The Relationship Between Students’ Achievement In The Theoretical And Practical Aspects Of Senior School Certificate Mock Examination In Chemistry

SALEH Mohammed Gero

Department of Chemistry
School of Science Education
Federal College of Education (Technical) PMB 1013 Potiskum, Yobe State, Nigeria
08061536183
salehgero@gmail.com

ABSTRACT
In this study an attempt was made to compare and find the relationship between students’ achievement in theoretical and practical aspects of Mock Senior School Certificate Examinations in Chemistry. The study adopted a correlation research design which specifically, compared recorded scores of students in theoretical and practical aspects of chemistry MOCK Examination of 2007-2009 academic sessions. One research question and one hypothesis guided the study. A total of 1200 SS3 students drawn from secondary schools within Potiskum education zone of Yobe state were used. The students were drawn through random sampling technique. Mean and standard deviation of scores were used to answer the research question while Pearson Product-Moment Correlation analysis was used to test the null hypothesis at p< 0.05. The result showed that students achieved better in the theoretical aspect than in the practical in the MOCK Examination in Chemistry 2007 – 2009 in Potiskum Education Zone of Yobe State. It also revealed that there were significant relationships between students’ achievement in the theoretical and the practical aspects of the examination. Thus it was concluded that students do not have enough laboratory experience to cope with the demand of the external practical examination in Chemistry. Therefore it was recommended that Chemistry teachers should give more priority to practical experiments as part of instruction in order to improve students’ understanding of practically related concepts. Theoretical and practical instructions should be given side by side.

Keywords: Chemistry teachers, science education, Mock Examination, Chemistry

INTRODUCTION
Science in general and Chemistry in particular plays a significant role in the economic development of a nation. This underscores the reasons for emphasizing the promotion of Science as the means for achieving technological development in many countries. Therefore, for a country to be economically viable, it must strengthen its science and technology programmes in content as well as in teaching and learning at secondary schools level (Gero, 2001).
Most of the educational objectives in Nigeria can be achieved through effective science education. Hence, science education is given priority because it will help in providing the essential manpower for the development of the country in areas such as Agriculture, extraction and processing of mineral resources, industrial production of consumer goods, Medicine and Pharmacy.
So these aspects of the importance of Chemistry explain why schools, governments, students and parents are worried over students’ poor achievement in Chemistry in senior school certificate examination.
Amaefule (2001) asserted that “chemistry is a science subject from which all science and technology disciplines draw sustenance”. However, students do not perform well in Senior School Certificate Examination (SSCE) in chemistry, (Akalonu, 1998, and Eze, (2000).
Chemistry is taught and tested in the secondary school both theoretically and practically. Theoretical aspect of Chemistry study stresses the verbal and written presentation of concepts, principles, ideas, contents and theories of Chemistry to students. The theoretical type test is used as a means of
evaluating the qualitative aspects of written instructions. The test items require the learner to reason out the responses, plan how best to arrange the responses sequentially, and then write them out at some length. Such concepts, ideas, theories and principles are presented as facts, which sometimes may not be fully and clearly explained to students by the teachers.

Usually practical work in senior secondary school Chemistry is organized to precede theoretical chemistry lessons, mainly as an attempt for students to learn practically the concepts they were earlier taught theoretically. During practical classes therefore, students are provided opportunities in the laboratory to have a hands-on experience under the guidance of the Chemistry teacher.

Raw scores obtained by students in Mock Senior School Certificate Chemistry Examination in both theoretical and practical aspects which is normally organized two weeks before WAEC/NECO by the Yobe State Education Resource Centre, Damaturu, (YSERCD) Yobe State, was used. The justification for the study was informed by the fact that many SS students are not doing well in their achievement in Chemistry (YSERCD, 2006) and therefore there is the need to investigate and find out which of these two components, theoretical chemistry or practical laboratory work that hinders students overall performance in Chemistry. Hence the need to undertake the present study arose.

Statement of Problem
The teaching of Chemistry has two components. The theoretical component is meant to train the students properly in the concepts, theories and principles of Chemistry. There is also the practical laboratory based component, which is intended to enable students undertake laboratory work necessary for explaining practically their understanding of the theories, ideas, principles and concepts of Chemistry they were taught theoretically. Both the theory and the practical work are important in the overall study and assessment of students in Chemistry because no one component is more important than the other. This is why it is important to compare and document the relationship between theoretical and practical aspects in the overall achievement of senior secondary school students in the study of Chemistry in Nigeria with particular emphasis on Yobe State. An extensive review of literature on the study of the theoretical and practical laboratory components of achievement in Chemistry showed that such literature is scanty and none have been reported for Yobe State. The literature also indicated that students do fail in chemistry, but it is not understood in which aspect (theoretical or practical) they fail worst. The literature also indicated that practical works are mostly delayed until SS II or SS III. Hence the study filled the gap of paucity of empirical data by comparing the scores of students in theoretical and practical aspects to find their relationship as they affect students overall achievement in Senior Secondary School Certificate in Chemistry in MOCK 2007-2009 in Yobe State.

Research Question
What is the relationship between the achievement mean scores of students in the theoretical (TH) and the practical (PR) aspects of the Mock Senior School Certificate Chemistry Examination?

Hypothesis
There is no significant relationship between students’ achievement mean scores in theoretical and practical aspects of Mock Senior School Certificate Chemistry Examination tested at 0.05 level of significance.

RESEARCH METHODS
Design of the Study
The design of the study is a correlation research, which compares recorded scores of students in theoretical and practical aspects of chemistry MOCK WASC examination of 2007-2009 academic sessions. Data were analyzed using mean and standard deviation.
PRESENTATION OF RESULTS

The hypothesis was tested at P<0.05 level of significance.

Table 1: Mean and Standard Deviation of Scores of Students in Theoretical (TH) and Practical (PR) Aspects of Senior School Certificate Mock Examination in Chemistry 2007 - 2009.

<table>
<thead>
<tr>
<th>Aspect of examination</th>
<th>Variable</th>
<th>N</th>
<th>Σ X</th>
<th>X</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH</td>
<td>All groups</td>
<td>1200</td>
<td>38898</td>
<td>32.42</td>
<td>09.91</td>
</tr>
<tr>
<td>PR</td>
<td>All groups</td>
<td>1200</td>
<td>25711</td>
<td>21.43</td>
<td>11.56</td>
</tr>
</tbody>
</table>

p= 0.05

Research question

What is the difference in achievement mean scores of students in theoretical (TH) and practical (PR) aspects of Mock Senior School Certificate Chemistry Examination 2007-2009?

Table 1 shows the mean of scores and standard deviation of scores of students in theoretical and practical aspects of Mock Senior School Certificate Examination for three years 2007-2009. From the Table, the students had means of scores of 32.42 and 21.43 in the theoretical and the practical aspects respectively. Comparing the means of scores of the two groups, the students had a higher mean achievement score in the theoretical aspect than in the practical. This implies that on average, the students have higher achievement in theoretical than in practical. It is also evident that they had the standard deviations of scores of 9.91 and 11.56 respectively. This indicated that the distributions of scores of students in the theoretical aspect are closer to the mean compared to their scores in practical which are further away from the mean. The implication is that, more students score higher on average in the theoretical aspect than in the practical aspect.


<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Σ X</th>
<th>X</th>
<th>S.D</th>
<th>R</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH</td>
<td>1200</td>
<td>38898</td>
<td>22.42</td>
<td>09.91</td>
<td>0.145</td>
<td>.000</td>
</tr>
<tr>
<td>PR</td>
<td>1200</td>
<td>25711</td>
<td>21.43</td>
<td>11.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Hypothesis

There is no statistically significant relationship between students’ achievement mean scores in theoretical and practical aspects of Mock Senior School Certificate Chemistry Examination.

The achievement scores obtained in theoretical and practical aspects in Mock Senior School Certificate Chemistry Examination for three years 2007-2009 in Potiskum Education Zone of Yobe State were subjected to Pearson Product-Moment correlation analysis and the result is presented in Table 2. From Table 2, r = 0.145, at p= 0.05. This implies that there is a significant positive relationship between the achievements means scores of students in theory and practical aspects of chemistry. However, the strength of the correlation is small (0.145). Thus, poor performance in theory will lead to poor performance in practical chemistry.

DISCUSSION OF THE FINDINGS

The discussion based on the one research question and the one null hypothesis. The analyses of Table 1 showed that students achieved better in theoretical aspect than in practical aspect in Mock Senior School Certificate Examination in Chemistry for the three years 2007-2009 in Potiskum Education Zone of Yobe State. This might be due to the much attention teachers give to the theoretical aspect of teaching Chemistry in the secondary schools than the practical aspect. Students receive much teaching and instructions in theoretical aspect of the syllabus than the practical aspect and therefore are bound to achieve better in the theory than in the practical. The fact that students achieve better in theory than practical in this study appears to be supported by available literature. For example, Eze (2000)
observed that in most senior secondary schools, Chemistry lessons are taught and completed without practical work. He further observed that some students of Chemistry never experienced any form of practical until second term of senior secondary year 3.

CONCLUSION
Critical analyses of the tables of results bring certain conclusions to the limelight. From the general achievement of the students in both the theoretical and the practical aspects of Mock Senior School Certificate Examinations in Chemistry of the year 2007 to 2009, it can be concluded that:
The main concern of evaluation in the school system is to assess the achievement of students and performance of teachers at different stages of educational processes and whose outcome could be used in decision making by the teachers, the students, the administrators and the parents for promotions, placements, certification, additional efforts etc. Students achieved significantly better in the Theoretical Aspect of evaluation in this work than in Practical Aspect in the Mock Senior School Certificate Examination in Chemistry, thus it can be concluded that students do not have enough laboratory experience to cope with the demands and challenges of the external practical examination in Chemistry and hence, must fail the final Senior School Certificate Examination in Chemistry. It is therefore clear from the result of this research that the failure in the Senior School Certificate Examination in Chemistry is caused by the failure of the students in the practical aspect of the examination in Chemistry.

RECOMMENDATION
In view of the results of these findings and conclusions reached in this study, the following recommendations are hereby offered:
Chemistry teachers should therefore balance their emphasis between the theoretical and the practical lessons in their day to day teaching and learning processes in order to improve students’ understanding of practically related concepts as well as the theoretical. In-fact, theoretical and practical instructions should go hand in hand together.

REFERENCES