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Trends in students performance in senior school certificate examination (SSCE) in mathematics between 2010 and 2015: implication for sustainable development

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Abstract

The study analyzed the trends of students' performance in International Mathematics competitions and May/June West African Senior Secondary Certificate Examination (WASSCE) in general Mathematics in Nigeria from 2010 to 2015 years and implication for sustainable development. The main objectives were to investigate the students' academic performance and the implication on sustainable development in Nigeria. The study used secondary data. WASSCE mathematics results of 9,396,442 Students who sat for May/June WASSCE from 2010-2015 were collected from the test development division, West African Examination Council (WAEC) Lagos, Nigeria as cited by Zalmon and Wonu (2017). The research design was a descriptive survey of the ex-post facto type. Percentage, mean and Standard Deviation (SD) were used to answer the research questions. The result revealed that mathematics performance in Nigeria has been persistently poor over the years, as less than 50% of the candidates passed at credit. Based on the findings, it was recommended among others, that mathematics teacher should present the subject in such a way that it becomes real, concrete, attractive, interesting, captivating, motivating and directly related and relevant to life.

Keywords: mathematics, senior school certificate examination, performance and sustainable development

Introduction

It is undisputable that education is a key to economic development of a nation and additionally in science and technology. Accordingly, science and technology education is vital and essential elements for the development of any country. Most likely, what differentiates the developed countries from the developing countries of the world is the level of science and technology predominant in these countries and mathematics is the support on which science and technology pivot. According to Inweregbuh (2015) ^[8], scientific and technological development of a nation depends largely on the mathematical understanding and application of its citizens in solving problems. Thus, mathematics is the basis of science and technology, which is the catalyst for national development. Mathematics has an enormous impact on science and society. The influence may be silent and appear hidden but has shaped our world in many ways. Musa and Dauda (2014) ^[10] opined that the centrality of mathematics in delivering graduates required for economic development cannot be over-underscored. This suggests that the place of mathematics in secondary school educational programs in Nigeria is fundamental for logical and human development as it serves both as an apparatus for scholarly advance in any profession and as an instrument for setting up the person for a valuable living. There is no gainsaying that Nigeria education is expected to create a workforce of dynamic people who have skills that can fit into the different work environment and ability to create work for themselves, which enhance the economic development of the nation. To achieve this, Ogunkunle (2009) ^[11] opined that it is important to equip the learner with skills such as

- Thinking skills
- Problem solving skills
- Information communication technology skills

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- Self-learning skills
- Language skills
- Basic skills in Arts, sciences and social sciences.

Mathematics principles and concepts are part of every aspect of man as he interacts with another component in nature. As such mathematics skills can enable learners to acquire other skills relevant for the economic development of a nation. Mathematics activity (research, applications and education) has changed a considerable measure in the most recent couple of years. Some of these progressions, like the utilization of Personal computers, are extremely obvious and are being executed in mathematics education broadly and coordinated with the recent information technology knowledge entering wherever on the world. There are other, more unremarkable patterns that may not be so noticeable yet relevant to economic growth.

Hanushek and Kimko (2000) ^[7] in Musa and Dauda (2014) ^[10] presented measures of mathematics and science abilities from internal appraisals into development investigation. They found that the nature of human capital was essentially identified with economic development. This demonstrates that economic development is firmly identified with the intellectual aptitudes of the population (Inweregbugh, 2015; Alio & Okafor, 2015) ^[8]. Building upon the data from Barro and Jong-Wha (2001), it was likewise found that the most ordinarily utilized measure of human capital is the level of mathematics performance in a nation. This is in line with the idea of the Federal Republic of Nigeria as stipulated in the National Policy on Education that mathematics will

continue to be the priority of the country (FRN 2013).

Recorded proofs demonstrated that advanced nations relied on upon mathematics education for their fast economic development, for example, those of United States of America, previous Soviet Union, Denmark and Japan. There were critical connections between their economic development and education given to their work-force particularly mathematics education (Miachi, 2006) ^[9]. Additionally, Daso, (2013) ^[4] opined that Mathematics is the bedrock of science and technology, its level of comprehension among the Nigerians turns into a genuine sympathy toward science and technological proficiency. The worry is that, if the level of mathematics among the Nigerian students remains so low, the sustenance of the scientific and technology development so far accomplished will turn into a fantasy. This implies that, there is requirement for improvement in mathematics education among Nigerian students.

Statement of the Problem

It is crippling that exploration and information from national examination bodies like West African Examination Council (WAEC) have demonstrated a persistent poor performance in May/June WASSCE general mathematics in Nigeria. If this pattern is permitted to proceed, the dread is that the nation may not accomplish sustainable development which essentially depends on mathematics performance. This study, therefore, examined the trends in student's performance in senior school certificate examination (SSCE) in mathematics between 2010 and 2015.

Table 1: Extract from International Mathematics Olympiad comes about because of 2010-2015 demonstrating the places of Nigeria:

Year	2010	2011	2012	2013	2014	2015
Position of Nigeria	84	78	67	84	82	88

Source: Extract from <https://www.imo-official.org/results.aspx> as referred to in Oyedeji, (2016) ^[12].

In like manner, the consequences of the International Mathematics Olympiad (IMO) competition for senior Secondary School understudies has been demonstrating a persistence poor performance by Nigerian Senior Secondary School students (Oyedeji, 2016) ^[12]. The study therefore aimed at inferring the implication of the observed to sustainable development.

Aims and objectives of the study

The aim of this study is to investigate the trends in students' performance in senior school certificate examination (SSCE) in mathematics between 2010 and 2015, also the implication of the observed to sustainable development. Specifically, the objectives of the study are to:

1. Determined the difference in the percentage of students in Nigeria that sat for the May/June WASSCE in general mathematics and the ones that obtained credit and above (A1- C6) between 2010 and 2015.
2. Ascertain the significant difference in academic performance of students in Nigeria that obtained (A1- C6) and (D7- F9) in the May/June WASSCE in general mathematics between 2010 and 2015.
3. Determined the implication of the observed students' performance in WASSCE mathematics between 2010 and 2015 on sustainable development in Nigeria.

Research Questions

Three research questions were raised for the study:

1. Is there any difference in the percentage of students in Nigeria that sat for the May/June WASSCE in general mathematics and the ones that obtained credit and above (A1- C6) between 2010 and 2015?
2. Will there be any significant difference in academic performance of students in Nigeria that obtained (A1- C6) and (D7- F9) in the May/June WASSCE in general mathematics between 2010 and 2015?
3. Is there any implication of the observed students' performance in WASSCE mathematics between 2010 and 2015 on sustainable development in Nigeria?

Methodology

The research design was a descriptive survey of the ex-post facto type. The population of the study consisted of all students in the five West African Countries of Nigeria, Ghana, Sierra-Leone, Gambia and Liberia who sat for the West African Senior Secondary certificate Examination (WASSCE) between 2010 and 2015 years. A sample of 9,396,442 students in Nigeria who sat for WASSCE between 2010 and 2015 years was used for the study. This sample was purposively selected. Data were collected from records. They are records of a total number of students who registered and sat for WASSCE with their performance in general mathematics between 2010 and 2015 in Nigeria as cited by Zalmon and Wonu (2017) ^[14]. Percentage, mean and Standard Deviation (SD) were used to answer the research questions.

Results and Discussion

Research Question one: What are the difference in the percentage of students in Nigeria that sat for the May/June

WASSCE in general mathematics and the ones that obtained credit and above (A1- C6) between 2010 and 2015?

Table 2: Summary of table demonstrating the Analysis of Enrolment, Number and Percentage credit Passes of Students in mathematics in Senior Secondary Certificate Examination in Nigeria in the vicinity of 2010 and 2015.

YEAR	Total No. Who Sat	No. of Students that Obtained (A1 - C6)
2010	1,351,557	453,447
2011	1,540,250	587,630
2012	1,675,224	819,390
2013	1,543,683	555,726
2014	1,692,435	529,732
2015	1,593,442	544,638
T0tal	9,396,442	3,490,563

Percentage of Students with (A1 - C6) 37.02%

Source: Test Development Division, West African Examination Council (WAEC) Lagos, Nigeria as referred to by Zalmon and Wonu (2017).

Table 2 shows that a total of 9,396,442 students sat for WASSCE in general mathematics between 2010 and 2015 while total of 3,490,563 students who sat for the same examination obtained credit and above (A1 –C6). However, 37.02% of students who sat for the examination obtained credit and above (A1 –C6). This showed that less than 50%

of the students who enrolled for this examination obtained credit and above.

Research questions two: Will there be any significant difference in academic achievement of students in Nigeria that obtained (A1- C6) and (D7- F9) in the May/June WASSCE in general mathematics between 2010 and 2015?

Table 3: Percentage of students in Nigeria that obtained credit and above (A1- C6) pass and below (D7- F9) in the May/June WASSCE in general mathematics between 2010 and 2015years.

YEAR	Total No. Who Sat	No.of Students that Obtained (A1 - C6)	%of Students with (A1- C6)	No.of Students with (D7- F9)	%of Students with (D7- F9)
2010	1,351,557	453,447	33.55	898,110	66.45
2011	1,540,250	587,630	38.93	952,620	61.07
2012	1,675,224	819,390	49.00	852,834	51.00
2013	1,543,683	555,726	36.00	987,957	64.00
2014	1,692,435	529,732	31.30	1,162,703	68.70
2015	1,593,442	544,638	34.18	1,048,804	65.82
T0tal	9,396,442	3,490,563		5,903,028	
		Mean (%)	37.02	Mean (%)	62.95

Source: Test Development Division, West African Examination Council (WAEC) Lagos, Nigeria as referred to by Zalmon and Wonu (2017). From the analysis in Table 3, it shows there is a significant difference between the performances of Students who obtained (A1 - C6) with percentage 37.15% and the performances of Students who obtained (D7 – F9) with the percentage of 62.82% in Mathematics in Nigeria over the years of study. In 2010 -2015 33.55%, 38.93%, 49.00%, 36.00%, 31.30%, 34.18% of students who enrolled for this examination obtained credit and above while 66.45%, 61.07%, 51.00%, 64.00%, 68.70%, 65.82% had D7 and F9 respectively.

Research questions three: What is the implication of the observed students’ achievement in WASSCE mathematics between 2010 and 2015 on sustainable development in Nigeria?

Table 4: Mean of the percentage of students in Nigeria that obtained credit and above (A1-C6) and pass and below (D7- F9) in the May/June WASSCE in general mathematics.

Achievement	2010 – 2015	
	Mean %	SD
Credit & above (A1- C6)	37.02	5.72
Pass & below (D7- F9)	62.95	5.67

Table 4 shows that six (6) years of the study, mean percentage of students in Nigeria who obtained (A1- C6) is 37.02% while mean percentage of students in Nigeria who had (D7-F9) is 62.95 % in the May/June WASSCE in general mathematics. The results indicated students’ abysmal performance in mathematics. Therefore, this revealed that if the pattern of observed performance in

May/June WASSCE general mathematics in Nigeria from 2010-2015 is maintained, the percentage of students who would pass mathematics at credit level continued to drop and the failure rate continued to increase over time. Then realizing sustainable development in Nigeria will be difficult. This general observable trends of students’ performance in May/June WASSCE mathematics in Nigeria from 2010-2015 is in agreement with the trend which is also less than 50% credit pass and above as confirmed by WAEC and other researchers (Adeiza, 2011 & Azuka, 2012 as in Musa & Dauda, 2014) [1, 3, 10]. It is fascinating to note that the discoveries of the present review are not unique in relation to the discoveries of (Zalmon and Wonu, 2017) [14]. The teaching and learning of mathematics in Nigeria can be said to be unacceptable and irritating. This is confirmed by the declining pattern in the performance of students. The outcome from table 4 above demonstrated the dismal performance of students and this forecasts threat for the eventual fate of Nigeria in the parts of human capacity development in realizing sustainable development.

Conclusion

The yearly arrival of West African Senior Secondary Certificate Examination (WASSCE) Mathematics by West African Examination Council (WAEC) demonstrates the hazardous nature and general poor performance of Secondary School students in Mathematics. This circumstance must be tended to if the Nation is to accomplish a sustainable development. This poor condition of Mathematics must be enhanced when there are satisfactory quantities of qualified Mathematics educators in the Nation.

Recommendations and Suggestions

1. The result recommends that mathematics teachers should present the subject in such a way that it becomes real, concrete, attractive, interesting, captivating, motivating and directly related and relevant to life.
2. The performances call for urgent attention for better academic performance.
3. The finding shows that there is a need to urgently make effort to improve students' performance in mathematics.

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