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EDITORIAL

The Institute of Education, University of Ibadan is happy to announce the rebirth of West African Journal of Education with a slight change in name as it will now be known and called The West African Journal of Education. We wish to recall that the publication of West African Journal of Education was suspended because of operational reasons. The last issue of the journal was published in 1981.

The West African Journal of Education will be published two times in a session, October and June. We sincerely hope that we shall be able to sustain the publication of the journal. If we are to succeed, however, we would require regular subscribers. We, therefore, solicit the support of all for the success of this new venture.

The West African Journal of Education, will continue to provide a medium for the exchange of information on education at all levels. The emphasis of The West African Journal of Education will be on articles that deal with the application of research findings to classroom situation—teaching and learning.

In this maiden edition of the reorganized WAJE, we are featuring eight articles covering various aspects of education, with practical implications for teachers and students in the pursuit of the teaching—learning enterprise.

Ibeagha and Idowu in their article looked at how teachers can reduce the marking load on them when they have to carry out student assessment, especially in Mathematics. They noted that with the increased emphasis on science and technology, and the fact that Mathematics has been made compulsory at the secondary school level, the number of Mathematics students has risen sharply, and Mathematics has to come up every day in the school time—table. This means enormous work for Mathematics teachers, especially when they have to give class and home assignments. To reduce the marking load on Mathematics teachers, and also to help them to be more effective, Ibeagha & Idowu developed guided scoring by students as an instructional strategy. It was found to motivate students' learning and to help clarify instructional objectives, thus providing students with better learning outcome.

Obemeata also looked at another secondary school subject—Economics—and how its teaching can be made more effective. After spanning through the problem areas faced by teachers in the teaching of Economics and by learners, in the learning of Economics, he came up with recommendations. Some of these are: to give assignments to learners which involve the collection of materials, the writing of essays on topics taught, attempting past examination questions, providing students with feedback and helping students to improve their proficiency in the English language.

Adegbite writing on the teaching of traditional music as a component of music programme in Nigerian schools suggested that music which has become a medium through which history, myths and legends are recorded, can also be used to regulate the excesses of citizens within the society. He recommended changes in the teaching of music at the secondary school level. Adegbite concluded that attitudes of parents, students and the society towards music as a subject in the school curriculum should change.

Many times the results of research findings do not get to the secondary school teachers and students who need them. Yoloye and Emeke in their article on the "Current Research Trends In the Teaching and Learning of Science" tried to find out whether schools have access to research report. They further reviewed some research reports in the area of teaching and learning of science.

Ayodele and Araromi reviewed Recent Research Findings on English Language and French Language. They concluded that the poor performance of learners which they identified would improve if teachers adopted a different approach to teaching and they used more teaching aids.

In the past few decades, science, technology and mathematics have led to significant improvement in the quality of human life though the effect has been felt in varying degrees in different parts of the world. Jegede in his article argues that the field of philosophy of science has witnessed many studies of immense usefulness to science, technology and mathematics education. He expressed the view that an eco-cultural paradigm should be developed for science, technology and mathematics education in contemporary Nigeria and he attempted the development of one.

Adeigbo raised the issue of objectives for curriculum from the philosopher's point of view. He started with a critique of idealism and naturalism and said that, though the metaphysical realist does not explain intellectual, conceptual knowledge as a one-to-one correspondence, realism itself is not only sensible but intelligible. He went on to examine the valid epistemological position. He argued that idealism and dualism as epistemological positions have faulty starting points, which reduce reality finally to a world of immateriality. He attempted to prove that metaphysical realism: plrovides the only valid epistemological approach to curriculum planning. He concuded by giving some curriculum guidelines, noting that at all levels, emphasis should be on the love of learning rather than on a sterile memorization of verbal formulae.

Any educational planning that does not take the child into consideration is likely to fail. It is against this background that Onibokun has examined early childhood care and education in Nigeria.

CURRENT RESEARCH TRENDS IN THE TEACHING AND LEARNING OF SCIENCE: IMPLICATIONS FOR SECONDARY SCHOOL TEACHERS

YOLOYE T. W. & E. A. EMEKE

Introduction

A lot of research studies have been carried out in Nigeria in the areas of science by science educators and evaluators. But it is sad to note that the secondary school, teachers for whom many of the results of these findings are relevant and significant do not get the results for consultation and use.

Many times, when the data for the research studies are being collected, secondary school teachers and students are the subjects of the sample. Oftentimes, when principals are reluctant to grant permission for the use of their schools and students the researchers promise the principals that the results of the findings of the study will be made available to the schools for their use. Contrary to this promise, these writers found out that most schools do not see the initial researchers to even come back to say "Thank you for allowing us to use your school and its facilities", not to talk of depositing a copy of the result findings with the schools.

These writers visited ten schools close to the University of Ibadan which they knew from experience have been in frequent use by the University lecturers and students for research purposes. Principals of nine of the ten schools reported not having any report of results of researches carried out using their schools, and the nine principals recalled that within the last two years an average of ten research studies were carried out in each of their schools. This leaves an average of five research studies per school per year. The tenth principal also reported that about eight research studies had been carried out in her school, but only one report was deposited with her office. She further reported her wish to have had the report in a less voluminous and less technical form. In other words, she wanted a functional report which her teachers can easily go through, comprehend and apply to both their teaching and students' learning.

It is against the above background that the writers of this paper decided to look through a few of the studies carried out in the last seven years in the area of science teaching and learning, summarize the research findings, simplify them and make them available in readable form to secondary school teachers.

It must be stated very clearly from the onset that there are very many studies in the area of science teaching and learning in the Ibadan University library where this study was carried out. But only few are reported on here and only four major areas of relevance are focused upon.

Effects of Sequencing of Topics

There are certain concepts in science e.g. the Mole Concept—which are difficult for students to grasp and comprehend.

Madukwe (1985) showed from his research that the students perform and achieve higher when topics in science are sequenced and discussed, as against the usual and easier practice of teaching concepts as a global whole. In his Topic Sequencing with Discussion (T.S.D.) method, students are taught related topics and concepts underlying a particular concept, and these are taught in sequential order. When this teaching strategy, was compared with a Non Topic Sequencing (NTS) strategy, there was a significant difference in the performance of the TSD and NTS groups.

This research result shows that teaching a concept in a centrally unifying way helps in the understanding and application of the concept.

The Issue of Readable Science Textual Materials

Reading problems related to specific content areas have been recognized by researchers (Robinson 1975, Mallow, 1991) as a problem that should not be relegated to the background. Content area reading instruction had been recommended in Nigeria by science educators (Balogun 1980, Isiugo—Abanihe, 1991a).

In Science and probably in most other subject areas, the problem with readable textual materials can be regarded as being basically two—(1) text-related problem area and (2) reader related sources of difficulty. The text—related problem area focuses on the special features of the science text that demand special application of general reading skills. For example, the highly technical formula—laden vocabulary coupled with the introduction of many new concepts, formulas, principles, definitions etc. requiring both inductive and deductive thinking render the reading of science text difficult. The reader related sources of difficulty is tied to the different levels of other knowledge brought to science by the different students. Students who has been exposed to interact with scientific toys at home, playground centres, nursery/primary schools, etc are definitely armed with a higher understanding of scientific concepts and principles which will positively influence their comprehension of scientific text than those who had not been so exposed.

Isiugo—Abanihe (1991b) carried out a study recently on the comprehension and retention of scientific texts. She trained three science teachers to use three content-area reading instructional strategies to guide students in improving their ability to learn from text. The three stategies she called Directed Reading Activity (DRA), the Prepare, Guide, Read Strategy (PGR) and the Prepare, Guide, Read, Evaluate strategy (PGRE). She found that the PGRE strategy "was the most facilitative in terms of improving comprehension and retention of science texts" (Isiugo--Abanihe, 1991b). The four major steps involved in her strategy are summarized below:

Step 1 *Prepare*

In this step, which essentially activates background knowledge the teacher activates the students' background experiences relating to the text being read through questioning or brain-storming. He also discusses with them the meaning of important vocabulary items.

Step 2—*Guide*

Here, the teacher presents to the students a reading guide to stimulate and guide comprehension.

In another study carried out by Madukwe (1985), in the stage equivalent to the Guide step of Isiugo—Abanihe (1991b), Madukwe gave to the students study monographs in which he had broken down concept and principles into a simpler and manageable whole, thus ensuring that the texts are at the students' own readability level. A positive level of comprehension and higher level of achievement in the post-test was recorded.

Step 3—*Read*

Here Isiugo-Abanihe made the students interact with the text by reading it silently-expressing their views with others, and taking notes on what they are reading.

Step 4—Evaluate

Essentially at this stage the teacher and the students summarize the texts with individual students taking notes based on group's summary, ending up with teacher and students discussing further activities that may be necessary for a fuller comprehension of the topic.

The findings of Madukwe (1985) Isiugo—Abanihe, (1991b) as well as that of Heyman *et al* (1981) show that availability of readable textual materials as well as acquisition of favourable science reading techniques appear to be consistently associated with higher achievement levels in science.

Issue of Teacher's Perception of the Science Curriculum and the "Chalk & Talk" Method of Teaching

Despite over two decades of curriculum reforms, many science teachers still have conceptions about the philosophy of Science that are at odds with more recent views. (Hodson 1988; Rowell and Cawthron, 1982). Hence, there is the need to improve teacher's perceptions as one way of making science more meaningful. For despite an increase in literature dealing with the implications of the philosophy of science, for science educators, science teachers remain surprisingly ill informed about the basic issues.

In an action research carried out by Baimba (1991), eight Science teachers selected from three secondary schools were used. The teachers were all trained and qualified, and three of them were Head of Science departments who were responsible for drawing up topics that constituted the general science syllabus in their respective schools.

The teachers took part in a two week in—service programme, organised by the researcher, in which they developed, taught and reflected on teaching packages on selected topics in Science.

During the first week of the in-service training, the researcher, presented working papers he had prepared, followed by a short discussion, which enable the teachers to ask questions and note observations. After every two working papers, the participating teachers, who had been divided into two groups, met to deliberate on the key issues that had been raised. Individual group presentations in plennary sessions were made after these discussions. During these presentations, the researcher played the role of a moderator. Consensus on the main ideas from these discussions which were considered relevant were recorded. These deliberations led to the clarification of aims and objectives for a proposed science Curriculum for Secondary Schools.

The second week of the in—service programme consisted of groups aimed at selecting content for the new Curriculum and developing teaching packages on two selected topics for trial. The teachers were reminded to select contents of personal and social relevance to the learners, so that it could be an extension of what the students already knew about their real world.

The major impact of the new Curriculum on the experimental teachers' perceptions was a change in their outlook to the image of the secondary school Science Programme. The action research experience with the Curriculum helped the teachers to appreciate recent views about the nature of science and ways of acquiring scientific knowledge.

In the post experimental evaluation of the study, many of the participating teachers in Baimba's (1991) study reported that they became aware of setting aims and objectives for a general science curriculum that was attainable and meaningful o the majority of their students. They saw the futility of using textbook examples

which were unfamiliar to both themselves and the students. They also saw the need to make science related to students' everyday living, even to those who may not likely complete their secondary school education.

As a consequence of their interaction with the in—services programme the teacher came to understand and appreciate the conceptual change approach as a more appropriate method of teaching than the traditional method which they described as "Chalk and Talk" method. Results and conclusions similar to this were also reported by Adesokan (1987), and Badmus (1991).

On the issue of "Chalk and Talk" method of teaching Ebrima (1983) in his study on the teaching of Integrated Science noted rather sadly that most of the lessons were taught using the lecture method. As he said.

> "..... One can hardly say that the pupils were acquiring such scientific skills as observing carefully, and reporting what they observe accurately, organising information, making predictions or forecasts as a result of generalising, designing experiments to check predictions etc....." (pg. 60)

Teachers' perception of the philosophy of the Science Curriculum and science teaching need to change and be made relevant to the realities of the time. The studies of Baimba (1991), Adesokan (1987), and Badmus (1991) have clearly shown this, and Baimba (1991) has gone a step further to demostrate that a way to accomplish this is to institute action research programmes which can be imparted to the teachers through in—service programmes.

Effect of Take—Home Assignments

Take—Home assignments have been found to enhance the learning of science However it must be noted that when these take—home assignments are not corrected in class and discussed, the desired effect of enhancing the achievements of students will not be accomplished. Madukwe (1985) in his research gave daily assignments to the two experimental groups and none to the control group. But with one of the experimental groups, the assignments were corrected and discussed in class the next day, and this was done regularly for six weeks, while there was no discussion and correction with the other group. The group (Experimental group 1) that had the assignments corrected and discussed was 2.905 Standard Deviation above the group (Experimental Group II) that had no correction and discussion. Experimental Group II was 1.805 Standard Deviation above the control group. The fact that Madukwe obtained the type of result reported above show that the very use of out-of-classroom active time on tasks to supplement school learning is a useful variable that could raise the achievement level of students. Even a higher achievement level will be the case when the assignments are corrected and students remedy their errors

Conclusions

These writers have attempted to bring to focus the fact that there is need for the result of research findings to get to the grassroots—the secondary schools—where they are needed for the improvement of the teaching—learning enterprise.

The results of the few studies focussed on in this review also show that the amalgamation of intensive practice, feedback and readable textual materials enhanced students' intellectual knowledge and problem solving behaviour of science easier and will also see the achievement level of students on the increase. Bello (1985) carrying out a study using chemistry as the science subject of focus found out that problem—solving strategy supplemented with practice, verbal feedback and teacher directed remedial instruction is the most effective instructional approach to facilitate substantially students' achievement in science. This strategy influenced

students' performance at the cognitive levels of remembering, understanding and thinking. This method is very helpful to the low ability students, for as Bello (1985) himself put it.

> ...the low ability students made higher congnitive gain scores than the high ability students''.

Students cannot do without readable textual materials at their level of understanding. In this regard, all of teachers, writers and publishers need to team up to achieve this feat. The review however, looked at the fact that some teachers had gone a long way in simplifying texts for their students and where this has been done enhanced performance has been the result.

Teachers who participated in in—service programmes where the focus was change of teachers' perception of the philosophy of the science curriculum and science teaching taught science better, making the teaching of science more meaningful and relevant to the everyday living of their students. In other words, science was made functional as its intent is.

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