

LINKING SCHOOL CHEMISTRY WITH LEARNERS' DAY -TO-DAY ACTIVITIES

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Abstract

The paper looked into the possibility, of teaching Chemistry using activities in the learners' environment. Problems such as unqualified teachers, Shortage of relevant and affordable textbooks. shortage of relevant leaching materials and hick of conducive atmosphere were discussed. Some materials and activities that can help in the teaching of Chemistry were suggested. The materials include computers, televisions, video and materials such as tins, water, clothe etc that can easily be obtained from the learner's environment. Recommendations which include changes in the curriculum design, encouraging indigenous writers, improving teachers' welfare, training and retraining of teachers and provision of adequate instructional materials were made.

Introduction

Chemistry is an experimental science. Learners usually express negative attitude to the study of chemistry mainly because they feel the subject is full of abstract concepts.

Chemical reactions occur continuously in the atmosphere, in factories, in vehicles, in the environment and in our bodies (Encarta Premium, 2007). In a chemical reaction, one or more kinds of matter is changed into a new kind or several new kinds of matter. Life could not exist without these processes. Plants could not photosynthesis, cars could not move, pudding could not thicken, muscles could not burn energy, glue could not stick and fire could not burn, (Encarta Premium, 2007).

Researchers have linked positive achievement in school chemistry to activity based method of teaching using materials in the learner's environment {Abubakar, (2007); Buhari, (2006); Yusuf (2006); Peter (2004)}.

As a result science teaching is now inclined towards linking teaching with the learner's day-to-day activities. This has led to the provision of books by indigenous writers such as the STAN Integrated Science books, MAN Secondary Mathematics, N1STEP course outline series etc.

Much has been done in terms of the provision of indigenous book which tries to relate concepts to the learner's environment and organising workshops and conferences whose themes focus on teaching science for technological breakthrough, self-sufficiency or self-reliance but the problem; still persists.

The much desired technological breakthrough and self-reliance can only be achieved if learners can apply what they have learnt to solve their daily problems, Oriafio in Toyosi (2006), identified self-sufficiency as a position that a functional science and technological education should raise the benefiting individuals to and provide basic needs such as:

- i. sufficient and satisfactory shelter;
- ii. transportation and communication that are cheap and easily available;
- iii, medical care that is commonly available and obtainable by all;
- iv. electricity and water supply in sufficient and uninterrupted quantities etc.

Okoye, also in Toyosi (2006) supported this by saying any education that falls short of these expectations is largely theoretical and not fulfilling the important requirement of being a reliable index of the potential for overall development of the individuals and the nation.

This paper therefore looks the possibility of teaching chemistry using activities in the learners' environment. The problems associated with it and possible solutions were highlighted.

The Journey so Far

In order to make changes in any existing phenomenon, its present state must be assessed. Research findings have shown poor attitudes, interests and performance of students in chemistry (Kzeliora in Gnu 2006). Blele (2004) has observed that although the enrolment in the chemistry department of many tertiary institutions in Nigeria is increasing, many of the students dropout before graduation due to poor performance or graduate in poor grades, which cannot facilitate further studies in chemistry. Johnstone, in Elele (2004), opined that this observation seem to be global as "students are not flocking into chemistry thirsting for knowledge". Many of them see the subject as difficult and feel that studying chemistry means exposure to only corrosive, harmful and toxic substances. Forgetting that such substances as water, toothpaste, soap, perfume etc are also chemicals. They feel that concepts in chemistry are abstract and can only be imagined by the learner. This can be attributed to factors such as

unqualified teachers, lack of relevant and affordable textbooks, lack of conducive atmosphere and inadequate instructional materials. These are problems that can easily be solved with determination and selflessness on the part of all stakeholders.

Teachers

No meaningful learning can take place even if all other necessary facilities are provided without the intervention of a competent teacher. The quality of chemistry education bears a direct relationship with the quality of the chemistry teachers as well as the societal support/goodwill to them (Elele, 2004). Most chemistry teachers seem to require more training considering the importance of technology in teaching and learning chemistry nowadays. Education is dynamic, so, teachers should be trained on how to search for information that can help them in their teaching. Most teachers teach using only what they can find in textbooks accessible to them. Hardly, do they link concepts to the learners' day-to-day activities. Teachers' cognitive development has been identified as a strong factor affecting students' low achievement in science (Gnu, 2006). He further opined that, the teachers' actions or inactions in terms of method of teaching and explanation of difficult concepts have not created positive cognitive gains for learners. Computer assisted instruction and learning could assist in functional chemistry teaching/learning.

Relevant Textbooks

The quest for improvement in the educational sector has led to the provision of books by indigenous writers. They also tried to link the concepts to the learner's environment. This is a positive development as the learners will find the books easier to comprehend. They are also more affordable, cheaper and more accessible than the foreign books. But more needs to be done in tertiary level books.

Relevant Teaching Materials

Practical work is indispensable in science teaching and it is only possible if there are facilities (Suleiman, 2004). Urebu in Suleiman (2004); has stated that laboratory work bridges the gap between abstract ideas and reality, assists learning the true nature of science, develops desired traits and appreciation, teaches useful practical skills and is necessary for problem solving/enquiry approach. Inadequate facilities in chemistry laboratories forms part of the problems faced by science teachers. However, when teachers are enlightened on the need to improvise materials that are not available and the use of other materials in the learners' environment, this problem will be reduced. Other materials that can aid in teaching such as computers, television sets, video, radio, overhead projectors and their accessories should be provided where possible.

Conducive Atmosphere

Meaningful teaching and learning situation can only take place in the right environment. Ladan (2006), has observed that the environment to a large extent influences learning positively or otherwise in terms of academic pursuits and attainment. He classified the learning environment into four: the physical environment, the psychological environment, the social environment and the cultural environment. He further observed that, the above learning environments exert a lot of influence on students' learning effectiveness and the interest to learn. This point was buttressed by U'dok and Ajala; and Dakurn in Ladan (2006).

Above also, applies to the teacher. A teacher can only teach affectively when there is job security, adequate remuneration, regular payment, provision for further training etc.

Linking school Chemistry to Learners' Day-to-day Activities

Chemical concepts can be made easier to comprehend and retained better if they are linked to the learners' day-to-day activities. This can only be done by a qualified and competent teacher. Most of the activities we come across every day can be explained using chemical principles. The learners will appreciate how interesting chemistry is if the so called abstract concepts are explained using such activities.

Computer Assisted Instructions (CAI) and Computer Assisted Learning (CAL); Television sets, radio, overhead projectors, video etc and their accessories can be carefully selected and utilized by the teacher to achieve this. Other equipment in the laboratory can also be used. In their absence or where they cannot be used for some reasons, a resourceful teacher can improvise where possible or use other materials available locally to achieve his objective.

For instance; Kassim (2006), demonstrated how chemical kinetics can be taught by mixing flour, yeast and glucose in a measuring cylinder. He then measured the increase in volume of the dough due to accumulation of carbon (IV) oxide with time. Also, Hogue (2006), demonstrated

expansion of substances with heating by comparing boiled and raw rice. The relationship between pressure and boiling of liquids can be shown by comparing time taken for water to boil in an open and in a closed container. The bursting of an over inflated tyre in a hot day can be used to show the expansion of air with temperature. Effervescence can be dramatically shown by showing the release of carbon (IV) oxide (CO₂) when a bottle of soft drink is opened after being shaken. Simple separation techniques such as sieving of flour in the homes; filtration of ground cereals for "pap" and decantation of excess water from materials can be used as examples when leaching related topics. Change of states of matter can be taught using simple tins, water and a source of heat.

Industrial visits to local chemical industries such as where local aluminium pots are made, dye pits, tanneries, soap making industries, oil mills, water treatment plants etc should be encouraged. The chemical principles behind such processes should be explained to the learners while at the same time relating it to what they have learnt in their classes.

Taking such steps will definitely make teaching and learning more meaningful. There will be higher retention, it will stimulate learners' interest, ensure better performance, stimulate enquiry and research by the learners. Definitely, someone who learns chemistry in this way will be able to apply it to solve his day-to-day problems.

Recommendations

- > The Science Curriculum design should provide a link between classroom teaching and the learners' environment.
- > Teacher- training programmes should emphasis on activity method of teaching.
- > Workshops and Conferences should be geared towards acquisition of knowledge and exchange of ideas.
- > Only qualified teachers should be employed to teach.
- > The necessary materials for effective teaching and learning should be provided in schools.
- > Teachers and students should be given the right environment on which they can put in their best.
- > Chemistry students should be admitted based on qualification and interest.

Discussion

The science curriculum design should provide a link between classroom teaching and the learners' environment. Experts in Chemistry should be encouraged to write books for different levels relating chemical concepts to the learner's environment. Teachers are the pivot on which instructional process resolves (Otuka, 2006). Linking school chemistry to the learners' day-to-day activities can only be done by a resourceful teacher. This is a teacher who is knowledgeable, skillful, morally upright, committed, properly oriented and positively motivated.

Buildings and other support facilities alone do not guarantee effective learning without good teachers (Shema, 2007). He further added that, teachers are the foundation for every type of learning and without them to instruct, guide and serve as example, there could not possibly be any meaningful progress by the student. He opined that solution must be found to the "teachers problem" if we wish to lay a solid foundation for our future.

Efforts should therefore, be geared towards the production of resourceful teachers. This will need dedication and sincerity of purpose on the part of all stakeholders. Teacher - training programmes should emphasis on activity method of teaching.

Training and retraining teachers should emphasis e on real classroom interactions. Workshops and Conferences should be geared towards the acquisition of knowledge and exchange of ideas. Rather, the organisers seem to be more interested in the fees charged and the presenters in the certificates which will serve for promotion purposes. Enough time should be given to presenters so as to ensure that proper interaction takes place.

NCE teachers are produced, but they seem to lack the methodology of teaching. Therefore, only qualified teachers should be employed to teach. Teaching practice and micro-teaching should be taken more seriously. There is need for improvement on the current trend as the six-weeks teaching practice is actually too short for a teachers-in-training to acquire the desirable skills.

Even without expensive materials, a resourceful teacher can effectively teach his students using materials in the environment at little or no cost.

As much as possible, the necessary materials for effective teaching and learning should be provided in schools. This will require the efforts, of the government, philanthropists, parents,

parent-teachers association, alumni association, non-governmental organizations and the community in general. Simple materials can also be improvised by the teacher or by the students guided by the teacher.

Both the teachers and students should be given the right environment on which they can put in their best. This should include payment of adequate remuneration and other allowances as at when due; promoting hardworking teachers when due; and recognizing role models by giving them awards. This will serve as an enticement to them and others. Provision should also be made for teachers to for further training in order to meet the challenges of time with ease. Such training should be accompanied with study leave with full sponsorship. Studies have shown positive relationship between adequate compensation and teachers' performance, (Baba, 1999), Usman (1999).

As much as possible, chemistry students should be admitted based on qualification and interest. A student who is forced into a course might find it very difficult to comprehend thereby leading to poor performance and adding more burden on the teacher. Studies have correlated interest and performance (Onu, 2006).

Conclusion

The National Policy on Education, NCCE minimum standards etc have always emphasized on applying the skills and knowledge gained through the study of science to solve day-to-day problems.

Studying science for self-reliance, self-sufficiency etc have been the themes for discussion in many conferences and workshops. The problems have been identified and possible solutions provided. What remains now is proper implementation of the policies. This, as earlier stated needs dedication and sincerity of purpose on the part of all stakeholders.

References

- Abubakar, Z. (2007). Assessment of chemistry practical lessons in senior secondary school and subsequent students' performance in WASSCE chemistry practical examination. An unpublished NCE project submitted to the department of chemistry, F.C.E Katsina.
- Baba, M.A (1999) effective teaching, *In Journal, of Science Katsina*. Vol. 1 No1 December pp 61 -66.
- Buhari, A.R. (2006). Effects of science teachers qualification on academic performance in chemistry in some selected secondary school. An unpublished NCE project submitted to the department of chemistry, F.C.E Katsina.
- Elele, L.J.U. (2004). Chemistry "education in Nigerian tertiary institutions: Towards a brighter future. *In Chemclass journal. A publication of the Chemical Society of Nigeria (Zaria Chapter). Pp-180-184.*
- Encarta Premium (2007), Everyday applications of Chemistry.
- Hogue, M.F. (2006). Physical effects of cooking rice (swelling and expansion), *hi African journal of Natural and Material Sciences. Vol. 4. No. 3. September..*
- Kassim, A.G (2006). Kinetics of yeast fermentation: a biochemical approach in the demonstration of chemical kinetics, *hi Chemelass Journal. Vol. 3. A Publication of the Chemical Society of Nigeria (Zaria Chapter). Pp - 131 - 132.*
- Ladan, A.A. (2006). Effects of learning environment on teachers' motivational and students' academic achievement. *In Nigerian Journal of Science and Educational Research. Vol. I No 1 pp30-33.*
- Onu, A.D (2006). The predisposition to the teaching and learning of chemistry and its implication on the future of chemical industries, */// Chemclass journal, Vol 3. A Publication of the Chemical Society of Nigeria (Zaria Chapter), pp*
- Oluka, J.O.E (2006). The teacher as key to National development and technological breakthrough. *In Nigerian Journal of Science and Educational research. Vol. I. No 1 pp 1 - 5.*

- Peter, A.B. (2004)- The altitude of Secondary School Students towards learning Chemistry. An unpublished NCE project submitted to the department of Chemistry, FCE Katsina.
- Shema, I.S. (2007). A speech by the Executive Governor of Katsina State during the opening ceremony of the 54th meeting of the National Council on Education, which held at the state Secretariat Conference Hall, Katsina. On Friday 14th December, 2007.
- Suleiman, F.B (2004). Provision of chemistry laboratory facilities in secondary Schools: A case study of Katsina local government of Katsina State. *In Journal of vocational Studies Vol. 2. No 2B August. A Publication of the Department of Vocational and Technical Education A.B.U Zaria. Pp 24 ~ 30.*
- Toyosi, MS (2006). Repositioning the teaching of Biology for technological breakthrough. *In Nigerian Journal of Science and Educational Research. Vol. 1 No. 1 pp 44 - 48.*
- Usman, T. (1999). Effective strategies for mathematics teacher education for national development. *In Journal of Science Katsina. Vol. 1 No. 1 December pp 46 —51.*
- Yusuf, S.D. (2006). The effect of availability of facilities on students performance in chemistry in some selected secondary schools in Katsina State. */// Journal of Vocational and Technical Education Vol.1 No. 1. A publication of technical Education department, Kaduna Polytechnic*