



Impact of Lagos Eko Secondary Education Project on Academic Performance of Students in West Africa Senior School Certificate Examinations

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Authors' contributions

This work was carried out in collaboration between the authors. Author MAO conceived the study, coordinated the collection of data, and helped drafting the manuscript. Author MBA designed the study, wrote the protocol, and performed the data analysis. Both authors read and approved the final manuscript.

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ABSTRACT

This study aimed to investigate the impact of the Lagos Eko Secondary Education Project (LESEP) on the average academic performance of students in the West Africa Senior School Certificate Examination (WASSCE) in Agege Local Government Area (LGA) of Lagos State, Nigeria. Convincing evidence was required that showed the WASSCE results of students in Pre-LESEP period differed significantly from the WASSCE results of students in Post-LESEP period in the three core subjects of Mathematics, English, and Biology. Simple random sampling techniques were used in this study. Any student who had written WASSCE within Agege LGA was a potential respondent. Six schools were selected from among the public secondary schools existing in Agege LGA. The WASSCE results and summary of the results were collected personally from the schools with the assistance of the Vice Principals. The data was carefully studied and checked for any omission.

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The analysis of the data was carried out using simple percentages and *R* software package which is publicly available and free. All the hypotheses were tested at 5% level of significance. The results show that the students' average academic performances in the core subjects are significantly better in Post-LESEP than in Pre-LESEP. Also students' performance in WASSCE rose from 7% in 2007 to 39% in 2012. In light of this significant achievement, it was recommended that Lagos Eko Project Training Programmes be extended beyond the core subjects. Teacher training must be continuous and on a regular basis for all teachers not just core subject teachers. When other teachers are given the opportunity to go through the same type of training, it should improve the overall performance of the students.

Keywords: Academic performance; *R* software package; ex-post facto; public secondary schools; education; Lagos; Nigeria.

1. INTRODUCTION

Education plays a key role in national development and is an essential path of a nation's well-being. Through education, individuals are empowered to make choices that affect their health and livelihood. The United Nations' International Conference on population and development [1] encouraged governments worldwide to ensure access to all to education beyond the primary school level.

The Federal Government of Nigeria (FGN) has recognized the risks to Nigeria's economy if its workforce is inadequately prepared and undereducated. The importance of education for individual, social, and political development and has resulted in an ambitious agenda of policy reforms across the entire sector.

Federal Government of Nigeria in 1999 launched the Universal Basic Education (UBE) Program and the UBE bill was passed in May 2004 making it mandatory for every child to receive nine years tuition-free education. Also, FGN in 2003 started the National Economic Empowerment and Development Strategy (NEEDS) which is a core multi-sectorial reform program that makes educational reforms as an important transformational tool and instrument for socio-economic empowerment.

A National Committee was inaugurated in June 2005 to oversee and allocate additional funds from debt relief for the success of the Millennium Development Goals. The FGN in 2006 launched an important education reform program which emphasizes the benefit of institutional reforms to adequately improve the efficiency and effectiveness of service delivery at all levels of education [2]. Similarly, Nigeria States have also developed individual State Empowerment and Economic Development Strategies (SEEDS)

which prioritize provision of education at the state level.

As part of the efforts to provide qualitative and affordable free education in the state, the four-year Lagos Eko Secondary Education Project (LESEP) was initiated by the Government of Lagos State in 2009. This initiative is a \$90 million partnership between the World Bank and the Lagos State Government and complements on-going reforms in the state education sector. The predominant aim of this strategic investment initiative is the provision of qualitative education to children in secondary school (Junior and Senior) designed to strengthen the development of human capital in the state. The Project directly supports public secondary schools through the awarding of development grants at school level; performance based incentives, teacher training and standardized testing of students, public-private collaboration for technical education, and the volunteer teachers' scheme. The project directly supports over 620,000 students in 667 public junior and senior secondary schools [3].

The goals of LESEP include the followings:

First, the Eko Project covers 632 JSS and SSS public secondary schools and 5 technical colleges. This is to ensure that they are suitable to the world of work in general and that they can attract private sector involvement.

Second, the Eko project is for the enhancement of the teaching and learning of English, Mathematics and Science subjects. It is also to improve the competency of the students in these subject areas and it is expected to open the doors to increase competencies in other subject areas.

The third goal is for the strengthening and equipping Lagos State Examination Board to

carry out quality standardization of testing to measure student's performance.

Fourth, it is for strengthening and equipping of Teachers Establishment and Pension Office (TEPO) to deliver good quality training relevant to the needs of teachers.

Lastly, it supports the six (6) educational districts to deliver increased educational performance in students.

The Lagos state education sector faces serious challenges including low access to secondary school education for the poor, insufficient funding and absence of accountability, inadequate capacity for policy making, management, assessment, and controlling, bad design of curriculum to meet the job market needs, and large private provision of primary and some secondary schools not consistently checked or audited by the State [2,4].

These led to declined performance of students in internal examinations conducted by the schools as well as external examinations conducted by the West Africa Examination Council for Senior School Certificate Examinations (WASSCE). Therefore, the extent to which LESEP imparted on the students' academic performance in West Africa Examination Council will therefore be investigated in this study.

1.1 Purpose of the Study

The main objective of Lagos Eko project has been to improve the overall quality of public secondary education in the state by enhancing students' learning outcomes. This study however, is to investigate the impact of LESEP on the students' academic performance in WASSCE in the three major subjects (Mathematics, English Language, and Biology).

1.2 Research Questions

To achieve the main aim of this study, the following research questions guided the study: What is the level of academic performance of students in West African Senior School Certificate Examination (WASSCE) before the implementation of Lagos Eko Secondary Education project (LESEP) in the three major subjects? Is there any effect of LESEP on the academic performance of students in the three major subjects at WASSCE? What is the general impact of LESEP on academic performance of students in WASSCE in the three major subjects?

1.3 Hypotheses

In order to answer the research questions, the following research hypotheses were formulated:

- There is no significant difference in the students' average academic performance in Mathematics at WASSCE prior and during the implementation of LESEP.
- There is no significant difference in the students' average academic performance in English at WASSCE prior and during the implementation of LESEP.
- There is no significant difference in the students' average academic performance in Biology at WASSCE prior and during the implementation of LESEP.

2. METHODS

Ex-post facto survey design was adopted in this study. Akuezilo and Agu in [5] stated that an ex-post facto design is where a researcher carried out empirical inquiry but did not have direct control of the independent variables because their manifestations had already occurred. Ex-post facto design is a non-experimental research technique in which pre-existing groups are compared on some dependent variable; it is a type of study that can masquerade as a genuine experiment. It is then, a method of teasing out possible antecedents of events that have happened and cannot, therefore, be engineered or manipulated by the investigator.

This study covered Agege Local Government Area (LGA) which in the Zone I of Lagos State Education District I. There are thirty seven senior public secondary schools within Education District I out of which eight are situated in Agege LGA. The target population for the study consists of all students in Agege LGA who had written WASSCE and have their Ordinary level results released by West Africa Examination council (WAEC) for a period of six years (2007 - 2012).

Simple random sampling technique was used in this study so that any student who had written WASSCE within Agege LGA would be fit to be a respondent. Six schools were selected from public secondary schools existing in Agege LGA. The selected secondary schools are:

- Government Senior College, Iyana-Ipaja, (GSC)
- Girls Senior High School, Iyana-Ipaja, (GSHS)
- State Senior High School, Oyewole (SSHS)

Lagos Baptist Senior College, Orile-Agege (LABASCO)
 Dairy Farm Senior Grammar School, Sango (DFSGS)
 Abibat Mogaji Millenium Senior Secondary School, Iloro (AMMSSS)

These schools were chosen owing to their reputation of academic excellence and because of their proximity to the researchers.

The WASSCE results and summary of the results were collected personally from the schools with the assistance of the Vice principals. The data was carefully studied and checked for any omission. With this procedure, we expected a high degree of accuracy in the data collected from the six schools. In each of the six schools, students that scored (credit and distinction i.e. C6 – A1) in Mathematics, English Language, and Biology were collected.

This study investigated the impact of LESEP on the students' academic performance in WASSCE in Lagos state. The data collected are grouped into Pre-LESEP performance (2007 - 2009) and Post-LESEP performance (2010-2012).

3. DATA ANALYSIS

R free software package was used to analyze the data collected. The package is a broad statistical environment and programming language for adept data analysis and graphical display [6,7,8]. It runs on all common operating systems and has

many benefits over Excel and other data analysis software. Using t-test, the statistical analysis was tested at 0.05 level of significant. The analysis was based on the data collected (WASSCE results 2007 to 2012) from the selected schools as shown in the Tables 1 and 2.

4. RESULTS AND DISCUSSION

Figs. 1 and 2 above illustrate the students' academic performance in Mathematics, English language, and Biology at WASSCE before and during the implementation of Lagos EKO secondary education project (LESEP).

First, the percentage academic performance of students in Mathematics, we observed that Lagos Baptist Senior College (LABASCO) improved significantly from 6.4% in pre-LESEP to 83.2% in post-LESEP, a clear difference of 76.8%. Government Senior College (GSC) was 3.3% and increased to 8.9% with a difference of 5.6% after three years of LESEP implementation. Abibat Mogaji Millenium Senior Secondary School (AMMSSS) improved from initial 2.3% performance to 34.4%. While performance of students from State Senior High School (SSHS) was 8.7% to 19.4%, Dairy Farm Senior Grammar School (DFSGS) was 3.5% to 26.5%; and also there was a noticeable improvement in the students' academic performance at Girls Senior High School (GSHS) from 1.8% to 2.5% during the period.

Table 1. Enrolment and performance of candidates in WASSCE from 2007 - 2009 in mathematics, english language, and biology (Pre-LESEP Enrolment and Performance)

Schools	2007 - 2009	GSC	GSHS	SSHS	DFSGS	LABASCO	AMMSSS
Subjects							
Mathematics	Enrolment number	1366	1307	1064	770	1004	2129
	Number of credit passes (A1 - C6)	45	24	93	27	64	50
	Percentage passed (%)	3.3	1.8	8.7	3.5	6.4	2.3
English language	Enrolment number	1366	1307	1064	770	1004	2129
	Number of credit passes (A1 - C6)	71	78	88	65	44	67
	Percentage passed (%)	5.2	6.0	8.3	8.4	4.4	3.1
Biology	Enrolment Number	1366	1307	1064	770	1004	2129
	Number of credit passes (A1 - C6)	80	5	80	22	23	44
	Percentage passed (%)	5.9	0.4	7.5	2.9	2.3	2.1

Table 2. Enrolment number and performance of candidates in WASSCE from 2010 - 2012 in mathematics, english language, and biology (Post- LESEP Enrolment and Performance)

Schools	2010 - 2012	GSC	GSHS	SSHS	DFSGS	LABASCO	AMMSSS
Mathematics	Enrolment number	1085	527	723	521	333	575
	Number of credit passes (A1 - C6)	97	13	140	138	277	198
	Percentage passed (%)	8.9	2.5	19.4	26.5	83.2	34.4
English language	Enrolment number	1085	527	723	522	333	575
	Number of credit passes (A1 - C6)	375	105	226	165	225	165
	Percentage passed (%)	34.6	19.9	31.3	31.6	67.6	28.7
Biology	Enrolment number	1085	527	720	522	333	575
	Number of credit passes (A1 - C6)	281	99	288	137	247	277
	Percentage passed (%)	25.9	18.8	40	26.2	74.2	48.2

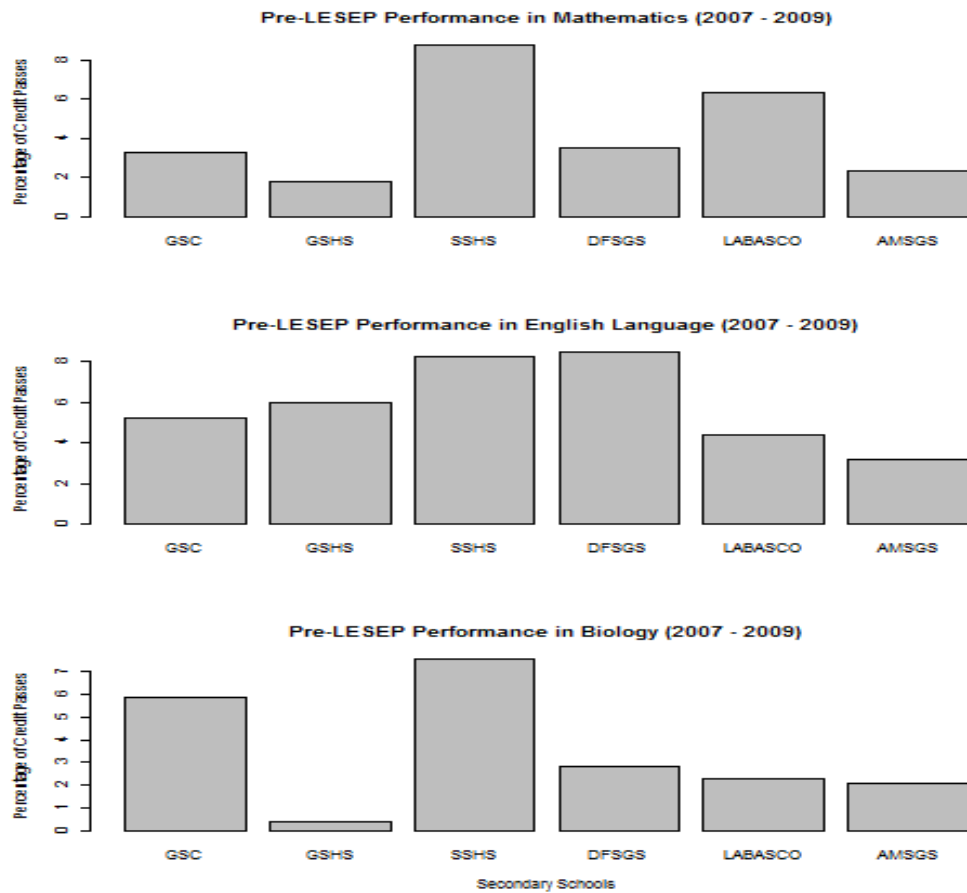


Fig. 1. Percentage performance of candidates for the period 2007 – 2009: Top panel represents performance in mathematics; middle panel represents performance in english language; and bottom panel represents performance in biology



Fig. 2. Percentage performance of candidates for the period 2010 – 2012: Top panel represents performance in mathematics; middle panel represents performance in english language; and bottom panel represents performance in biology

Furthermore, the students' percentage academic performance in English language, we noticed that GSC performance at WASSCE before implementation of LESEP was 5.2% and it was increased to 34.6% after three years of implementation showing an increase performance of 29.4%. At AMSSS, academic performance rose from initial 3.1% to 28.7%, an improvement of 25.6%; LABASCO improved significantly from 4.4% to 67.6%, showing a progress of 63.2%. Also, there was a significant improvement in the performance of GSHS's students from 6% to 19.9%; SSHS was 8.5% to 31.3%; and DFSGS was 8.4% to 31.6%.

Lastly, the percentage academic performance of students in Biology, we observed that GSHS improved considerably from 0.4% in pre-LESEP to 18.8% in post-LESEP; LABASCO also improved significantly from 2.3% to 74.2%; GSC percentage academic performance before implementation of LESEP was 5.9% and it improved to 25.9% after three years of

implementation of LESEP. Academic performance at AMSSS improved from initial 2.1% to 48.2%. While performance of students at SSHS improved from 7.5% to 40%; DFSGS also improved from 2.9% to 26.2%.

4.1 Hypothesis Testing

We looked at three hypothesis tests in order to answer the research questions. All are of the following form:

Null hypothesis →

$$H_0 : \mu_2 - \mu_1 = 0$$

Alternative hypothesis →

$$H_A : \mu_2 - \mu_1 \neq 0$$

where μ_1 represented the pre-LESEP group average academic performance and

μ_2 represented the post-LESEP group average academic performance.

We have three different sets of comparisons to make for the core subjects. The summary statistics are shown for the subjects in Tables 3, 4, 5. The observations are independent since the data come from random sample and less than ten percent of the population. Additionally, each group's sample size is large (at least 30), even extreme skew is acceptable. So, individual sample mean is associated with a nearly normal distribution [9].

4.1.1 First hypothesis

This hypothesis stated that there is no significant difference in the students' average academic performance in Mathematics at West Africa Senior School Certificate Examination (WASSCE) before and during the implementation of Lagos EKO secondary education project (LESEP).

Table 3. Summary statistics of performance of candidates in mathematics at WASSCE prior and during LESEP

	Number of credits (n)	Mean (\bar{x})	Standard deviation (s)
Pre-LESEP	303	50.5	25.59
Post-LESEP	863	143.8	89.47

Table 4. Summary statistics of performance of candidates in english language at WASSCE prior and during LESEP

	Number of credits (n)	Mean (\bar{x})	Standard deviation (s)
Pre-LESEP	413	68.83	14.77
Post-LESEP	1261	210.17	92.5

Using *R* software package [6,7,8], we obtained *P*-value of 1.586×10^{-84} which is less than the significance value, 0.05, so we reject the null hypothesis. Hence, it revealed that there is sufficient evidence to conclude that the candidates' average academic performance in Mathematics is significantly different (in fact, it is greater) in Post-LESEP than in Pre-LESEP. Also, in an attempt to investigate the actual difference in means, a 95% confidence level is given by (86.65, 99.95). Thus, we are 95% confident that the academic performance of candidates in Post-

LESEP is, on average, between 86.65 and 99.95 better than Pre-LESEP in Mathematics [10].

Table 5. Summary statistics of performance of candidates in biology at WASSCE prior and during LESEP

	Number of credits (n)	Mean (\bar{x})	Standard deviation (s)
Pre-LESEP	254	42.33	31.69
Post-LESEP	1329	221.5	82.267

4.1.2 Second hypothesis

This hypothesis stated that there is no significant difference in the students' average academic performance in English Language at West Africa Senior School Certificate Examination (WASSCE) before and during the implementation of Lagos EKO secondary education project (LESEP).

Similarly, using *R* software package [6,7,8], we obtained *P*-value of 6.203×10^{-184} which is less than the significance value, 0.05, so we reject the null hypothesis. Hence, it revealed that there is sufficient evidence to conclude that the candidates' average academic performance in English Language is significantly different (in fact, it is greater) in Post-LESEP than in Pre-LESEP. Also, in an attempt to investigate the actual difference in means, a 95% confidence level is given by (136.05, 146.69). Thus, we are 95% confident that the academic performance of candidates in Post-LESEP is, on average, between 136.05 and 146.69 better than Pre-LESEP in English Language [10].

4.1.3 Third hypothesis

This hypothesis stated that there is no significant difference in the students' average academic performance in Biology at West Africa Senior School Certificate Examination (WASSCE) before and during the implementation of Lagos EKO secondary education project (LESEP).

Similarly, using *R* software package [6,7,8], we obtained *P*-value of 6.999×10^{-151} which is less than the significance value, 0.05, so we reject the null hypothesis. Hence, it revealed that there is sufficient evidence to conclude that the candidates' average academic performance in Biology is significantly different (in fact, it is greater) in Post-LESEP than in Pre-LESEP. Also, in an attempt to investigate the actual difference

in means, a 95% confidence level is given by (173.25, 185.09). Thus, we are 95% confident that the academic performance of candidates in Post-LESEP is, on average, between 173.25 and 185.09 better than Pre-LESEP in Biology [10].

5. CONCLUSION

The findings confirmed the World Bank report in [11] on the development aim of the project which has enhanced the quality of public secondary education in the State.

It was revealed in this study that the project had supported over five hundred thousand public school students in 637 secondary schools, over 7,000 teachers and school administrators. It has empowered and strengthened the capacity of district, state and education institutions in Lagos state [2]. Also, it was found that LESEP improved the professional status and teaching methods of the teachers and boosted the students' academic performance; these were in agreement with the results obtained in [12,13].

The study discovered that student enrolments in public secondary schools for WASSCE before Lagos Eko project in Lagos state was higher with a record of poor academic performance. While the students' enrolments for WASSCE during the period of Eko project was reduced with an improved academic performance.

It was also discovered that under EKO project, students did not get the results of their assessments; instead the results are aggregated using statistical techniques in order to enhance policy development. The results of the analysis are used to monitor achievement trends over the period. The use of simple statistics for the presentation of school results provides the opportunity for stakeholders to have clear understanding of the trend of performance across schools, districts and state wide.

The study revealed that impact of Lagos Eko project on academic performance of students at WASSCE varies from school to school. While majority of the schools improved significantly, few are yet to justify the objective of Lagos Eko project grant.

This study established that Students' performance in WASSCE in 2007 shows poor performance of public schools students in SSCE but there was gradual improvement on the performance of students in English Language, Mathematics and Biology from 2010 to 2012.

Another visible impact of the project is the restoration of confidence in public schools as some parents now withdraw their wards from private schools to the improved public schools with motivated teachers and improved learning environment. This is in accordance to the results and suggestions given in the research papers by Akinyemi, et al. [12] and Gbenu [14].

Generally, the study confirmed Lagos Eko Secondary Education Project (LESEP) has an obvious impact on the students' academic performance in WASSCE in the last three years of its implementation in the three core subjects [12,15].

6. RECOMMENDATIONS

This study investigated the impact of Lagos Eko Secondary Education Project (LESEP) on the academic performance of students in WASSCE in Lagos state. It was discovered that the performance of students in WASSCE rose from 7% in 2007 to 39% in 2012. With this significance achievement, the followings were recommended:

First, Lagos Eko Project training programmes should be extended beyond the core subjects (English Language, Mathematics and Biology). Teacher training must be continuous and regular for all teachers, not just core subject teachers. When other teachers are given the opportunity to go through the same type of training, it will improve the overall performance of the students.

Furthermore, greater attention should be given to schools that do not have enough accommodation, furniture, and instructional materials particularly in the suburb areas of the state and there is need for a resourcing review to be carried out.

At the inception of the Lagos Eko Project there was a state-wide identification of poor academic performance of students in public secondary schools and training needs exercise for teachers. Having implemented the programme for three years, some of the needs have been fully met. It is therefore necessary to urgently carry out further research in order to design new strategies that will enhance the effectiveness of future interventions.

Utilizing the aforementioned suggestions and recommendations to sustain the Lagos Eko Project will go a long way to improve the standard of education in Lagos State.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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