

School Plants Planning and Maintenance as Correlate Students' Academic Performance in Irele Local Government Area of Ondo State, Nigeria

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Abstract This study among other things examines the relationship between school plant planning and students' academic performance in ten randomly selected secondary schools in Irele Local Government Area of Ondo State using descriptive survey research design. The sample consists of 110 respondents comprising 10 school principals and 100 students. Stratified and simple random sampling techniques were used to select the sample. Relevant data were collected by means of well structured questionnaires titled "School Plant Planning Questionnaire" for the school principals and Students' Academic Performance Inventory for the students. Data collected were analyzed using percentages and Pearson product moment correlation. Five null hypotheses were tested at 0.05 level of significance. The study revealed that the levels of school plant planning and students' academic performance were relatively close, and as such students' academic performance was significantly related to instructional space planning, Administrative space planning, circulation space planning, and space for convenience planning. Based on the findings, it was recommended that authorities concerned should implement.

Keywords Academic performance, Accessory, Maintenance, School plant, Convenience

1. Introduction

School is an organized environment where educational curricula are interpreted. It is a formal structured organization which serves as a transitional stage in life between family and the society [1,2]. School plant is the totality of all things that make up a school system. It involves the physical and material facilities in form of buildings, school site and the environment that embody the school. Akpan [3], Dimmock [4] and Adegoke [5] agreed that the school plants include the site, the environment, the building, facilities and equipment and this includes the permanent structures like workshops, libraries, classrooms, laboratories and semi-permanent structures like the educational system itself.

School plant planning throughout the world's educational systems including Nigeria has gained attention in recent times. Educational facilities such as school plant have been

repeatedly found to have positive relationship with quality of educational system [6]. School plant planning is the process of positioning school facilities in organized positions where educational activities could be achieved. Adeyemi [7] also referred to school plant planning as the process of management, construction, utilization and maintenance of school facilities to ensure goal achievement. Nevertheless, school plant planning requires maximum cooperation and hard work from a combined team of the school principal, teachers, students and other school personnel, architects, engineers and the community.

School plant planning which includes instructional spaces planning, administrative places planning, circulation spaces planning, spaces for conveniences planning and accessories planning are essential in teaching-learning process. The extent to which these spaces could enhance teaching and learning depends on their location within the school compound, their structure, and accessories. Odufowokan [8] states that a well-planned school plant will facilitate expected outcomes of education that will enable good social, political and economic emancipation, effective teaching and learning process and academic performance of the students.

Contextually in this study, school plant planning refers to the following [8]:

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- a) Instructional Spaces: These include classrooms, auditorium, gymnasium, library, workshops, laboratory, arts room, home economics rooms, multipurpose rooms/halls, music area and any other space where students receive instruction.
- b) Administrative Spaces: These comprise principal's office, clerk's office, staff room, Guidance Counsellors' office and Health clinics.
- c) Circulation Spaces: These include corridors, lobby, staircases and other spaces where students recreate.
- d) Spaces for conveniences: These consist of toilets, cafeteria, kitchen, dormitories, custodian sheds and stores, and
- e) Accessories: These include parks, garden, fields, courts and lawns.

The importance of school plant planning in the development of an effective educational programme at all levels of the educational system, particularly at the secondary school, cannot be overemphasized. The attainment of an effective teaching and learning is therefore closely related to the location of the school, the organization and arrangement of the physical structures and other educational facilities in the school [9-11].

Abdulkareem [12], Ijaluola [13] and Abayomi [14] remarked that the physical appearances and general condition of school facilities are the striking bases upon which many parents and friends of educational institution make their initial judgment about the education qualities in the school. They all agreed that schools with well coordinated plant planning and maintenance practice, recorded better students performance be they in rural or urban schools.

School plant management therefore involves a number of ongoing and related activities determining the need for school plants, educational programme planning, school facility or building design, building construction, furnishing and equipping the school, school plant operation, utilization and maintenance, and school plant modernization or renovation if and when the need arises [15]. Ajayi [16] and Ijaluola [17] opined that the school plants need to be adequately managed in order to ensure both effectiveness and efficiency of the system. Poor state of infrastructure in school is one of the principal factors militating against the effective academic achievement in secondary school in Nigeria. The common goal of operation and maintenance as remarked by Ojedele [18] is to keep physical plants in the best possible condition at all times. The importance of school plant maintenance as identified by Olagboye [19] includes:

1. Proper maintenance of school plant ensures safety for those occupying the school building.
2. It facilitates teaching and learning process.
3. It saves costs. This is because reactivating a collapsed building may cost more than to make early repairs on the building.

4. It ensures the suitability of school plant for continued use.
5. It reduces student unrest and demonstration because inadequate school facilities might lead to students protest.

In view of the aforementioned importance of school plant maintenance, Ijaluola [13] advised that professionals in the area of architecture and engineering should be involved in planning of the school plant right from the initial stage as each professional has unique expertise to contribute towards effective and efficient school plant.

Emphasizing the importance of school plant planning to students' academic performance cannot be overlooked. Oluchukwu, [20] stressed that school plant planning is an essential aspect of educational planning. He went further to explain that unless schools are well suited, buildings excellently erected and equipment appropriately used and maintained, much teaching and learning may not take place.

Corroborating these, Mark [21] and Ajayi [22] maintained that high levels of students' academic performance may not be failsafe where instructional space such as classrooms, libraries, technical workshops and laboratories are structurally defective. They also stressed that adequate structures, proper ventilation and well sited instructional space enhance teaching and learning process in Nigeria secondary school.

1.1. Purpose of the Study

This study therefore finds out the relationship school plant planning and maintenance have with students' academic performance in chemistry among secondary schools in Irele LGA, Ondo State, Nigeria. It also find out whether students' academic performance was significantly related to instructional space planning, administrative space planning, circulation space planning, space for convenience planning and accessories planning.

1.2. Research Hypotheses

The following null Hypotheses to which attention will be directed in the study are stated as follows;

- HO₁: There is no significant relationship between instructional space planning and students' academic performance.
- HO₂: There is no significant relationship between administrative space planning and students' academic performance.
- HO₃: There is no significant relationship between circulation space planning and students' academic performance.
- HO₄: There is no significant relationship between space for convenience planning and students' academic performance.
- HO₅: There is no significant relationship between accessories planning and students' academic performance.

2. Methodology

The research design of Ajayi and Yusuf, [23] and Odufowokan, [8] were employed and modified. A correlation survey research design was used in the study. All public and private secondary schools in Irele Local Government Area, Ondo State, Nigeria were considered as study population. A total of 110 respondents consisting of 10 school principals and 100 SS II students formed the sample of the study. Multi-stage, stratified and simple random sampling techniques were used to select the sample. A self-developed questionnaire titled School Plant Planning Questionnaire (SPPQ) and Students Academic Performance Inventory (SAPI) were used to collect data for the study. The developed SPPQ and SAPI were administered in ten secondary schools throughout the population. The data were collected and collated in 2010 and analyzed using frequency counts, percentages, Pearson product moment correlation and t - test. The value of 'r' was subjected to a t-test at 0.05 levels of significance. T – Test was further used to establish significant relationship in the academic performance of student with regard to instructional space planning, administrative space planning, circulation space planning, space for convenience planning and accessories planning.

3. Results and Discussion

Presentation of Data

Table 1. Sex Distribution of the Student Respondents

| SEX | NUMBER OF RESPONDENTS | PERCENTAGE (%) |
|--------|-----------------------|----------------|
| MALE | 50 | 50 |
| FEMALE | 50 | 50 |
| TOTAL | 100 | 100 |

Table 1 shows the sex distribution of the students – 50% of the respondents were male while the other 50% of the respondents were female in the schools used.

Table 2. Sex Distribution of the Principal Respondents

| SEX | NUMBER OF RESPONDENTS | PERCENTAGE (%) |
|--------|-----------------------|----------------|
| MALE | 8 | 80 |
| FEMALE | 2 | 20 |
| TOTAL | 10 | 100 |

Table 2 shows the sex distribution of the administrators – 80% of the respondents were male while the other 20% of the respondents were female in the schools used.

Testing of the Hypotheses

Hypothesis I: There is no significant relationship between instructional space planning and students' academic performance.

Table 3. Test of significant of Pearson Product Moment Correlation $r(xy)$ between instructional space planning and students' academic performance

| N | Df | r_{-cal} | r_{-crit} | Remark |
|-----|----|------------|-------------|-------------|
| 100 | 98 | 0.35 | 0.12 | Significant |

Significant at $\alpha = 0.05$

Table 4. Test of significant of Pearson Product Moment Correlation $r(xy)$ between instructional space planning and students' academic performance

| N | df | $r(xy)$ | t-cal | t-crit | Remark |
|-----|----|---------|-------|--------|-------------|
| 100 | 98 | 0.35 | 3.70 | 1.98 | Significant |

Significant at $\alpha = 0.05$

Table 3 shows that the calculated $r(xy)$ value (0.35) is greater than the critical value (0.12) at 0.05 level of significance with 98 degree of freedom. Furthermore, Table 4 show that when calculated $r(xy)$ value was converted to t-value, the t- calculated value of (3.70) is greater than the critical value of (1.98) at 0.05 levels and 98 degree of freedom. The finding indicated that there is significant relationship between instructional space planning in the secondary schools and the students' academic performance and therefore the null hypothesis one (H_{01}) is thereby rejected.

The study has shown that there was a significant relationship between instructional space planning and students' learning outcomes. This may be as a result of the fact that instructional space planning is directly linked with teaching and learning activities in the school system. This means that better instructional space planning would enhance better students' learning outcomes. However, poor classroom planning, laboratories planning, technical workshop planning and library planning may have negative effect on students' learning outcomes while a school with better classroom planning, laboratories planning, technical workshop planning and library planning may enhance better students' learning outcomes. The study supports that of Kennedy [24] and Stricherz [25] that instructional space planning such as classroom, laboratory, library and technical workshop design affect students' learning outcomes.

Hypothesis II: There is no significant relationship between administrative space planning and students' academic performance.

Table 5. Pearson Product Moment Correlation $r(xy)$ between administrative space planning and students'

| N | Df | r_{-cal} | r_{-crit} | Remark |
|-----|----|------------|-------------|-------------|
| 100 | 98 | 0.31 | 0.12 | Significant |

Significant at $\alpha = 0.05$

Table 6. Test of significant of Pearson Product Moment Correlation $r(xy)$ between administrative space planning and students'

| N | df | $r(xy)$ | t-cal | t-crit | Remark |
|-----|----|---------|-------|--------|-------------|
| 100 | 98 | 0.31 | 3.23 | 1.98 | Significant |

Significant at $\alpha = 0.05$

Table 5 shows that the calculated $r(xy)$ value (0.31) is greater than the critical value (0.12) at 0.05 level of significance with 98 degree of freedom while table 6 show that when calculated $r(xy)$ value was converted to t - value, the t - calculated value of (3.23) is greater than the critical value of (1.98) at 0.05 levels and 98 degree of freedom. The finding indicated that there is significant relationship between administrative space planning in the secondary schools and the students' academic performance and therefore the null hypothesis two (H_{O2}) is thereby rejected.

It was revealed in the study that there was significant relationship between administrative space planning and students' academic performance. It is expected that better administrative space planning would enhance better teaching and learning process in the school system, and this study proved it to be so since the research stated that there is significant relationship between the administrative space planning and the student' academic performance. This implies that better administrative space planning may guarantee better students' learning outcomes. Though administrative spaces are not directly linked with teaching and learning activities but it will affect students' academic performance. The finding of this study supports that of Stevenson [25] and Oyesola [27].

Hypothesis III: There is no significant relationship between circulation space planning and students' academic performance.

Table 7. Pearson Product Moment Correlation $r(xy)$ between circulation space planning and students' academic performance

| N | Df | r -cal | r -crit | Remark |
|-----|----|----------|-----------|-------------|
| 100 | 98 | 0.22 | 0.12 | Significant |

Significant at $\alpha = 0.05$

Table 8. Test of significant of Pearson Product Moment Correlation $r(xy)$ between circulation space planning

| N | df | $r(xy)$ | t -cal | t -crit | Remark |
|-----|----|---------|----------|-----------|-------------|
| 100 | 98 | 0.22 | 2.23 | 1.98 | Significant |

Significant at $\alpha = 0.05$

Table 7 shows that the calculated $r(xy)$ value (0.22) is greater than the critical value (0.12) at 0.05 level of significance with 98 degree of freedom. Also, table 8 show that when calculated $r(xy)$ value was converted to t - value, the t - calculated value of (2.23) is greater than the critical value of (1.98) at 0.05 levels and 98 degree of freedom. The finding indicated that there is significant relationship between circulation space planning in the secondary schools and the students' academic performance and therefore the null hypothesis three (H_{O3}) is thereby discarded.

The study revealed that there was significant relationship between circulation space planning and students' learning outcomes. This means that better circulation space planning would enhance better students' academic performance. However, a well-developed circulation space in a school setting may greatly enhance students overall development.

Working in an open environment may encourage discussion, cooperation and experimentation among the students. The circulation space planning may influence the students' social and physical skill development which in turn may affect the learning outcomes of students positively. The finding of this study supports that of PEB Exchange [28] that school playground (circulation space) and the behavior and attitude of students (learning outcomes).

Hypothesis IV: There is no significant relationship between space for convenience planning and students' academic performance.

Table 9. Pearson Product Moment Correlation $r(xy)$ between space for convenience planning and students' academic performance

| N | Df | r -cal | r -crit | Remark |
|-----|----|----------|-----------|-------------|
| 100 | 98 | 0.30 | 0.12 | Significant |

Significant at $\alpha = 0.05$

Table 10. Test of significant of Pearson Product Moment Correlation $r(xy)$ between space for convenience planning and students' academic performance

| N | df | $r(xy)$ | t -cal | t -crit | Remark |
|-----|----|---------|----------|-----------|-------------|
| 100 | 98 | 0.30 | 3.11 | 1.98 | Significant |

Significant at $\alpha = 0.05$

Table 9 shows that the calculated $r(xy)$ value (0.30) is greater than the critical value (0.12) at 0.05 level of significance with 98 degree of freedom. Furthermore, table 10 show that when calculated $r(xy)$ value was converted to t - value, the t - calculated value of (3.11) is greater than the critical value of (1.98) at 0.05 levels and 98 degree of freedom. The finding indicated that there is significant relationship between space for convenience planning in the secondary schools and the students' academic performance and therefore the null hypothesis four (H_{O4}) is thereby discarded.

The study revealed that there was significant relationship between space for convenience planning and students' learning outcomes. It could be inferred from the finding that better space for convenience planning would enhance better students' learning outcomes. The result of this study supports that of Lemaster [29], Crandel *et al*, [30], Nabelek and Nabelek [31] and Rogoft [32].

Hypothesis V: There is no significant relationship between accessories planning and students' academic performance.

Table 11 shows that the calculated $r(xy)$ value (0.11) is lower than the critical value (0.12) at 0.05 level of significance with 98 degree of freedom. Also table 12 shows that when calculated rxy value was converted to t - value, the t - calculated value of (1.10) is lower than the critical value of (1.98) at 0.05 levels and 98 degree of freedom. The finding agree with null hypothesis which state that there is no significant relationship between accessories planning in the secondary schools and the students' academic performance and therefore the null hypothesis five (H_{O5}) is thereby

accepted.

Table 11. Pearson Product Moment Correlation $r(xy)$ between accessories planning and students' academic performance

| N | Df | r-cal | r-crit | Remark |
|-----|----|-------|--------|-----------------|
| 100 | 98 | 0.11 | 0.12 | Not Significant |

Significant at $\alpha = 0.05$

Table 12. Test of significant of Pearson Product Moment Correlation $r(xy)$ between accessories planning and students' academic performance

| N | df | r(xy) | t-cal | t-crit | Remark |
|-----|----|-------|-------|--------|-----------------|
| 100 | 98 | 0.11 | 1.10 | 1.98 | Not Significant |

Significant at $\alpha = 0.05$

It was found out that there was no significant relationship between accessories planning and students' learning outcomes. It could be expected that better accessories planning would enhance better students' learning outcomes, but the study has proved otherwise. However, better accessories planning are only necessary in school plant planning but cannot determine the learning outcomes. Where the accessories are well planned without good school site, good instructional space planning, good circulation space planning, and teachers' job commitment, good students' learning outcomes may not be guaranteed.

4. Conclusions and Recommendations

This study revealed the importance of school plant planning in the area of instructional space planning, administrative space planning, circulation space planning and convenience space planning. It established that school plant planning directly relates to improved students' academic performance. School plants were well-planned while the students' learning outcomes was good in the schools sampled for the study during the period under investigation. Aspects of school plants planning such as instructional space planning, school site planning and circulation space planning were important factors in students' learning outcomes but there were other factors that contributed largely to students' learning outcomes. The researcher is of the opinion that, the information of competent measures such as appropriate teaching method, good moral of the students and the teachers, provision of adequate equipment, and teaching aid among others are not enough to ensure better students' academic performance without well school plant planning. Based on the findings, it was recommended that authorities concerned should implement architectural designs of buildings and spaces for education to ensure students' academic performance. Also, other local government should be investigate to give detail information of effect of school plant on academic performance of student in ondo state since all government at all levels are now planning to restructure the education system in Nigeria.

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