AN INVESTIGATION INTO THE USE OF RESOURCE PERSONS FOR QUALITY CONTROL OF SCIENCE INSTRUCTION IN KWARA STATE SECONDARY SCHOOLS

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ABSTRACT

In recent years, science educators have come under much criticisms regarding the nature of the science taught in our secondary schools and higher institutions. The frequent poor performance of students in science (Daramola, 1983) has contributed in no small measure to such criticism. Questions are being asked concerning the quality of science instruction given to students in Nigerian Secondary Schools.

This study sought to examine the use of resource persons for quality control of science instruction in Kwara State secondary schools.

Findings revealed that:

i. Sex and type of school of the science teachers had a positive relationship with their awareness of resource persons.

ii. Academic qualification and years of teaching experience have influences on the use of resource persons in secondary school by science teachers.

iii. Although being aware does not necessarily mean that such teachers would act favourably towards the invitation of resource persons in secondary schools.

INTRODUCTION

In Nigeria today, the aims of the 6—3—3—4 Educational System is to teach the type of science that will be consistent with the challenges of a modern technological age and to produce the anticipated manpower for production with a view towards self-reliance and economic independence for the nation. It is therefore imperative that science instructions in the secondary schools meet the objectives as revealed in the core curriculum for Integrated Science (J. S. S.) of Federal Ministry of Education which include:

i. Teaching by enquiring and experimentation.

ii. Teaching of scientific knowledge and skills.

iii. Application of science in solving societal problems.

iv. Teaching of science in relation to reality.

Odunsi (1986) is of the opinion that:

What we need in science teaching is revolution not a transformation. A slow but irreversible change from the Modus Operandi of our present science teaching to a more effective and productive approach. (p. 46).

How can science teachers in secondary schools improve the quality of science instruction? How can science teachers be more effective in teaching science? These are pertinent questions that come to mind. It is apparent that the most important aspect of the secondary school curriculum relevant to those questions is obviously the target for scrutiny and reform.
Indeed, an aggregate of problems has plagued our educational system for some time now, especially with respect to the sciences at the secondary school level. There are problems of low enrolment of students for science subjects into higher institution (Aghenta, 1982), shortage of science teachers (Oyanna, 1979); poor quality of science instruction (Usua, 1973) and poor performance in the science by secondary school students (Daramola, 1983). One problem leads to another resulting in a kind of vicious circle. The quality of instruction has a serious consequence on the performance of students, thus, the penultimate and last problems enumerated are directly related.

Educationists are aware of the existence of poor quality of instruction as regards science subjects because it is not new. However, its persistence in our educational system yearns for an ‘unusual’ approach in order to tackle the problem effectively.

RATIONALE FOR THE STUDY

The present study sought the opinions of science teachers on the use of resource persons in secondary schools for quality control of science instruction.

Many research studies conducted have revealed different deficiencies in the teaching of science presently. In their investigations, (Sheikh, 1982; Abdullahi and Aninyei, 1983; Iheuzaor and Adelaiye, 1985) revealed that secondary school pupils find some topics difficult to understand in the various science subjects.

Also some studies have shown that some science teachers find certain topics in their subject area difficult to teach and thereby avoiding such topics completely or teaching them poorly, if they have to. Such topics include for example; genetics and ecology in Biology (Oyewole, 1982; Jegede and Olagoke, 1986); organic Chemistry and solubility in Chemistry (Abdullahi and Aninyei, 1983), Usua (1973) in his investigation noted that:

Notwithstanding, it must be admitted that a large share of the testee’s lack of understanding of the concepts explored is because of deficiencies in their teachers. (p. 65).

The core concepts are often neglected and yet such concepts provide the academic background required for meaningful learning of science to pupils. He went on further that the origin of the observed testee’s poor performance clearly seems to indicate poor quality of teaching.

Yet another set of findings indicated that practical lessons are often avoided by most science teachers until late in the final year, (Asenuga, 1981; Idris, 1981). In general, many secondary schools start chemistry practicals in Form IV as Teiibo’s (1975) investigation indicated and this is commonly the case with physics too. In the case of Biology however, Soyibo (1976) made this observation.

To confound the matter of the utter neglect of practical biology in the majority of our secondary schools to date, it is regrettable to note that experiments and field work with the flora and fauna of the locality have little or no place in the scheme of work generally. (p. 14).

In most schools students attend the Biology laboratory for practicals only (and often late) in their final year twice weekly).

Most of the time is spent in dissecting flowers, drawing bones, copying diagrams from charts (Soyibo, 1976); There is a need for a practical approach towards science teaching and practical work is an integral part of science. Scientific con-
cepts and generalisations gain prominence in the literature only after they have survived series of empirical testing (Ogunniyi, 1977).

Another reason for this study stems from the knowledge that recent years have witnessed an unprecedented increase in the number of secondary schools and increase in population of pupils per class of which the number of trained teachers available does not match. Coombs (1968) observed that:

The numerical output can be expected to grow considerably, but again we come hard up against the issue of quality. (p. 43).

Besides, government in some states has already purchased materials and equipment worth millions of naira for the 3–3 level of the new educational programme which would also require competent teachers to handle. From this fact (Oladimeji, 1978) in his submission noted that:

... the maintenance and appreciable utilisation of instructional materials and the use of the right instructional procedure as occasions demand depend largely on the quality and resourcefulness of the teachers. (p. 105).

RESEARCH METHODOLOGY

The investigation was designed as a survey research in which the opinions of science teachers on the use of resource persons in secondary schools were sought.

SUBJECTS

The subjects were science teachers drawn from one hundred and thirty-two schools (132) randomly selected from twelve local government areas in Kwara State. Three hundred and twenty-four (324) science teachers participated in the study.

INSTRUMENT

A two-page questionnaire was designed and administered to the subjects. There were two sections to the questionnaire.

Section A: sought to know the characteristics of the respondents such as their sex, academic qualification, years of experience and type of schools in which the respondent was based.

Section B: consisted of some questions with a view to obtaining information on the awareness of resource persons by respondents and to seek their opinion on the invitation of resource persons to schools. The questionnaire was given out to science educators to ensure its content validity prior to the pilot study and final administration to the subjects.
i. Results on Availability of Resource Persons.

### TABLE 1

**FREQUENCY COUNTS OF SCIENCE TEACHERS ON THE AVAILABILITY OF RESOURCE PERSONS ACCORDING TO SEX**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>241 (236.5)</td>
<td>68 (72.5)</td>
<td>309</td>
<td></td>
</tr>
<tr>
<td>Not Aware</td>
<td>7 (11.5)</td>
<td>8 (3.5)</td>
<td>15</td>
<td>4.49</td>
</tr>
<tr>
<td>Total</td>
<td>248</td>
<td>76</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 1, \quad X^2\) is significant at \(p < 0.05\)

The expected frequencies are quoted in brackets.

The chi-squared value indicated that there was a significant difference in the responses of the male and female science teachers.

There was a significant difference in the level of awareness of resource persons between the two sexes. Male science teachers are more aware of the existence of resource persons than the female science teachers do \((p < 0.05)\).

### TABLE 2

**FREQUENCY COUNTS OF SCIENCE TEACHERS ON THE AVAILABILITY OF RESOURCE PERSONS ACCORDING TO ACADEMIC QUALIFICATIONS**

<table>
<thead>
<tr>
<th>Responses</th>
<th>N.C. E.</th>
<th>B.Sc. &amp; PGDE/ B.Ed.</th>
<th>B.Sc. Only</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>113(114.4)</td>
<td>108(105.8)</td>
<td>88(88.7)</td>
<td>309</td>
<td></td>
</tr>
<tr>
<td>Not aware</td>
<td>7 (5.5)</td>
<td>3 (5.1)</td>
<td>5 (4.3)</td>
<td>15</td>
<td>1.22</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>111</td>
<td>93</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 2, \quad X^2\) is not significant at \(p > 0.05\)

The expected frequency are quoted in bracket.

Table 2 is an indication that the academic qualification of respondents has no relationship with the awareness of resource persons. There is no significant difference between the different categories of science teachers as regards awareness of resources persons.
TABLE 3
FREQUENCY COUNTS OF SCIENCE TEACHERS ON THE AVAILABILITY OF RESOURCE PERSONS ACCORDING TO THE TYPE OF SCHOOL IN WHICH SCIENCE TEACHERS TAUGHT

<table>
<thead>
<tr>
<th>Responses</th>
<th>Govt.</th>
<th>Community</th>
<th>Schools' Management Board</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>127(124.9)</td>
<td>97(02.0)</td>
<td>85(82.0)</td>
<td>309</td>
<td>8.30</td>
</tr>
<tr>
<td>Not aware</td>
<td>4(6.1)</td>
<td>10(5.0)</td>
<td>1(4.0)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>107</td>
<td>86</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 2; \ X^2 \) is significant at \( p < 0.05 \)

The expected frequencies are quoted in brackets.

The Chi-squared value indicates that there were significant differences in the responses of the science teachers from the different schools with respect to resource persons. Science teachers from Government schools are more aware of the existence of resource persons than their counterparts in community schools and those under the schools management board.

TABLE 4
FREQUENCY COUNTS OF SCIENCE TEACHERS ON THE AVAILABILITY OF RESOURCE PERSONS ACCORDING TO YEARS OF TEACHING EXPERIENCE

<table>
<thead>
<tr>
<th>Responses</th>
<th>0 - 2 years</th>
<th>2 - 5 years</th>
<th>5 - 8 years</th>
<th>8 yrs.</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>130(134.5)</td>
<td>92(90.6)</td>
<td>35(34.3)</td>
<td>52(44.6)</td>
<td>309</td>
<td></td>
</tr>
<tr>
<td>Not aware</td>
<td>11(6.5)</td>
<td>3(4.4)</td>
<td>1(1.7)</td>
<td>0(2.4)</td>
<td>15</td>
<td>6.34</td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>95</td>
<td>36</td>
<td>52</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 3, \ X^2 \) is not significant at \( p > 0.05 \).

The expected frequencies are quoted in brackets.

The Chi-square value is an indication that the years of teaching experiences has no influence on the degree of awareness of science teachers on the availability of resource persons. There was no significant differences in the level of awareness of science teachers with above 8 years and those with less than 8 years of teaching experience.

ii. Results on Inviation of Resources Persons to Secondary Schools.
### Table 5

**FREQUENCY COUNTS OF SCIENCE TEACHERS' ON THE INVITATION OF RESOURCE PERSONS ACCORDING TO SEX**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitation</td>
<td>132(130.2)</td>
<td>46(41.8)</td>
<td>178</td>
<td></td>
</tr>
<tr>
<td>No invitation</td>
<td>116(111.8)</td>
<td>30(34.2)</td>
<td>146</td>
<td>1.12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>248</td>
<td>76</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 1\), \(X^2\) is not significant at \(p > 0.05\).

The expected frequencies are quoted in brackets.

The chi-square value indicates that there was no significant difference between the opinions of the male and female science teachers as regards invitation of resource persons to secondary schools.

### Table 6

**FREQUENCY COUNTS ON SCIENCE TEACHERS ON THE INVITATION OF RESOURCE PERSONS ACCORDING TO ACADEMIC QUALIFICATION**

<table>
<thead>
<tr>
<th>Responses</th>
<th>N. C. E.</th>
<th>B.Sc. &amp; PGDE /B.Ed.</th>
<th>B.Sc. Only</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitation</td>
<td>74(65.9)</td>
<td>63(61.0)</td>
<td>41(51.1)</td>
<td>178</td>
<td>6.64</td>
</tr>
<tr>
<td>No Invitation</td>
<td>46(54.1)</td>
<td>48(50.0)</td>
<td>52(41.9)</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>120</td>
<td>111</td>
<td>93</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 2\), \(X^2\) is significant at \(p < 0.05\).

The expected frequencies are quoted in brackets.

The chi-square value indicates that there are differences in the responses of the science teachers with the varying qualification with professional training are more inclined to invite resource persons to schools than those with a lower qualification.

### Table 7

**FREQUENCY COUNTS OF SCIENCE TEACHERS ON THE INVITATION OF RESOURCE PERSONS ACCORDING TO TYPE OF SCHOOLS**

<table>
<thead>
<tr>
<th>Responses</th>
<th>Govt.</th>
<th>Community</th>
<th>Schools’ Management Board</th>
<th>Total</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitation</td>
<td>68(72.0)</td>
<td>56(58.8)</td>
<td>54(47.2)</td>
<td>178</td>
<td>3.13</td>
</tr>
<tr>
<td>No invitation</td>
<td>63(59.0)</td>
<td>51(48.2)</td>
<td>32(38.8)</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>131</td>
<td>107</td>
<td>86</td>
<td>326</td>
<td></td>
</tr>
</tbody>
</table>

\(df = 2\), \(X^2\) is not significant at \(p > 0.05\).
The expected frequencies are quoted in brackets. The chi-square value reveals that the type of schools of science teachers is unrelated to their opinion on the invitation of resource persons to secondary schools.

**TABLE 8**

<table>
<thead>
<tr>
<th>Responses</th>
<th>8 — 2 yrs</th>
<th>2 — 5 yrs</th>
<th>5 — 8 yrs</th>
<th>8 yrs.</th>
<th>Total</th>
<th>$X^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitation</td>
<td>63(77.5)</td>
<td>59(52.2)</td>
<td>23(19.8)</td>
<td>33(28.6)</td>
<td>178</td>
<td>10.3</td>
</tr>
<tr>
<td>No invitation</td>
<td>78(63.3)</td>
<td>36(42.8)</td>
<td>13(16.2)</td>
<td>19(23.4)</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>95</td>
<td>36</td>
<td>52</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

$df = 3, X^2$ is significant at $p \leq 0.05$.

The expected frequencies are quoted in brackets. The chi-square value is an indication that the responses of teachers with less than 2 years, 2 — 5 years, 5 — 8 years and 8 years of teaching experience are significantly different. Science teachers with more years of teaching experience are more inclined to inviting resource persons to schools than the younger teachers with few years of teaching experience.

**DISCUSSION**

(i). *Awareness of the Availability of Resource Persons Table 1 — 4*

Table 1 reveals that there is a significant difference in the level of awareness of resource persons between the two sexes at $p \leq 0.05$.

Female science teachers are less inclined to attend workshops and conferences where resource persons are known to present papers, because sometimes workshops and conferences in which resource persons feature may be outside their station. Thus, travelling outside the stations may not attract female science teachers.

Table 2 reveals that, there is no relationship between the academic qualification of science teachers and awareness of resource persons. It was expected that science teachers with the highest academic qualification would be more aware of the presence of resource persons because they are the category of teachers who are usually sent to workshops and conference by the Ministry of Education and Schools Management Board as senior members of the teaching staff in the schools. This provides them with the opportunity of meeting resource persons.

Table 3, indicated a significant difference in the responses of the different subgroups with respect to the awareness of resource persons. The science teachers in Government Schools are more aware of the existence of resource persons than
those in community and schools under the School Management Board. This trend may be as a result of the location of most Government Schools in the townships and more importantly, the Ministry often supports its science teachers to attend workshops and conferences where resource persons present papers concerning improving the quality of science instruction and the education policy, held in universities whenever the need arises. Thus, it is not surprising that science teachers from government schools know that resource persons are available. The teachers from community schools, on the other hand, may not be privileged to attend one of such conferences for many years.

Table 4 shows that, the years of teaching experience has no influence on the degree of awareness of science teachers on the availability of resource persons. Thus, older more experienced science teachers have not been found to be more aware of resource persons than who are still new on the job as was expected. The reason for this may not be unconnected with the type of school in which they taught as regards sponsorship to conferences.

The researcher sought to compare the findings of the present study with a similar study but was unsuccessful as investigation on awareness of resource persons has not been conducted before now.

(ii) Invitation of Resource Persons to Secondary Schools (Table 5 – 8).

Table 5 reveals that there was no significant difference between the responses of the two sexes as far as invitation of resource persons to secondary schools is concerned. This is probably because they consider resource persons as meant for higher institutions only.

In Table 6, a significant difference was recorded concerning the responses of the different subgroups with different qualifications. This implies that science teachers with higher academic qualification are more inclined to invite resource persons to secondary schools. This is not surprising because this group of science teachers are the most qualified (i.e., holders of B. Ed. degree or B. Sc. and PGDE in addition) and are expected to perceive resource persons as partners in progress and seek their expertise for the improvement of science instruction in schools. Also, science teachers with a degree and teaching qualification in addition probably realise the shortage of qualified science teachers (Oyanna, 1979) in Nigerian secondary schools, and may be over loaded in terms of number of periods per week and class size. Therefore, they would require some assistance from resource persons from the Faculties of Education of the Universities. Moreover, that in spite of their qualification, the school laboratory may be ill-equipped and such teachers may welcome demonstrations which the resource persons would employ in making students understand science better.

Table 7 on the contrary, reveals that the type of school of the respondents is unrelated to their opinion on the invitation of resource persons to secondary schools for improving the quality of science instruction. This implies that, science teachers from government schools are unlikely to invite resource persons to schools than their counterparts in the community and schools under the Schools' Management Board.
The data shown in Table 8 is an indication that the responses of the science teachers with different years of teaching experiences were significantly different. Science teachers with more years of teaching experience are more inclined to inviting research persons to schools than those with fewer years of teaching experience. This is interesting, because it would be expected that the science teachers with many years of teaching experience (eight years and above) may be considered to have acquired enough experience and thus would not require the services of the resource persons from universities.

It is clear that, there is the need for such teachers to be up-to-date because it seems that these are the teachers who because of the training they received, are less likely to teach some topics on the syllabus. For instance, they probably have not had the privilege of studying ecology and genetics in Biology and organic chemistry in Chemistry during their training. Thus, making these areas difficult for them to teach to their students.

To sum up the discussion, it is noteworthy that although academic qualification and years of teaching experience of science teachers have no influence on their awareness of resource persons, there were some degree of relationship between these variables and invitation of resource persons to schools. This is encouraging as far as the study is concerned because there is an indication that the actual invitation of resource persons to secondary schools is perceived as beneficial to the learners and possibly minimise the deficiencies of science teachers as regards quality of instruction and more importantly deliberate avoidance of some topics seen to be difficult by science teachers.

An attempt by the researcher to compare the findings of this study with similar studies proved abortive as studies in this aspect are not available.

RECOMMENDATIONS:
1. The State Ministries of Education should ensure that every secondary school has a reasonably equipped laboratory with simple apparatus.
2. The State Ministries through the Inspectorate Division should ensure that every secondary school has adequate number of periods for both science lessons and practical sessions on the school Time-Table.
3. Science teachers should ensure that adequate preparations are made for science instructions and practical work in order to identify problem areas early enough to seek assistance.

CONCLUSION
Use of resource persons from the Nigerian Institutions of higher learning in secondary schools may be a way out of the problem of poor quality of science instruction and consequently poor performance of students in science subjects in our secondary schools. It is particularly important that science concepts at the Junior Secondary School level of the 6—3—3—4 programme be well taught, so that pupils would be given a good foundation in science. The writer believes that the success of the new education programme, rest not only on science teachers but also on teacher trainers of science teachers alike.
REFERENCES


