INFLUENCE OF INSTRUCTIONAL AND ADMINISTRATIVE SPACE PLANNING ON ACADEMIC ACHIEVEMENT IN MATHEMATICS AMONG PRIMARY SCHOOLS PUPILS IN LAGOS STATE, NIGERIA

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Abstract

This study examined the influence of instructional space planning and administrative space planning on pupils' academic achievement in mathematics among primary school pupils in Lagos state. The targeted population of this study was all the teachers and primary school pupils in 66 pubic primary schools from which a sample of 103 mathematics teachers and 850 primary school pupils was selected using stratified and proportionate random sampling methods. The research design for this study was a descriptive research design. A self-structured questionnaire titled "Instructional and Administrative Space Planning Questionnaire" (IASPQ) was used, validated and reliability coefficient was 0.97 and 0.72 respectively and 0.84 for academic achievement. Two research questions and two hypotheses guided the study at 0.05 level of significance. Data collected were analyzed using standard deviation and inferential statistics such as multiple regressions. Results indicated a significant combined influence of instructional and administrative space planning on academic achievement in mathematics among public primary school pupils ($F_{(1,102)= 321.412.}$ $p< 0.05$). Results also indicated a significant relative influence of instructional space planning and administrative space planning indices on academic achievement in mathematics in public primary school (β=0.34, t(103)= 4124, P< 0.05) and β = 0.23, t(103) = 6.213, p< 0.05) respectively. In conclusion, it was

observed that instructional space planning and administrative space planning influence academic achievement in mathematics among primary school pupils in Lagos. Based on the findings, it was recommended that modern classroom learning environment as well as the mathematics laboratory is conducive and adequate means of ventilation should be provided in order to keep the pupil hygienically sound and healthy in the school.

Keywords: *Instructional space planning, Administrative space planning, Academic Achievement, Mathematics, Lagos state*

Introduction

Education plays a major role in the life of any nation. It is regarded as the most important instrument of socialization, development, integration and reform. Education is asserted to be the most powerful and dynamic instrument for social, economic, political, scientific and technological development of nation (FRN, 2013) Education is a development of all capacities in an individual which will enable the individual to fit into its environment and fulfill has responsibilities that is self-realization, which promote societal development. Education in any society at all level is expected to help the members of the society to acquire necessary knowledge, attitude or values and competent skills for effective knowledge and functioning in the society. (FRN, 2013)

However, quality education cannot be achieved if there is decay in infrastructures of schools, as most public schools in Nigeria lack 21st century facilities like mathematics laboratories or technical workshop. Nigeria education sector got it wrong by not putting instructional space planning school plant indices include instructional space indices, administrative space indices, education spaces indices, convenience space indices, accessories space indices are very essential variables in students' academic achievement (Adefisayo, 2018) The level to which pupils academic achievement could be enhanced depends on their location within the school compound, the structure of their classroom, availability of instructional facilities and administrative facilities such as school library, class teacher's office, auditorium and mathematics laboratory. The physical characteristics of the school have a variety of influence on teachers, and the academic achievement on the pupils. Poor lighting, roads, high levels of carbon dioxide in

classroom and inconsistent temperatures make teaching and learning difficult and hence low academic achievement can be experienced. (Osikomaya and Adesanya, 2010).

According to Ileuma (2015), educational attainment levels in Nigeria appear to be low by international standards. The quality of pupil's performance in the key subject such as mathematics is reported low. It was stressed that everyday encounter with products of our educational institutions confirms their poor quality. Adenuga (2012) revealed low level of pupil academic performance which is associated with the decline in the availability instructional space planning (mathematics in the schools revealed laboratory, school library) and administrative space planning teachers' offices, school hall) that the performance of the output of the primary school system is questionable particularly with the failure rate and sub-optional performance in key subject area such as Mathematics pupils academic achievement cannot be considered in isolation of the determining factors such as mathematics library, availability of library, auditorium.

Adesanya (2010) argued that in Nigeria succession governments have often been blamed for the deteriorating level of education. The reasons adduced range from inadequate budgetary allocation, poor and inadequate infrastructures, overcrowded classrooms, and lack of data for accurate planning. According to Adeyemi (2010), education sector analysis report on monitoring of learning achievement studies conducted by the Federal Ministry of Education for primary school pupils clearly showed low achievement of students in basic knowledge and skills for entrepreneurship and educational achievement. Coher and Maliun (2010) submitted that the essence of any educational system at whatever level cannot be in isolation of the instructional space planning and administrative space planning. Yakubu aand Sowunmi (2018) argued that one of the strongest problems with Nigeria educational system is the inappropriate instructional space planning indices and administrative space planning indices.

Muraina and Muraina (2010) revealed that comfortable classroom temperature and smaller classes enhance teacher's effectiveness and provide opportunities for students to receive individual attention, ask more questions, participate fully in discussion, reduce discipline problems and perform better than students in schools with larger classes. Adequate means of ventilations should be provided in order to

keep the student hygienically sound and healthy; classrooms should be kept away from unnecessary noise and distractions. The number of classrooms in a school depends on the school enrolment, the subject learn and taught, a good school, the permanent classrooms, the special subject classroom and laboratories/workshop (Oyesola, 2000)

Adeogun (2001) revealed that instructional materials support pupil's wellbeing and provide a gathering pace to talk, shore ideas, skills and stories, pay with Lego, play to listen to music, and build relationships with peers, teachers and facilitators. They are whore emotional support that can be given by spending time with others to listen and talk both formally and informally and feelings and understanding can be developed can be stimulated by providing challenges and opportunities for discovery and play, like pulling computer apart and naming and identifying parts and what they do. Learning new skills can help boost confidence and a sense of achievement and deeper learning. A classroom that is suitable has much more than good lighting, good seating desks and cupboard (Adeogun 2001).

Ijaiya and Fabunmi (2007) postulated that instructional space planning condition influence student's academic achievement. Their study revealed significant positive relationship between conducive classroom environment and pupils' academic achievement. The study has shown that there was a significant relationship between instructional space planning and student academic achievement. That is better instructional space planning such as classroom, laboratory, technical workshop would enhance better pupils' academic achievement but poor instructional planning space may have negative influence on pupils' academic achievement in schools. Thus instructional space planning should be well design in a comfortable and a manner, so as to make student proud of them. The authors advocated that Educational planners should look at pupils' developmental needs and curriculum in order to make proper planning, re-designing and expanding instructional space to those needs and requirements (Ileuma, 2015).This study therefore seek to examine the influence of instructional and administrative space planning on academic achievement in Mathematics among public primary schools pupils in Lagos state.

Purpose of the study

This study seeks to ascertain the influence of Instructional and Administrative space planning on academic achievement in Mathematics among public primary schools in Lagos, Nigeria. Specifically, the study sought to:

1. Examine the availability level of instructional space planning in Lagos state, Nigeria.
2. Examine the availability of administrative space planning in Lagos state, Nigeria.
3. Examine the combined influence of instructional and administrative space planning on academic achievement in Mathematics among public primary school pupils in Lagos state Nigeria.
4. Investigate the relative influence of instructional and administrative space planning on academic achievement in Mathematics among public primary school pupils in Lagos State, Nigeria.

Research Questions

1. What is the availability level of instructional space planning indices in primary schools in Lagos state?
2. What is the availability level of administrative space planning indices in primary schools in Lagos state, Nigeria?

Hypotheses

Ho_1: There will be no significant combined influence of instructional and administrative space planning on academic achievement in Mathematics among public primary school pupils in Lagos State, Nigeria.

Ho_2: There will be no significant relative influence of instructional and administrative space planning on academic achievement in Mathematics among public primary school pupils in Lagos state, Nigeria.

Methodology

The study employed a descriptive survey research design. The population of the study is made up of all public primary schools pupils in Lagos state in which fifty one were selected, two mathematics teachers were randomly selected from each of the primary school. A

stratified and simple random sampling was used to select the respondents in the public primary schools (103 public primary school mathematics teachers). A self-structured questionnaire tagged "Instructional space planning questionnaire (ISPQ), Administrative space planning questionnaire (ASPQ) and a standardized achievement test in mathematics (SATM) were administered to the respondents. It consists of 3 sections. Section A contains bio-data of the mathematics teachers, section B deals with the instructional space planning questionnaire while section C deals with administrative space planning questionnaires. The coefficient of internal consistency obtained using Cronbach Alpha for Instructional Space Planning scale was 0.97 and Administrative space planning scale was 0.72 respectively while academic achievement scale was 0.84 at 0.05 level of significant. The data analysis involved the use of frequency count, percentage standard deviation and inferential of multiple regression.

Results and Discussion of Finding

The result of the research questions and hypotheses of the study would be discussed in the table below

Research Question 1: What is the availability level of instructional space planning indices in primary schools in Lagos state?

Table 1: Availability Level of the Instructional Space Planning

S/N	Items	Available & Adequate	Available not Adequate	Available not in Use	Not Available	Mean	Std. D
1.	Classroom for learning	24 (23.3%)	13 (12.6%)	30 (29.1%)	36 (35%)	2.56	0.813
2.	The school library with current periodical textbook	14 (13.6%)	20 (19.4%)	29 (28.2%)	40 (39.0%)	3.41	0.621
3.	Equipped mathematics laboratory	16 (16%)	24 (23.3%)	50 (48.5%)	13 (12.6%)	2.62	0.462
4.	The instructional material in the school	40 (39.0%)	30 (29.1%)	20 (19.4%)	13 (12.6%)	3.14	0.562
	Total	**Weighted mean = 2.95**					

Note: Mean ranges form: 0- 1.49 = Not Available 1.50 – 2.4 =Available Not in Use 2.50 -3.49 Available Not Adequate, 3.50 – 4.0= Available and Adequate

Table 1 above shows the level of classroom for learning (mean = 2.56); School library with current periodical textbook (mean = 3.41); Equipped Mathematics laboratory (mean = 2.62); Instructional material (mean = 3.14). The weighted mean is given as 2.95 which implied that the respondents submitted that the instructional space planning is available but not adequate. Muraina and Muraina (2010) submitted that comfortable classroom temperature and smaller classes enhance teacher's effectiveness and provide opportunities for students to receive individual attention, ask more questions, participate fully in discussion, reduce discipline problems and perform better than students in schools with larger classes. In line with the above submission, Ijaiya and Fabunmi (2007) postulated that instructional space planning condition influence student's academic achievement. Their study revealed significant positive relationship between conducive classroom environment and pupils' academic achievement.

Research Question 2: What is the availability level of administrative space planning indices in primary schools in Lagos state, Nigeria?

Table 2: Availability of level of the Administrative Space Planning Indices

S/N	Items	Available & Adequate	Available not Adequate	Available not in Use	Not Available	Mean	Std. D
1.	Headmasters office	07 (7.0%)	21 (20.4%)	35 (34.0%)	40 (38.8%)	3.16	0.452
2.	Well-equipped furniture in the Offices	21 (20.4%)	30 (29.1%)	30 (29.1%)	22 (21.4%)	3.43	0.814
3.	Teacher staff offices	36 (35.0%)	20 (19.4%)	30 (29.1%)	14 (16.5%)	2.21	0.343
4.	Ventilated Auditorium and school hall	41 (40.0%)	31 (30.1%)	20 (19.4%)	12 (11.5%)	3.62	0.731
	Total	**Weighted mean = 3.02**					

Note: Mean ranges form: 0- 1.49 = Not Available 1.50 – 2.4 =Available Not in Use 2.50 -3.49 Available Not Adequate, 3.50 – 4.0= Available and Adequate

Table 2 above indicated the level of availability of headmaster office (mean = 3.16); Well –equipped furniture in the office (mean = 3.43); Teachers' staff offices (mean = 2.21); Ventilated Auditorium and School Hall (mean = 3.62). The weighted mean is given as 3.05 which implied that the respondents submitted that the administrative space planning are available but not adequate. Yakubu S. & Sowunmi G (2018) argued that one of the strongest problems with Nigeria educational system is the inappropriate instructional space planning indices and administrative space planning indices. In addition, Educational planners should look at pupils' developmental needs and curriculum in order to make proper planning, re-designing and expanding instructional space to those needs and requirements (Ileuma, 2015). Holler (2010) argued that one of the strongest problems with the Nigeria educational system is the inappropriate instructional and administrative space planning.

Test of Hypotheses

HO_1: There will be no significant combined influence of instructional space planning indices on academic achievement in mathematics among public primary school pupils in Lagos State, Nigeria.

Table 3: Combined Influence of Instructional space planning indices on academic achievement in mathematics among Primary Schools Pupils in Lagos State, Nigeria

R = 0.621; R2 = 0.315; Adj. R2 = 0.243; Std. Error = 12.132

Model	Sum of Square	Df	Means Square	F	Sig
Regression	35617.43	1	1345.1612	321.44	.000
Residual	147436.35	102	154.362		
Total	183053.78	103			

Predictors (Constants) academic achievements in Mathematics

Result in table 3 shows that combined influence of instructional and administrative space planning on academic achievement in mathematics among public primary schools pupils in Lagos State. The multiple correlation coefficient (R = 0.62) imply that there is a linear relationship between these variables. It indicates that the value of R square which was 0.315 (instructional and administrative space planning) jointly account for 31.5% observed variance on academic

achievement in mathematics in public primary schools in Lagos. The result is consistent with that of Adenuga (2012) who found that low level of pupils academic performance is associated with the decline in the unavailability of instructional space planning (mathematics laboratory, school library) and administrative space planning (teacher office and school hall) in schools. Also in line with the study by Yakubu S & Sowunmi G (2017) which revealed that the essence of any educational system at whatever level cannot be in isolation of the instructional and administrative space planning in schools.

The linear combination of all the predictor variables was found to have significant influence on academic achievement in mathematics ($F_{(1,\ 102)}$ = 321.412, p<005) therefore the hypothesis is rejected. This implies that instructional and administrative space planning jointly determined academic achievement in mathematics among public primary schools in Lagos state, Nigeria.

HO_2: There will be no significant relative influence of instructional and administrative space planning indices on academic achievement in Mathematics among public primary schools pupils in Lagos state, Nigeria.

Model	**β**	**Unstandized Coefficients std Error**	**Standardized coefficients (β)**	**t**	**Sig**
(Constant)	5.436	2.153	.461	7.146	0.000
Instructional space planning indices	.431	.342		4.124	0.000
Administrative Planning Indices	0.534	.246	.514	6.213	000

The above table shows the instructional and administrative space planning had significant relative influence to academic achievement in mathematics (β = 0.34, t (103) = 4.124, p < 0.05) and β=0.23, t (103) = 6.213, p < 0.05). This implies that instructional space planning and Administrative space planning independently determines pupils' academic achievement in mathematics among Public Primary Schools

Pupils in Lagos State, Nigeria. This is in line with the submission of Adeogun (2001) that a classroom which is suitable for learning is much more than good lighting, a good seating desk and overcrowding classroom have influence on academic achievement of the pupils. Muraina and Muraina (2014) also revealed that comfortable classroom temperature and smaller classes enhance teachers' effectiveness and provide opportunities for students to receive attention and this enhanced high academic achievement.

Conclusion

Based on the finding of this study, it is concluded that instructional (mathematics laboratory and availability of library) and administrative space planning (adequate and conducive teacher's staffroom) jointly influenced academic achievement in mathematics among public primary schools pupils. It also concluded that mathematics laboratory, school library, adequate and conducive teachers' staffroom independently determined academic achievement in mathematics among public primary schools pupils in Lagos state.

Recommendations

The following were recommended based on the findings of the study

1. Modern classrooms with adequate means of ventilation should be provided in order to keep the pupils hygienically sound and healthy, classroom should be kept-away from unnecessary noise and distractions.
2. Government should pay more attention to primary school education and provide adequate facilities like libraries, mathematics laboratories e.t.c.
3. Teachers' salary should be paid prompt and at the same time try to improve the salary scale of teachers so as to encourage them to put in their best.
4. The administrative offices should be well furnished and adequate for use of the teachers.
5. The infrastructures and facilities in primary schools should be renovated in order to fit for the 21st century schools so as to provide a conducive atmosphere for learning.

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