

THE INFLUENCE OF INSTRUCTIONAL MATERIALS ON ACADEMIC PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS IN CHEMISTRY IN CROSS RIVER STATE

STEPHEN A. ADALIKWU AND ISAAC T. IORKPILGH

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ABSTRACT

This research work investigated the influence of instructional materials (teaching aids) on students' academic performance in senior secondary school Chemistry in Cross River State. A two group pre-test post test quasi-experimental design was adopted for the study. One research question and one hypothesis were formulated to guide the study. A total of 100 senior secondary one (SS1) Chemistry students were selected from five (5) Schools in Yakuur Local Government Area of Cross River State through simple random sampling and stratified random sampling techniques. Fifty SS1 students (Experimental group) were taught with instructional materials and another forty (Control group) were taught without instructional materials. A validated Chemistry Achievement Test (CAT) was used to gather data for the study and a split-half was carried out using the Pearson product moment correlation to obtain a reliability coefficient of 0.67. Independent t-test was used to test the hypothesis at 0.05 significant level while the Pearson product moment correlation coefficient at that level was used to analyse the research questions. The study revealed that students taught with instructional materials performed significantly better than those taught without instructional materials and also that the use of instructional materials generally improved students' understanding of concepts and led to high academic achievements. Recommendations were made on how to improve academic performance of chemistry students by encouraging the use of instructional materials in teaching-learning chemistry.

KEY WORDS: Instructional Materials, Teaching-Learning, Sampling Techniques, Academic Performance and Experimental Group.

INTRODUCTION

Instructional materials serve as a channel between the teacher and the students in delivering instructions. They may also serve as the motivation on the teaching-learning process. It is use to get the attention of the students and eliminate boredom. Instructional materials are highly important for teaching; especially for inexperienced teachers. Teachers rely on instructional materials in every aspect of teaching. They need material for background information on the subject they are teaching.

Young teachers usually have not built upon their expertise whenever they enter into the field. Teachers often use instructional materials for lesson planning. These materials are also needed by the teachers to assess the knowledge of their students. Teachers often assess students by assigning tasks, creating projects, and administering exams. Instructional materials are essential for all of these activities.

Chemistry as a science subject is activity oriented and the suggested method for teaching it which is guided discovering method is resource based (NTI, 2007). This suggest that mastery of

Stephen A. Adalikwu, Department of Chemistry, Cross River State College of Education, Akamkpa P.M.B 1171, Calabar, Cross River State, Nigeria.

Isaac T. Iorkpilgh, Department of Chemistry, College of Education, Oju, P.M.B. 2035, Benue State, Nigeria.

chemistry concepts cannot be fully achieved without the use of instructional materials. The teaching of chemistry without instructional materials will certainly result to poor performance in the course. Franzer *et al.* (1992) stressed that; a professionally qualified science teacher no matter how well trained would be unable to put his ideas into practice if the school setting lacks the equipments and materials necessary for him or her to translate his competence into reality. Bassey (2002) described instructional materials media as system component that may be used as part of instructional process which are used to disseminate informative message and ideas or which make possible communication in the teaching-learning process. Experience over the years has shown that teachers have been depending on excessive use of words to express, convey ideas or facts in the teaching-learning process. This process is termed the 'chalk-talk' method. Today advances in technology have made it possible to produce materials and devices that could be used to minimize the teachers' talking and at the same time, make the message clearer, more interesting and easier for the learner to assimilate (Onasanya, *et al.* (2008). According to Soetan *et al.* (2010), graphics including charts, posters, sketches, cartoons, graphs and drawings. Graphics communicate facts and ideas clearly through combination of drawings, words and pictures. The use of graphics in teaching creates definitiveness to the materials being studied. They help to visualize the whole concepts learned and their relationships with one another.

Hands-on instructional materials show, rather than tell, which increase information retention. A truism often heard in teaching is that if you have not learnt, I have not taught. A reasonable conclusion then is that the importance of instructional materials in teaching and learning science is most efficient illustrated through student achievement result. The Biological Science Curriculum Study (BSCS) (2011) asserts that students come to the science classroom with many misconceptions to correct for proper scientific learning to progress. Schools should base instructional material on fundamental scientific concepts and principles, which help to align students understanding with current knowledge and teach them to monitor and control their own thoughts process to facilitate learning. When science is integrated with other inter-disciplinary courses, the teacher

should give careful attention to designing a logical and coherent structure for ensuring that they clearly communicate and ensure contextual understanding of embedded scientific concepts, as recommended by the Long Beach Unified School District (LBUSD) (2010). The LBUSD recommends the use hand-on science activities. The BSCS advocates group work and inquiry based activities. Such explorations encourage students to engage in science, which promote problem-solving thoughts patterns and correct students' mistaken notion of science and the world. Teachers who take time to provide instructional materials and option that take into consideration or account the different ways students receive and express knowledge are more likely to see their students' success. Science classroom should provide a variety of audio, visual and print input methods depending on students need, allow students the flexibility to communicate their true learning. According to BSCS, students or teachers who must closely follow their 5Es instructional model...engage, explore, explain, elaborate and evaluate...achieve a high rate of success. Taylor, Scotter and Coulson (2007) conclude, that there is a statistical link between superior student achievements and basic or extensive of strategies and learning sequences consistent with the 5Es. Research study has shown that where instructional materials are used the learning environments are highly stimulating and the students appear to take greater interest in learning.

Statement of Problem

The transmission of facts, ideas and information from the teacher to the students in a systematic order or procedure is referred to as teaching. During this process instructional material other wise known as teaching aids meant to make instruction more meaningful, clear and much more interesting to students are brought in display. There is a general impression that science education is not achieving the desired objectives especially with high incidence of students' poor performance in chemistry and other science subjects at senior secondary certificate examination. This situation has assumed a precarious dimension in all secondary schools in Cross River State and particularly in Yakurr Local Government Area. The failure of educational system to provide adequate and appropriate teaching-learning aids in order to

improve academic performance of students is of a great concern to government, educational institutions and other concern citizens. It is believed that if adequate instructional materials are made available to school and are used appropriately in teaching-learning process, a better performance could be achieved. Hence, the motivation of this study which seeks to find out the influence of instructional materials on academic performance of senior secondary schools students in chemistry.

Purpose of the Study

The purpose of this study is to:

1. Find out the influence of instructional materials on academic performance of senior secondary school students in chemistry.
2. Compare the performance of two sets of students in which one of the groups is taught with instructional materials and the other without instruction materials (Experimental and Control group respectively.)

Research Questions

In the course of this research work, the following question was raised:

1. To what extent do students taught with instructional materials perform higher than those taught without instructional materials

Hypothesis

H₀: There is no statistical significant relationship between the academic performance of chemistry students and the use of instructional materials in Teaching-learning.

Significance of the Study

This study will help to:

1. Steer Government and Proprietors of schools to recognize the need to adequately equip their schools with current and appropriate instructional materials.
2. Prove the worth of instruction materials in teaching learning processes.
3. Inculcate in teachers the habits of using instructional materials appropriately in teaching learning process to arouse interest and determination among students.

METHOD AND MATERIALS

The researcher adopted a quasi-experimental design for this study. The population consist of the entire senior secondary one in Yakurr Local Government Area of Cross River State. A total of one hundred (100) students were sampled from five secondary schools using random sampling technique and a stratified random sampling technique was used to select the five schools in order to have a true representative sample. The number of boys to girls was in the ratio of 1:1 which reflect women equality. The simple random sampling technique was used in selecting students to avoid prejudice and give room for effective students- materials interaction and adequate class room management.

The researcher prepared two different lesson notes which were used to teach the students. There were two groups; the experimental group was taught with instructional materials but the control group was taught without instructional materials. The same topic %Rostulates that support the kinetic theory of matter+ was used for both groups. At the end of the lesson, the researcher administered a Chemistry Academic Test (CAT) to the students in the two groups. The Chemistry Academic Test comprised ten (10) multiple choice items and each question has four options with one correct answer. And each correct answer was scored two marks. The researcher experiences a difference in performance of pre and post test analysis in the two groups. The instruments were first validated by chemistry education experts and the reliability of the Chemistry Academic Test (CAT) was determined using Pearson product moment correlation for split-half to obtain a reliability coefficient of 0.67.

The purpose of this research was explained to the students. In testing the performance of experimental and control groups on a pre-test, pre-test based on the topic to be taught was administered to the students. The pre-test was followed immediately by teaching the two groups of students on the topic %Rostulate that support the kinetic theory of matter+; one group with instructional materials and the other without instructional materials. The researcher made sure that the students in the two groups passed their scripts after both Tests giving a return rate of 100%. During the Pre-Test and Post-Test examination, the same examination condition were enforced in the two groups. This was done so as to obtain reliable and valid

results from the two groups. To assured confidentiality and avoid prejudice, the students were asked not to write their full names.

The scores of students in both pre-test and post-test were transformed into group data and the frequency of studentsq performance computed. The independent t-test statistic was employed to analyse the two groups, (one was taught with instructional materials and the other without instructional materials). The Pearson product Moment Correlation (PPMC) and independent t-test were used for data analyses. The hypothesis and research questions were tested at 0.05 alpha level significance. The mean scores and the standard deviation of the two groups were also computed.

RESULTS:

Hypothesis (H₀)

There is no statistical significant relationship between the academic performance of chemistry students and the use of instructional materials in Teaching-learning.

The analysis in Table 1 shows that the calculated t-value (5.42) is greater than the critical value (1.98) at 0.05 alpha significant levels. Therefore, the null hypothesis is rejected. This implies that there is a statistical significant relationship between the academic performance of chemistry students and the use of instructional materials in Teaching-learning.

Research Question One

To what extent do students taught with instructional materials perform higher than those taught without instructional materials?

The analysis in Table 1 shows that the calculated r-value (0.61) is greater than the critical value (0.273) at 0.05 alpha significant levels and the standard deviation and mean of students taught with instructional materials are greater than students taught without instructional materials. The result shows that the performance

of experimental group is better than the control group.

DISCUSSION OF THE RESULT

The findings in the research hypothesis showed that there is a statistical relationship between the academic performance of chemistry students and the use of instructional materials in Teaching-learning.

The result agrees with the findings of Inyang (1997) that teaching is effective when the teacher make use of instructional materials. (Lance *et al*, 1999; Todd & Kuklthau, 2004.) Confirmed a significant correlation between the presence and the use of library materials by the students and teachers with better performance. Similarly, (Todd & Kuklthau, 2005, p.82.) found a simple correlation between the students inputs and better academic achievement. Analysis shows that the availability and the use of chalkboard, math kit, teaching guide, science guide, audio-visual aids and the use of science kit have positive impart on the academic performance for science students. The concept of instructional materials revolves on the fact that, it does not only stimulate the learner, but enhances learning outcome generally, increased relationship and recall by involving the relevant senses and makes instruction clear, meaningful and in most cases real. Also Emma & Ajayi , (2004) asserted that %eaching equipments and materials have change over the years, not only facilitate teaching-learning situation but also address the instructional needs of individuals and groups.+ Okendu (2012) asserted that regular instructional supervision has a significant bearing on studentsq academic performance. He also, affirmed that adequate supply of instructional resources have significant effect on studentsq academic performance. Onasanya & Omosewo (2011) confirmed that both standard and improvised instructional materials have the same positive effects on studentsq academic performance.

Table 1

Independent t-test and Pearson product moment correlation analysis of students taught with instructional materials those taught without instructional materials

GROUP STUDENTS	OF	N	X	Y	SD _x	SD _y	r _{cal}	r _{cri}	df	t _{cal}	t _{cri}	Decision at p=0.05
Students taught with instructional materials(X)		50	52.26		9.95		0.61	0.273	98	5.42	1.98	
Students taught without instructional materials (Y)		50		29.02		8.47						

Significant at $p < 0.05$

The results of research question one implied that the performance of experimental group is better and higher than the control group. This is in agreement with the concept that if learning is to be achieved positively then the laboratory should be seen as a workshop for a range of students' activities, including experimental investigation to confirmatory exercise and skills learning. The results are in accordance with Inyang (1997) views that students learn faster through activity oriented instruction and when students are not actively involved in the learning process, performance becomes poor. This is not farfetched from the fact that instructional materials are very important in teaching learning process if learning out-come are to be achieved with relative ease. Jimoh, M.F. (2009) emphasized that advances in technology have brought instructional materials especially the projected and electronic materials to the forefront as the more radical tools of globalization and social development which have affected class teaching-learning situation positively. Such technological breakthroughs as networked and non-networked projected and non-projected, visual, audio, audio-visual electronic material is important landmark in knowledge transfer and high academic performance. Also, Aguisiobo (1998) expressed that learning is an activity that take place in a contact and not in a vacuum. He reiterated that students with teaching aids do not have a blank mind but a consolidated and developed library of knowledge. Omosewo (2008) ascertained that in a modern science curriculum programme, students need to be encouraged to learn not only

through their eyes, or ears, but should be able to use their hands to manipulate apparatus.

CONCLUSION

In this study the aim was to examine the influence of instructional materials (teaching aids) on students' academic performance of senior secondary schools in Chemistry, it is hereby concluded that;

1. The students taught with instructional materials perform better and higher than those taught without instructional materials
2. There is a statistical relationship between the academic performance of chemistry students and the use of instructional materials in Teaching-learning

RECOMMENDATIONS

Based on the results of the study the following recommendations are made:

1. The teachers should encourage active students' participation in class work by adopting instructional materials interactions.
2. Workshops, seminars, conferences or orientation courses on chemistry should be designed to acquaint the teachers with the latest development in the field of chemistry.
3. Well equipped chemistry laboratories should be established in all the schools by owners.

4. Chemistry teachers should improvise instructional materials for teaching-learning process.
5. Government should within its lean financial resources ensure equitable distribution of instructional materials to schools in urban and rural areas for effective learning and teaching of science.
6. The ministry of education should evenly distribute trained and qualified chemistry teachers to all the secondary schools.
7. The ministry of Education should donate enough money; co-operation organizations as well as other meaningful citizens should donate money for the provision of books that are up to date and other resource materials in the schools for use by both teachers and students.
8. The government should make educational technology a compulsory course in the teachers' curriculum of training colleges and colleges of education both in the state and federal levels.

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