

**AVAILABLE INFRASTRUCTURAL FACILITIES MANAGEMENT  
AND CHEMISTRY STUDENTS' ACADEMIC ACHIEVEMENT IN  
BORNO STATE TERTIARY INSTITUTIONS IN NIGERIA**

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**ABSTRACT**

*The study was to examine available infrastructural facilities management and Chemistry students' academic achievement in Borno State Tertiary Institutions in Nigeria. A correlational research design was employed for the study, covering an accessible population of 471 academic staff from three Colleges of Education in Borno State. Using stratified random sampling 40% of the population was selected for the study, bringing the sample size of the study to 188 academic staff. A research question and a null hypothesis guided the study. A questionnaire and Result Collection Proforma designed by the researcher were used for data collection. The questionnaire was validated by five experts and has a reliability coefficient of 0.85 using split-half method. Data collected were analyzed using Mean, Standard Deviation and Pearson Product Moment Correlation Coefficient. The study revealed that there was fairly management of available infrastructural facilities in the Colleges, there was significant relationship between available infrastructural facilities management and Chemistry students' academic achievement. Based on these findings, it was recommended that the Borno State Government should improve its management and provision of infrastructural facilities in the Colleges of Education to facilitate teaching and learning of Chemistry. Similarly the Colleges should improve upon management of infrastructural facilities provided and students' performance in all science courses.*

**Keywords:** *Infrastructural Facilities, Management, Chemistry and Academic Achievement.*

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## INTRODUCTION

Infrastructural facilities are the physical things that facilitate teaching and learning in schools. It includes the laboratories, libraries, workshops, classrooms and equipment. These are the related infrastructure significant for learning to take place in academic environment for achievement. The objectives of these infrastructures are to arouse the learner's interest to full participation (Abdul, 1987).

Infrastructural facilities management would involve forecasting, planning, budgeting, organizing, utilizing as well as replenishing infrastructure and facilities in order for these resources to continuously meet the purpose. For they were in the first instance harnessed together (Babalola and Ayeni, 2009).

Resource management in education is by far one of the most important aspects of education process and should be given great priority if the school system is to be effectively and adequately managed to meet the yearnings and aspirations of the learners and the society at large. Furthermore, in order to improve the management of resources in education, trusted and efficient men and women should be employed into institutions for the purpose of proper implementation of objectives for our educational systems. Also, qualified, experienced, and endowed persons should be controlling and managing the affairs of the educational institutions so as to utilize the scarce educational resources efficiently and effectively.

Management acts as an objective function that ought to be grounded in the responsibility for performance. Management is set of activities which can be classified as concerned with planning, organizing and controlling. Management acts as an art or act of managing an organization. Management acts as the manner of directing or using anything in the act of management. Management of educational resources is a process of making prudent utilization, control and maintenance of available scarce educational resources in order to achieve academic performance of the students (Babalola and Ayeni, 2009).

In resource management, good educational managers must carefully and effectively handle educational resources (men, money, material, and machines including computers, teaching technology and internet facilities) put under their custody (Babalola et al, 2006).

Furthermore, academic achievement essentially applies to what an individual can do within a specified criterion domain. Ebel (1979) defines academic achievement as the assessment of outcome of formal instruction in a cognitive domain within defined subject matter that is explicitly taught. Ebel stresses that this instruction is expected to produce observation changes in behaviors of those who are being instructed. Both Ebel (1979) and Uba (1987)

believed that academic achievement is the current measure of performance as a yardstick. This study was designed to determine the available infrastructural facilities management and Chemistry students' academic achievement in Colleges of Education in Borno State.

## RESEARCH QUESTION

The following research question was answered in the study.

1. What is the relationship between available infrastructural facilities management and Chemistry students' academic achievement in Colleges of Education in Borno State?

## HYPOTHESIS

The hypothesis was to guide the study

- HO<sub>1</sub>:** There is no significant relationship between available infrastructural facilities management and Chemistry students' academic achievement in Colleges of Education in Borno State.

## METHODOLOGY

The study employed a co relational research design method in which data were collected from the respondents by the use of questionnaire, and academic achievement results of students for five sessions in Chemistry. The population for this study includes 152, 190 and 129 respectively (471) academic staff in the three Colleges of Education in Borno State. In this study, stratified random sampling was used and 40% of the population (188) was considered as the sample size. According to Nwana (1981), if a population reaches one hundred or more, then 40% of the population should be selected. Borno State has nine tertiary institutions out of them three are Colleges of Education namely; College of Education, Science and Technology, Bama, which is located in North-Eastern part of Borno; Kashim Ibrahim College of Education, Maiduguri is located in Borno Central and College of Education, Waka-Biu is located in Southern part of Borno. These are the study areas. These institutions have sample size of 61, 76 and 51 respectively.

## INSTRUMENTATION

Two instruments were used in collecting data: The first was self developed questionnaire titled: Available Infrastructural Facilities Management and Academic Achievement Questionnaire (AIFMAAQ). The questionnaire consisted of items that were structured. The questionnaire containing 10 items concerned with the management of available infrastructural facilities in relation to academic achievement. The categories of responses were provided with 5 point rating Likert scale as given on weight, thus: Strongly Agree (SA) = 5; Agree (A)

= 4; Undecided (U) = 3; Disagree (D) = 2; and Strongly Disagree (DA) = 1 respectively. The Split-half Co-efficient of the scale was found to be 0.74 and its reliability was 0.85.

Therefore, any item that yield mean above 3.50 was regarded as agree, item yield mean of 3.50 was regarded as undecided and any mean below 3.50 was regarded as disagree (Olagunye & Awoyokun in Dapshima, 2011).

The second instrument was Result Collection Proforma (RCP) which was used to obtain the final year Nigerian Certificate in Education (NCE) results of students from 2006/2007 to 2010/2011 academic sessions in Chemistry of the three Colleges of Education was obtained from various academic offices for verification. The expected academic performance of each was coded as follow:

|             | <b>Grade</b> | <b>GPA</b>  | <b>Raw Score</b> |
|-------------|--------------|-------------|------------------|
| Distinction | = A          | (4.50-5.00) | 70% and above    |
| Credit      | = B          | (3.50-4.49) | 60%-69%          |
| Merit       | = C          | (2.40-3.49) | 50%-59%          |
| Pass        | = D          | (1.50-2.39) | 45%-49%          |
| Lower pass  | = E          | (1.00-1.49) | 40%-44%          |
| Fail        | = F          | (0.00-0.99) | 39% and below.   |

This is in accordance with laid down standard of the National Commission for Colleges of Education (NCCE). For detail Tables 3, 4 and 5.

The data were analyzed using SPSS, Mean and Standard Deviation was used to answer the research question, while Pearson Product Moment Correlation was used to test the null hypothesis. For this study, the decision to either reject or to accept null hypothesis ( $H_{01}$ ) depends on whether the calculated value of the test statistic was greater than or less than critical value at 0.05 level of significance.

For null hypothesis ( $H_{01}$ )

Decision I: Reject the null hypothesis if the calculated value of F-test is greater than the critical value of F-test.

Decision II: Accept the null hypothesis if the calculated value of the F-test is less than the critical value of F-test.

## RESULTS

The results obtained from the data analysis are in Table 1.

**Table 1: MEAN RATING OF RESPONSES OF ACADEMIC STAFF ON AVAILABLE INFRASTRUCTURAL FACILITIES MANAGEMENT IN RELATION TO CHEMISTRY STUDENTS' ACADEMIC ACHIEVEMENT IN COLLEGES OF EDUCATION.**

| S/No | Management of available infrastructure in relation to students' academic achievement.  | G $\bar{x}$<br>N=188 | SD     | Remark   |
|------|--|----------------------|--------|----------|
| 1.   | Your college has laboratories for chemistry course which are effectively used to enhance academic achievement.                 | 4.20                 | 0.1931 | Agree    |
| 2.   | Your college lecture halls are enough for Chemistry students' lecture.   | 2.91                 | 0.1140 | Disagree |
| 3.   | There is enough library in your college to enhance academic achievement in chemistry.  | 2.87                 | 0.1086 | Disagree |
| 4.   | Conditions of infrastructure in your college are good to enhanced academic achievement.  | 2.73                 | 0.0469 | Disagree |
| 5.   | There is adequate maintenance of available infrastructure in the college.  | 2.43                 | 0.3078 | Disagree |
| 6.   | The available infrastructural facilities in your college are properly maintained to enhance academic achievement in chemistry. | 2.49                 | 0.1652 | Disagree |
| 7.   | There is adequate provision of office accommodation in the college to enhance academic achievement in chemistry.               | 2.70                 | 0.0624 | Disagree |
| 8.   | Infrastructural facilities are adequately provided to enhanced academic achievement.   | 2.73                 | 0.0264 | Disagree |
| 9.   | Infrastructural facilities in your college are up to standard to enhance academic achievement in chemistry.                    | 2.43                 | 0.3058 | Disagree |
| 10.  | The available infrastructural facilities in your college are properly utilize to enhance academic achievement in chemistry.    | 2.99                 | 0.6689 | Disagree |

Source: Survey 2012

Note:

N = Total Number of Sampled Academic Staff

$\bar{Gx}$  = Grand Mean Total

SD = Standard Deviation

Table 1 shows that 1 item have been rated agree and 9 items disagrees. The mean rated above 3.50 by academic staff. This suggests that there is laboratories for Chemistry course and are effectively used. But other 9 items with mean rated below 3.50 by academic staff indicates that no enough library in the Colleges, infrastructural facilities in the Colleges are not up to standard and also there is no available infrastructural facilities in the Colleges which are properly used, no enough lecture halls, no office accommodation, no any maintenance, any control and supervision of available infrastructural facilities in the Colleges of Education in Borno State and affect students' academic achievement in Chemistry.

### Hypothesis 1

There is no significant relationship between available infrastructural facilities management and Chemistry students' academic achievement in Colleges of Education in Borno State.

Data relevant to Hypothesis 1 for the three sampled Colleges of Education are presented in Table 2.

**Table 2: RELATIONSHIP BETWEEN AVAILABLE INFRASTRUCTURAL FACILITIES MANAGEMENT AND CHEMISTRY STUDENTS' ACADEMIC ACHIEVEMENT IN COLLEGES OF EDUCATION.**

| Variables | Number | Means | Std. Dev. | r     | Relationship | Remark   |
|-----------|--------|-------|-----------|-------|--------------|----------|
| AIFMR     | 188    | 2.12  | 0.64      | 0.42* | Moderate     | Rejected |
| SAAR      | 188    | 2.01  | 0.48      |       |              |          |

Source: Survey, 2012

\* Significant at 0.05 level

MAIFR: Management of Available Infrastructure Facilities Rating;

SAAR: Student Academic Achievement Rating

Table 2 shows that there is positive correlation between available infrastructural facilities management and Chemistry students' academic achievement in College of Education Borno State. This implies that there is moderate relationship between available infrastructural

facilities management and Chemistry students' academic achievement in Colleges of Education Borno State. Since the correlation is moderate (0.42) this indicates that a change in one variable is associated with the change of similar, but not equal degree in the other according to Hopkins and glass (1989). The null hypothesis is rejected, since there is significant relationship.

## **DISCUSSION**

The findings of the study revealed that there is no proper management of available infrastructural facilities in the Colleges of Education. The available infrastructural facilities in the Colleges are not properly managed and hence affect academic achievement in Chemistry in the Colleges (Tables 3, 4 and 5). The hypothesis tested shows that there is a moderate positive correlation between available infrastructural facilities management and Chemistry students' academic achievement in College of Education in Borno State. This implies that there is moderate relationship between available infrastructural facilities management and Chemistry students' academic achievement in Colleges of Education in Borno State. Hence there is urgent need to make infrastructural facilities available in the Colleges of Education, and to be properly managed and to maintain the standard of these facilities in order to enhance academic achievement.

The finding of this study is in line with Ojo (1998) who noted that the availability and adequacy in quantity and quality of these facilities promote effective teaching activities in schools. While their inadequate affect academic achievement negatively. For effective and smooth management of these colleges to be achieved, infrastructural facilities must be provided adequately and managed by the government.

## **CONCLUSION**

The study established the fact that management of available infrastructural facilities in Colleges of Education have been found less effective and have fairly affect academic achievement in Chemistry in the Colleges of Education in Borno State. This brings to fore the need for adequate provision and maintenance of infrastructural facilities in Chemistry in particular and Sciences in general in Borno State Colleges of Education in Nigeria.

## **RECOMMENDATIONS**

Based on these empirical findings, the following recommendations were made to improve the students' academic achievement in Chemistry in Colleges of Education.

The Borno State Government should improve the management of available infrastructural facilities in the Colleges of Education, and also there is need to maintain,

control and utilize properly the available infrastructural facilities in the Colleges to facilitate academic activities. Borno State Ministry of Education should equip its monitoring unit for effective supervision and management of the Colleges of Education available infrastructural facilities and other resources. Borno State Government should provide more infrastructural facilities to the Colleges of Education in order to facilitate teaching and learning.

## REFERENCES

1. Academic Office, (2011). *Record Department College of education, Science and technology*. Bama, Borno State. Nigeria.
2. Academic Office, (2011). *Record Department Kashim Ibrahim College of Education*, Maiduguri, Borno State. Nigeria.
3. Academic Office, (2011), *Record Department College of Education, Waqa-Biu*, Borno State. Nigeria.
4. Abdu, H. B. (1987). *Factors affecting students' performance in science subjects in school certificate examination*. (Unpublished Ph.D. Thesis A.B.U. Zaria).
5. Babalola, J. B., Ayeni, A. O., Adedeji, S. O., Suleiman, A. A. and Arikewuyo, M. O. (2006). *Educational Management*. Thoughts and Practice. Ibadan. Codat Publication.
6. Babalola, J. B. and Ayeni, A. O. (2009). *Educational Management*. Theories and Tasks. Lagos. Macmillan Ltd.
7. Dapshima, G. A. (2011). *Management of Educational Resources and Students' Academic Achievement in Borno State Colleges of Education*, (Unpublished M.Ed. Thesis), Modbbo Adama University of Technology, Yola, Adamawa, Nigeria.
8. Ebel, R. L. (1979). *Essentials of Educational Measurements*. Englewood Cliffs: N. J. Prentices Hall.
9. Hopkins, K. D. and Glass, G. V. (1989). *Statistical Methods in Education and Psychology*. New Jersey, Prentice – Hall.
10. Nwana, O. C. (1981). *Introduction to Educational Research for Students and Teachers*. Ibadan, Heinemann Educational Books Ltd.
11. Ojo, F. (1998). *Human Resource Management*. Theory and Practice. Lagos, Pana Publishing.
12. Uba, N. J. I. (1987). *Internal and external assessment of educational achievement at 14+ Anambra State*. A Comparative Study. (Unpublished M.Ed. Dissertation).



**TABLE 3**

*Number of Students Admitted and those Graduated in Chemistry Department of College of Education, Science and Technology, Bama Nigeria between 2006 and 2011*

| Year      | Department | Students admitted | Students graduated | Distinction | Credit | Merit | Pass | Lower pass | Fail | % graduated | % failed |
|-----------|------------|-------------------|--------------------|-------------|--------|-------|------|------------|------|-------------|----------|
| 2006/2007 | Chemistry  | 44                | 24                 | 02          | 08     | 10    | 04   | 00         | 20   | 54.5        | 45.5     |
| 2007/2008 | Chemistry  | 65                | 46                 | 04          | 20     | 16    | 06   | 00         | 19   | 70.8        | 29.2     |
| 2008/2009 | Chemistry  | 59                | 20                 | 01          | 03     | 07    | 09   | 00         | 39   | 33.9        | 66.1     |
| 2009/2010 | Chemistry  | 84                | 69                 | 08          | 19     | 31    | 10   | 01         | 15   | 82.1        | 17.9     |
| 2010/2011 | Chemistry  | 40                | 21                 | 01          | 05     | 11    | 04   | 00         | 19   | 52.5        | 47.5     |
| Total     |            | 292               | 180                | 16          | 55     | 75    | 33   | 01         | 112  |             |          |

Source: Academic office, Record Department College of Education, Science and Technology, Bama, (2011).

**TABLE 4**

*Number of Students Admitted and those Graduated in Chemistry Department of Kashim Ibrahim College of Education, Maiduguri Nigeria between 2006 and 2011*

| Year      | Department | Students admitted | Students graduated | Distinction | Credit | Merit | Pass | Lower pass | Fail | % graduated | % failed |
|-----------|------------|-------------------|--------------------|-------------|--------|-------|------|------------|------|-------------|----------|
| 2006/2007 | Chemistry  | 49                | 23                 | 01          | 04     | 07    | 04   | 07         | 26   | 46.9        | 53.1     |
| 2007/2008 | Chemistry  | 57                | 33                 | 02          | 05     | 10    | 13   | 03         | 24   | 57.9        | 42.1     |
| 2008/2009 | Chemistry  | 41                | 05                 | 00          | 00     | 00    | 03   | 02         | 36   | 12.2        | 87.8     |
| 2009/2010 | Chemistry  | 35                | 13                 | 00          | 02     | 09    | 02   | 00         | 22   | 37.1        | 62.9     |
| 2010/2011 | Chemistry  | 44                | 13                 | 00          | 04     | 07    | 02   | 00         | 31   | 30          | 70       |
| Total     |            | 226               | 87                 | 03          | 15     | 33    | 24   | 12         | 139  |             |          |

Source: Academic office, Record Department Kashim Ibrahim College of Education Maiduguri, (2011).

TABLE 5

*Number of Students Admitted and those Graduated in Chemistry Department of College of Education, Waka-Biu Nigeria between 2006 and 2011*

| Year      | Department | Students admitted | Students graduated | Distinction | Credit | Merit | Pass | Lower pass | Fail | % graduated | % failed |
|-----------|------------|-------------------|--------------------|-------------|--------|-------|------|------------|------|-------------|----------|
| 2006/2007 | Chemistry  | 28                | 14                 | 00          | 04     | 07    | 02   | 01         | 14   | 50          | 50       |
| 2007/2008 | Chemistry  | 77                | 35                 | 01          | 10     | 16    | 07   | 01         | 42   | 45.5        | 54.5     |
| 2008/2009 | Chemistry  | 33                | 20                 | 01          | 08     | 07    | 04   | 00         | 13   | 60.6        | 39.4     |
| 2009/2010 | Chemistry  | 34                | 25                 | 00          | 07     | 04    | 11   | 03         | 09   | 73.5        | 26.5     |
| 2010/2011 | Chemistry  | 61                | 41                 | 01          | 03     | 24    | 12   | 01         | 20   | 67.2        | 32.8     |
| Total     |            | 233               | 135                | 03          | 32     | 58    | 36   | 06         | 98   |             |          |

Source: Academic office, Record Department College of Education Waka-Biu, (2011).