



Entry Qualification as Correlates of Students' Performance in Chemistry in College of Education, Zaria

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ABSTRACT

This research work was aimed at identifying the factor responsible for students' academic performance in NCE chemistry program in their first year; the relationship between entry qualification and academic performance of NCE I chemistry students among others and was guided by three research questions and two research hypotheses. Correlation research design was employed in this study. The study population comprises of all the 384 NCE I Chemistry students in Federal College of Education Zaria in 2019/2020 academic Session. Simple random sampling technique was used to select a sample of one hundred (100) NCE I chemistry students. The instrument for data collection was questionnaire, students O-level results and their NCE I second semester result. The data collected were analyzed using descriptive and inferential statistics. The finding of the study revealed that poor background in chemistry at ordinary level, poor reading habit, students' low interest, poor methods of teaching and poor practical orientation were the major factors responsible for poor academic performance of chemistry students; the finding also revealed that no significant relationship between entry qualification and NCE one chemistry students' academic performance ($r=0.06$, $p=0.57$), it was further revealed that significant difference exists in the mean academic performance of male and female NCE I chemistry students that is in favour of female students ($t=-2.35$, $p=0.02$). It was therefore recommended that government should ensure that dedicated and qualified chemistry teachers with good teaching methodology should be employed to teach chemistry in secondary schools level to lay a good chemistry foundation; entry qualification should not be used to gauge students subsequent performance though the parameter should not be ignored in admission exercises; male and female chemistry students should be subjected to equal methods of teaching, use of learning materials and well-motivated to study chemistry.

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INTRODUCTION

Generally, learning is a cumulative process and chemistry education is not an exception to this very fact. Chemistry is a fundamental science subject require in fulfilling the technological needs of the society as buttress by Nwachukwu in Benedict (2019) who noted that lots of technological advancement being made in the field of medicine, pharmacy, engineering, agriculture and others are largely made or based on the studies conducted in the field of chemistry. Chemistry is taught in all the secondary

schools in Nigeria and one is expected to obtain a certain grade in chemistry as one of the entry requirements into major Science, Technology, Engineering and Mathematics (STEM) field.

Chemistry is required both as a university matriculation examination subject and as an entry qualification into engineering and other STEM related fields. Chemistry, because of its scope and potentials, is quite unique in its connection with several aspects of modern life. Its role as a transforming agent is recognized as crucial, especially in developing



countries. In Nigeria, for example, mastering chemistry content is one of the greatest challenges students have. Surprisingly, many students are not aware of a chemists' role in the overall well-being of the society. Chemistry departments in the colleges and universities are therefore being challenged to broaden their curricula to make chemistry students aware of chemists' role in the society (Ferrer-Vinent, Bruehl, Pan, and Jones, 2015). The pitfalls in the process of the development of curriculum created a big gap between curricular learning targets and level of student's cognitive abilities which comes with age. Chemistry departments, through a variety of courses and programs, provide opportunities for students to explore the nature and significance of chemistry for knowledge about ourselves and the world around us (Ferrer-Vinent, Bruehl, Pan, and Jones, 2015). The chemistry field, as a major area of study, provides excellent preparation for graduate study in chemistry, biochemistry, chemical engineering, environmental sciences and the medical sciences. It can also be useful to those whose later professional or business career may be related to chemical materials or processes (Ferrer-Vinent, Bruehl, Pan, and Jones, 2015). Differences in background, curriculum coverage and examination bodies at post primary education level affects students' performance in the university to some extent (Ringland and Peason, 2013). For example, it has been observed that while some students come in with distinction, some come in with credit and others even with a pass in mathematics. This is relative to what happens in other examinations which act as entry qualification for student who are seeking admission into various tertiary institutions in the country. The Joint Admission and Matriculation Board (JAMB) with the aid of the University Matriculation Examination (UME) and Monotechnic, Polytechnic and College of Education Examination (MPCE) screen students seeking admission into tertiary institutions in the Federation. In the process, students obtain score which qualify or disqualify them from entering these institutions of higher learning yet this cannot give a true picture of what the students' performance will look like.

Chemistry is one of the three physical science subjects, whose teaching and

learning is surrounded by many problems. Such problems are associated with the teachers, learners, supervisors and the educational authority. Available statistics showed that for some years now, mass failures have been experienced among students admitted for chemistry in colleges of education. Some chemistry teachers do not have a good methodology and procedure of teaching chemistry. It therefore, results to poor foundation in chemistry from secondary school level. It is a fact that institutions desire to achieve the best but they are mostly faced with the problem of massive failure.

With regards to the scenario pointed above, the question that arises from all these is "will the various entry grades have a relationship with students' performance in their course of study? I.e. will those that come in with distinction, credit, pass, fail also continue and consequently graduate with the same grades or marks they came in with or will they obtain better or worse grades than those they came in with.

In the light of all these questions, this study has been undertaken to determine the relationship between entry qualification and students performance in chemistry among NCE students.

Objectives of the Study

The objectives of this study are to:

- i. Identify the factors responsible for students' academic performance in NCE chemistry program in their first year.
- ii. Find out the relationship between entry qualification and academic performance of NCE one chemistry students.
- iii. Analyze and compare the academic performance of male and female NCE I chemistry students.

Research Questions

The following research questions will guide the conduct of this research

- i. What are the factors responsible for NCE I chemistry students' academic performance?
- ii. Does entry qualification has any relationship with academic performance of NCE I chemistry students in FCE, Zaria?
- iii. Are there any differences in performance of male and female NCE one chemistry students?

Hypothesis

The study seeks to test the following hypotheses:

- H_{0i}: There is no significant relationship between entry qualification and NCE I chemistry students' academic performance.
- H_{0ii}: There is no significant difference in the academic performance of male and female NCE I chemistry students.

RESEARCH METHODOLOGY

The correlation research design was employed and according to Nworgu (2006), correlational survey seeks to establish what relationship exists between two or more variables. The study seek to establish what relationship exists between entry qualification and students performance in chemistry among NCE I students of Federal College of Education Zaria.

The population of this study consist of NCE I Chemistry students of Federal College of Education, Zaria in the 2018/2019 academic session which comprise of three combinations, they are; chemistry/computer with 103 students, chemistry/integrated science with 246 students and chemistry/mathematics with 35 students. Their population stands at 384 as at the period of this study.

Simple random sampling technique was used to select one hundred (100) NCE I students from the entire population of 384 students. The samples were drawn based on numbers of students in each combination using simple ratio. The formula below was used to calculate the number of students drawn randomly from each department.

$$\text{Sample} = \frac{\text{No of NCE I students in the combination}}{\text{Total number of NCE I students (population)}} \times 100$$

The first step was the comparative weighting of all the results to harmonise and eliminate differences in the grading systems. F representing scores of 0-39, E representing scores of 40-44, D representing scores of 45-49, C representing scores of 50-59, B representing scores of 60-69, A representing scores of 70-100 for the O'level result; while F represents points of 0.00-0.99, E represents points of 1.00-1.49, D represents points of

1.50-2.39, C represents points of 2.40-3.49, B represents points of 3.50-4.49, A represents points of 4.50-5.00 for the NCE second semester result. The average weighted pre-admission qualification for each student was obtained by taking the average weighted scores in chemistry and it was correlated with their second semester NCE I result. In other to obtain differences between the grades, the O'level result was weighted again as F representing scores of 0, E representing scores of 1, D representing scores of 2, C representing scores of 3, B representing scores of 4 while A representing scores of 5.

Also, the researcher made use of questionnaire titled "Questionnaire on Factor Responsible for Students Academic Performance towards NCE Chemistry Program in their First Year" designed on five point likert scales of Strongly Agree – 5, Agree – 4, Undecided – 3, Disagree – 2 and Strongly Disagree – 1 to captured the respondents bio-data and factors responsible for students' academic performance as raised in research question one in chapter one of the study.

The students' O'level information was collected from data record in Chemistry Department while the Second Semester NCE results (CGPA) was collected from the Examination Office in the Department.

The data collected were analyzed using descriptive and inferential statistics. The respondents bio data was analyzed using frequency counts and simple percentages, research questions were answered using mean and standard deviation while PPMC was used to test hypothesis one and t-test statistical tool was used to test hypothesis two at 0.05 level of significance.

RESULT

The data were analyzed in tabular form and interpretation followed under each table presented. Frequency counts and simple percentage was employed in answering research question one while mean and standard deviation was used to answer research question two and three. Pearson Product Moment Correlation (PPMC) was used to test hypothesis one while independent t-test statistics was used to test hypothesis two.

**Analysis of Respondents Bio-Data****Table 1: Gender**

Gender	Frequency	Percentage
Male	50	50
Female	50	50
Total	100	100

Table 1 revealed that both respondent males and females have equal

number of responses to the questionnaires with scores of (50%) each.

Table 2: Age

Age	Frequency	Percentage
16-18	20	20
19-21	70	70
22-24	8	8
25 years and above	2	2
Total	100	100

Table 2 revealed that majority of the respondents (70%) were between the ages of 19-21 years while the minority (2%) are 25 years and above.

Answers to Research Questions

Research Question One: What are the factors responsible for NCE I chemistry students' academic performance?

Table 3: Factors responsible for chemistry students' academic performance

S/N	Statement	Agree (%)	Disagree (%)
1.	Students' low interest	70	30
2.	Poor practical orientation	65	35
3.	Poor methods of teaching	75	25
4.	Poor reading habit	90	10
5.	The insufficient resources include laboratories science equipment and specimens	36	64
6.	Shortage of qualified and dedicated teachers	39	61
7.	Poor background in chemistry at ordinary level	90	10

Table 3 revealed that poor background and poor reading habits in chemistry at ordinary level were the major factors responsible for chemistry students' performance with 90% of the respondents agreed with the decision, followed by poor methods of teaching with 75%, then students'

low interest 75%, poor methods of teaching and poor practical orientation 65%.

Research Question Two: Does entry qualification has any relationship with academic performance of NCE one chemistry students in FCE, Zaria?

Table 4: Descriptive statistics on relationship between entry qualification and academic performance of NCE I Chemistry students

Groups	N	Mean	Std. Dev	Mean Difference
Entry qualification	100	3.25	0.5	
NCE I Second Semester Result	100	2.2	1.1	1.05

Table 4 revealed that entry qualification does not have relationship with NCE I chemistry students' academic performance. The mean score of students with

entry qualification was 3.25 while that of NCE I Second semester was 2.2 respectively with a mean difference of 1.05 that was in favour of entry qualification. This is an indication that



entry qualification does not have any relationship with academic performance of NCE I chemistry students in FCE, Zaria.

Research Question Three: Are there any differences in performance of male and female NCE I chemistry students?

Table 5: Descriptive statistics on any differences in performance of male and female NCE one chemistry students

Groups	N	Mean	Std. Dev	Mean Difference
Male	50	2	1.1	0.48
Female	50	2.48	1.0	

Table 5 revealed that differences in performance of male and female NCE I chemistry students' academic performance. The mean score of male students was 2.00 while that of female students was 2.48 respectively with a mean difference of 0.48. This is an indication that differences do exist in performance of male and female NCE I chemistry students' academic performance.

The difference was in favour of female students.

Hypotheses Testing

Hypothesis One: There is no significant relationship between entry qualification and NCE I chemistry students' academic performance.

Table 6: Correlation analysis between entry qualification and NCE I chemistry students' academic performance

Variables	N	Mean	SD	df	correlation index r	p
Entry qualification	100	3.25	0.5	98	0.06	0.57
NCE I Second Semester Result	100	2.2	1.1			

Correlation is significant at the 0.05 level (2-tailed).

Table 6 is the Pearson Product Moment Correlation (PPMC) statistics which showed that no significant relationship exist between entry qualification and NCE I Second Semester Result. Reason being that the calculated p value of 0.57 is greater than the 0.05 alpha level of significance and the computed absolute value of the correlation index r value of 0.06 at df 98. Therefore, the

null hypothesis which states that there is no significant relationship between entry qualification and NCE I chemistry students' academic performance, is hereby retained.

Hypothesis Two: There is no significant difference in the academic performance of male and female NCE I chemistry students.

Table 7: T-test statistics on significant difference in the academic performance of male and female NCE one chemistry students

Study Groups	N	Mean	Std. Dev	df	t-cal	p	Decision
Male	50	2	1.1	98	-2.35	0.02	Significant
Female	50	2.48	1.0				

Significant at $p < 0.05$

Table 7 is t-test analysis result which revealed that a p-value of 0.02 was obtained which is less than p value ≤ 0.05 level of

significance set for acceptance or rejection of the hypothesis. This is an indication that there is significant difference in mean academic



performance of male and female NCE I chemistry students. The difference was in favour of female students. Thus, the hypothesis which stated that there is no significant difference in the academic performance of male and female NCE I chemistry students was rejected. This implies that female NCE I chemistry students performed better than their male counterparts.

DISCUSSIONS

Finding number one of this study revealed that poor background in chemistry at ordinary level, poor reading habit, students' low interest, poor methods of teaching and poor practical orientation were the major factors responsible for poor academic performance of chemistry students. This finding agrees with that of Yusuf (2017), Igwe & Nwali (2015) and Joseph (2013), they reported that many factors have been identified to be responsible for the poor state of students' performance in Chemistry which includes: students' low interest, students' negative attitude to reading, poor methods of teaching, poor reading habit, students' low language proficiency among others.

Finding number two revealed that there is no significant relationship between entry qualification and NCE I chemistry students' academic performance. That is, entry qualification does not predict future academic performance. This finding is in line with that of Babalola (2015) posited in his study "Relationship between entry qualification and performance in A'level chemistry: A case study of School of Basic and Remedial Studies, Yobe State University, Damaturu, Yobe State" that there was no relationship between performance of the students in the A'level chemistry and the entry grade (O' level chemistry) in the Basic programme.

Finding number three revealed that there is significant difference in mean academic performance of male and female NCE I chemistry students that is in favour of female students. This finding disagrees with that of Udousoro (2011) who investigated the effect of gender and mathematics ability on academic performance of students in Chemistry. The result of the test indicated that gender does not have any significant effect on the academic performance of students in Chemistry. It was also observed that students

with high mathematics ability performed significantly better than those with low mathematics ability in chemistry.

CONCLUSION

Chemistry is one of the three physical science subjects, whose teaching and learning is surrounded by many problems. Such problems among others include poor background in chemistry at ordinary level, poor reading habit, students' low interest, and poor methods of teaching and poor practical orientation. Results of this study also revealed that entry qualification does not predict student future academic performance that is entry qualification is not the best variable to predict academic performance though this parameter should not be ignored in admission exercises. The result further revealed that there is significant difference in mean academic performance of male and female NCE I chemistry students that is in favour of female students.

RECOMMENDATIONS

From the findings of this study, it was recommended that:

- Government should ensure that dedicated and qualified chemistry teachers with good teaching methodology should be employed to teach chemistry in secondary schools level.
- Entry qualification should not be used to gauge students' subsequent performance though the parameter should not be ignored in admission exercises.
- Male and female chemistry students should be subjected to equal methods of teaching, use of learning materials and well-motivated to study chemistry.

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