students would prefer to do something else no matter how difficult rather than to attend mathematics classes.

Most parents do not play a crucial role in preparing their children for school. Opposition from the child arises from what appears to him obsolete and defense of traditionalism by the parents. Parents on their part hardly requires their children

to explain the problem or joy found in their mathematics classes. And this count as one of the causes of poor performance of students in mathematics. Teachers of mathematics in junior secondary schools are hard to come-by because of the site of some schools. The few available teachers have not been given opportunities to up-date their skills and knowledge available in-service training. Teachers have an important part to play in learning mathematics by students. According to Nicol (2007) "A teacher can only be seen to be effective, if the students can learn with greater ease and perform well".

Teacher's attitude can hinder learning especially when one does not present oneself as a high intellectual and formidable person. A quack doctor is capable to handle an individual at a time but a bad teacher can ruin not only the individual but also a nation. Nigeria is faced with the problem of competent teachers in mathematics which is the major causes of this mass failure of student in mathematics in preparation of students well enough for examination. A school that lacks discipline hardly achieves the aim and objective of the educational system. Through these factors enumerated above, it could be seen that, there are many causes attributed to mass failure in mathematics examination in junior secondary school certificate examination.

Statement of the Problem

Perhaps not much attention has been given to the performance of students in junior secondary school subjects in recent years. This neglect, no doubt has relegated this subjects to the background in our junior secondary school certificate examination. A close look at the result records of students, confirms that students' performance has been very poor generally. This study therefore is specifically designed to assess the causes and effects of mass failure of mathematics in junior secondary school certificate examination in selected Junior Secondary school in Benue State.

Objective of the Study

This study examines the causes and effects of mass failure of mathematics in junior secondary school certificate examination in selected Junior Secondary school in Benue State. The specific objectives are to:

i. examine the effect of sufficient numbers of qualified mathematics teachers on mass failure in junior secondary school certificate examination.

ii. determine the effect of students socio-economic background on mass failure in junior secondary school certificate examination.

iii. Assess the effect of interest of students on mass failure in junior secondary school certificate examination.

2.0 LITERATURE REVIEW
Conceptual Framework
Mass failure in Mathematics

The term mass failure has no acceptable definition base on the board nature of it. According to Okoye (1982), mass failure in individuals or candidates in learning situation refers to one who fails to attain a set standard performance in given evaluation exercise such as test, examination or of continuous assessment. This means that the standard could be based on a number of stipulated subjects and other schools activities, candidates who scores less or below a given standard are regarded as mass failure academically.

Mass failure is no more news in our ears, we hear of it almost every day. When examination results are being released, massive failure follows. The question now is "who are the major people responsible for the massive failure in mathematics at junior secondary schools certificate examination (JSSCE)? Thus, all the bodies responsible for the educational sector need to be reviewed. There is need for students to change their attitude towards their studies and all other factors affecting their success need to be dealt with. No stone should be left unturned when curbing the massive failure rate among students. Three major factors; qualified teachers, students socio-economic factor and students interest responsible for mass failure of examination are examined in this study.

The National Mathematical Centre, Abuja (NMC, 2009), in an attempt to revamp Mathematics teaching and learning at Secondary Schools, has successfully researched into the causes and remedies for the abysmal failure in WAEC, SSCE and JAMB Mathematics examinations. It has discovered that poor performance in the promotion/public examinations in Mathematics has more to do with the teachers' method of teaching than the content of curricular of the school Mathematics (NMC, 2009). It was this empirical background that necessitated and spurred the Center's Mathematics.

Pathetically, shameful failure in students' academic performance in mathematics Nigeria is no longer news in the recent years. This axiomatically noted in the public's unhappiness which becomes more prominent following the annual release of the West Africa Junior School Certificate Examination results, since the student outcomes do not match the government and parental investments both at the junior secondary schools and tertiary institutions. The situation is so pathetic that stakeholders keep on wondering why this level of education has persistently failed to meet the yearnings and aspirations of the society.

In spite of its importance, the performance of students in mathematics has been a great concern to the society. Awokoya (1975) and Fafunwa (1980) revealed in their different research studies that everyone lives in a world where science and technology have become an integral part of the world culture,

therefore for any nation to be relevant; it must not over look the importance of mathematics in her educational system. Adebule (2004) submitted that there is a consensus of opinion about the fallen standard of education in Nigeria. He further stated that parents and government are in total agreement that their huge investment on education is not yielding the desired dividend. Teachers also complain of students' low performance at both internal and external examinations (Ashiaka, 2010). Aremu and Sokan (2003) submitted that the search for the causes of poor academic achievement in Mathematics is unending. Some of the factors identified by them are: motivational orientation, self-esteem/self efficacy, emotional problems, study habits, teacher consultation and poor interpersonal relationships among students.

A great number of researchers have continuously been probing into the causes of mass failures in our schools and suggesting ways of reversing the ugly trend. The responsibility for the lacklustre performances has been characterized by a series of buck passing. There is no gainsaying that the litany of problems identified have been impeding on students' performances in examinations since decades but what is more worrisome than the problem of poor performances itself is that despite the series of solutions proffered to the problems, there seems to be no end in sight.

Empirical Studies

Poor academic performance according to Aremu and Sokan (2003) is a performance that is adjudged by the examinee and some other significant as falling below an expected standard. The investigator selected 500 students (250 males and 250 females) from senior secondary schools in Ibadan, Oyo State of Nigeria. Parental involvement was found as a necessary predictor for academic achievement. Aremu and Sokan (2003) submit that the search for the causations of poor academic achievement is unending and some of the factors they put forward are: motivational orientation, self-esteem/self-efficacy, emotional problems, study habits, teacher consultation and poor interpersonal relationships.

Ashiaka (2010) examined the perception of students and teachers on the causes of poor academic performance among secondary school students in Ogun State, Nigeria. Subjects for the study were one hundred and thirty-five (135) students and fifty (50) teachers randomly drawn from five secondary schools in Odogbolu Local Government Area of Ogun State. Questionnaire was used to collect relevant data for the study. Percentages and chi-square were 83 used to analyze the research questions. Teachers believe that students' poor academic performance is not influenced by teachers' qualification while students perceived that teacher's qualification do affect their academic performance. The difference in their perceptions could be because students have high expectations for teachers that should teach them and

therefore believe that any teacher that does not meet up to such expectations will not aid their academic performance.

Adaval *et al*. (1961) tried to find out the possible causes of failure in high school examination and to suggest ways and means to eradicate them. The sample comprised of eighty girls and 116 boys who had failed in the examination conducted by the Board of High School and Intermediate education, Uttar Pradesh, India. The study revealed that the majority of the students were below average in intelligence.

Rao (1965) investigated the factors related to scholastic achievement. He found that intelligence; study habits and school attitude were significantly related to the prediction of scholastic achievement. The multiple correlations co-efficient between achievement scores of the intelligence, study habits and attitude towards school was quite high. The three independent variables namely intelligence, study habits and school attitude were significantly related to the prediction of scholastic achievement while the socio-economic status was not.

Kaur (2014) studied the causes of low achievement of 9th class students. 100 students who were low achievers (boys and girls), 100 parents and 100 teachers were taken as a sample. The study revealed the opinion of the parents, teachers and the students. The main cause of low achievement of 9th class students in order of priority are ill health, lack of interest in studies, lack of facilities at home, shortage 74 of food, participation in sports and poor educational environment. Low academic achievement is related to home than to the school or any other factors. The male and female teachers do not differ significantly with regard to the causes of low achievement.

Noah and Eckstein (2014) conducted an international study of school achievement. It was concluded that the home background of children as measured by father's education and occupation, mother's education and number of books in the home stands out, as an internationally strong variable. Few of the directly school related variables such as sex of teacher, teachers' experience and training, size of school, quality of home work and type of curriculum come through as important in all the nations tested.

Mishra (2017) studied the educational backwardness in science and mathematics at delta level in Varanasi district. He took a sample of 1,060 students of class VIII and found that in all 23.58% students were educationally backward in science and mathematics. The general level of achievement in mathematics is same among boys and girls both in urban and rural areas. Inferior intellectual potential was the important cause of educational backwardness.

Mayuri and Suneeta (1999) designed a study to find out the effect of selected familial factors on the academic achievement of school children. The sample comprised of 120

children of IX and X standards drawn purposively from ten schools, recognised by the State Education Board, Andhra Pradesh, India and distributed across the different zones of the Hyderabad city. The parents of the children too formed the sample of the study. Interview schedules for the children and separate questionnaire for the parents were developed and administered to the respondents. The results indicated that the parental factors, namely father's occupation and parental contributions were found to have significant effect on academic achievement of children. High achievers generally seem to come from families where there are few children, a nuclear type of family, and average to higher educational qualifications among parents, mothers' mostly full-time housewives and a middle class socio economic status. Father's occupation was the only factor that showed positive and significant correlation at 5% level of confidence for achievement in English language, the other correlations being either negative or close to zero. None of the family contributing factors including the parental 76 contributing factors were significant for achievement in Mathematics. However, parental contribution at home as well as father's occupation had a prominent role to play in the achievement in Science subject, with other factors making no relative contribution.

Hui-Ling (2001) conducted a cross-national study of factors influencing mathematics achievement for eighth grade students. The purpose of the study was to determine the internal factor structure of the six latent variables investigated, including home environment, peer influences, school environment, educational aspirations, and attitudes towards mathematics and study habits and to examine the effects of these variables on mathematics achievement as measured by Third International Mathematics and Science Study. The TIMSS mathematics achievement test and the student background questionnaire for eighth grade students were used to achieve the purposes.14,651 eighth grade students were taken as sample (2920 students from the Republic of South Korea, 4,644 students from Singapore and 7,087 students from the United States). The study reported different factor structures and different influences on mathematics achievement across the three selected countries. Home environment, attitude towards mathematics and educational aspiration emerged as the more important and consistent predictors of mathematics achievement for the three countries. The other three variables have mixed effects on mathematics achievement.

3.0 RESEARCH METHODOLOGY

This study used a survey research design. The population of the study is two Junior secondary schools in Makurdi Metropolis purposively chosen from both private and public secondary schools. They are made up of both junior secondary

school students of Padopas Harmony Secondary School and Government College Secondary School Makurdi with a population of two hundred and thirty (230) students purposively chosen due to large sample size.

The data for the study was collected using questionnaire, coded and analyzed using computer-based Statistical Package for Social Sciences (SPSS version 20.0 for Microsoft Windows). The validity and the reliability of the instrument was established using the factor analysis. It was established that the instrument is valid and reliable as the validity score that considered Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity is above the threshold and the Cronbach Alpha Coefficient for reliability is above 0.7.

Table 1: Kaiser-Meyer-Olkin and Bartlett's test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.861
Bartlett's Test of Sphericity	Approx. Chi-Square	6.937
	df	6
	Sig.	.033

Source: SPSS Result, 2019

A pilot test was conducted. The input variable factors used for this study were subjected to exploratory factor analysis to investigate whether the constructs as described in the literature fits the factors derived from the factor analysis. From Table 1, factor analysis indicates that the KMO (Kaiser-Meyer-Olkin) measure for the study's three independent variable items is 0.861 with Barlett's Test of Sphericity (BTS) value to be 6 at a level of significance p=0.033. Our KMO result in this analysis surpasses the threshold value of 0.50 as recommended by Hair, Anderson, Tatham, and Black (1995). Therefore, we are confident that our sample and data are adequate for this study.

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.824	.927	4

Source: SPSS Result, 2019

As shown by the individual Cronbach Alpha Coefficient the entire construct above falls within an acceptable range for a reliable research instrument of 0.70. The Cronbach Alpha for the individual variables is 0.824 and is found to be above the limit of acceptable degree of reliability for research instrument.

Table 3: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MFM	112.3500	221.713	.897	.956	.604
QMT	117.6500	252.029	.542	.765	.766
SSB	112.8000	188.274	.890	.928	.683
ITS	105.2500	438.934	.460	.536	.642

Source: SPSS Result, 2019

As shown in Table 3, an item-total correlation test is performed to check if any item in the set of tests is inconsistent with the averaged behaviour of the others, and thus can be discarded. A reliability analysis was carried out on the variables of the study values scale comprising two (2) items. Cronbach's Alpha showed the questionnaire to reach acceptable reliability, $\alpha = 0.824$. All items appeared to be worthy of retention, resulting in a decrease in the alpha if deleted. There is no exception to this in all the variables of the study as none of the items if deleted will improve the overall Cronbach alpha statistics. As such, none of the variables was removed. A correlation value less than 0.2 or 0.3 indicates that the corresponding item does not correlate very well with the scale overall and, thus, it may be dropped.

Method of Data Analysis
The Correlation Matrix analysis was used to assess the nature and degree of relationship between the variables of the study. This examines the various levels of correlation that exist between the variables under investigation.

4.0 RESULTS AND DISCUSSION
This section presents the result of the study from the selected secondary schools in the study area in Benue State.

Table 4: Statistical Significance of the model
ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	177.822	3	59.274	.564	.047[b]
	Residual	1682.178	16	105.136		
	Total	1860.000	19			

a. Dependent Variable: MFM
b. Predictors: (Constant), ITS, SSB, QMT
Source: SPSS Result, 2019

The result of the statistical significance of the model is presented in Table 4. The F-ratio in the ANOVA table above tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predicts the dependent variable $F_{(3, 16)} = 0.564$, $p = 0.047^b$ (i.e., the regression model is a good fit of the data).

Table 5: Correlation coefficients
Correlation Matrix[a]

		MFM	QMT	SSB	ITS
Correlation	MFM	1.000	-.120	.239	-.245
	QMT	-.120	1.000	.234	-.457
	SSB	.239	.234	1.000	-.232
	ITS	-.245	-.457	-.232	1.000

a. Determinant = .662
Source: SPSS 20.0 Result Output, 2019

As shown by the result of the correlation matrix, Quality of Mathematics Teachers (QMT) is inversely related to mass failure in Mathematics. This means that an increase in quality of mathematics teacher will lead to a 12.0% reduction in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. This finding is in line with that of Ashiaka (2010) who examined the perception of students and teachers on the causes of poor academic performance among secondary school students in Ogun State, Nigeria found that teachers believe that students' poor academic performance is not influenced by teachers' qualification while students perceived that teacher's qualification do affect their academic performance.

Students socio-economic background is directly related to mass failure in Mathematics in the selected Secondary Schools in Benue State Nigeria. This means that a unit increase in Students socio-economic background will lead to a 23.9 % increase in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. This is contrary to the findings of Mayuri and Suneeta (1999) who studied the effect of selected socio economic factor familial on the academic achievement of school children. The results indicated that the parental factors, namely father's occupation and parental contributions were found to have significant effect on academic achievement of children. High achievers generally seem to come from families where there are few children, a nuclear type of family, and average to higher educational qualifications among parents, mothers' mostly full-time housewives and a middle class socio economic status. Father's occupation was the only factor that showed positive and significant correlation at 5% level of confidence for achievement in Mathematics, the other correlations being either negative or close to zero.

The result of the correlation matrix indicates that Interest of Students is inversely related to mass failure in Mathematics. This means that an increase in interest of students will lead to a 24.5% reduction in mass failure in mathematics in the selected Secondary Schools in Benue State Nigeria. This finding is in line with that of Kaur (2014) who studied the causes of low achievement of 9th class students. 100 students who were low achievers (boys and girls). The study revealed that the main cause of low achievement of 9th class students in order of priority are ill health, lack of interest in studies, lack of facilities at home.

5.0 CONCLUSION AND RECOMMENDATIONS

This study discussed the causes and effects of mass failure of mathematics in junior secondary school certificate examination in selected Junior Secondary Schools in Benue State, Nigeria. It then proposed and discussed the three proxies (objectives) used in measuring causes and effect of mass failure of mathematics in the study area. Based on the findings of this research work, it is recommended that teachers should develop positive relationship with students and stress classroom activities that will involve active teaching-learning process and ignite their interest and students' participation in the class. Students should create enough time for personal practice of mathematics questions in order for it to be part of them. Secondary schools, faculties of education, state and federal Ministry of Education, professional bodies such as the Mathematical Association of Nigeria (MAN), Science Teachers' Association of Nigeria (STAN) and other stakeholders in the education industry should organize periodic seminars and workshops for students, parents, teachers and school administrators on the need to revive the perennial poor performance in Mathematics in particular and the fallen standard of education in Nigeria in general.

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