STRATEGIES FOR IMPROVING THE QUALITY OF INTEGRATED SCIENCE EDUCATION IN NIGERIA

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Abstract

Quality education has been described as any educational system that is effective and functional as to develop and equip the citizens with the skills to interact and contribute to the development of the society. Integrated science being one of the subjects necessary for the acquisition of skills has been defined as an approach to teaching of science in which concepts and principles are presented so as to express the fundamental unity of scientific thought and avoid pre-mature or undue stress on the distinctions between the various scientific fields. To improve the quality of integrated science education in Nigeria, there is need for mounting of vacation courses for non-integrated science specialist teachers, presently engaged in the -teaching of integrated science. Improvisation and allocation of more periods for integrated science in the school time-table have been suggested as some of the ways of improving integrated science education.

Introduction

Basic education is the right of every boy and girl. The National Policy on Education (1998) attests to Nigeria's commitment to education for all. The policy lays emphasis on universal, functional and qualitative education. The guiding principle of education for all, in Nigeria, is the equipping of every citizen with such knowledge, skill, attitudes and values as to enable him or she derives maximum benefits from his membership of the society. He should be able to live fulfilled life and contribute his own quota towards the development and welfare of the community.

A qualitative education, therefore, must satisfy the wishes of good father for his son or daughter. Commenting on what a good father wishes for his son or daughter, an article in Nzewi (1998), simply states:

> That he should grow to the full stature of a man, sound in mind and body; that according to his ability, he should acquire the knowledge and the skills that will enable him live a life useful to his fellows and enjoyable to himself; and willing to take his rightful part in the affairs of his country and his people; that he should be a man of courage and sound judgment, not too easily deflated by emotions of the moment; that he should be a man of peace with himself; rightly discerning his duty to himself; his fellows and his good.

Federal government of the Federal Republic of Nigeria recognizes the importance of science education and has made several efforts to take care of it. But in spite of this, the performance of students in science based courses has not be encouraging and this could be attributed to poor performance in integrated science. This paper therefore, discusses the strategies for improving the quality of integrated science education in Nigeria.

The Concept of Quality Education

The term quality is defined in the Oxford Advanced Learner's Dictionary (Hornby, 1995), as "the degree of goodness or worth'[1] of something. Also, New Webster's Dictionary, in Okeke (2004), defined quality as "degree of excellence, high social status, high grade, and superiority. From the foregoing definitions therefore, quality education has to do with excellence in education. In the context of this write up, quality education is interwoven with efficiency and functionality in the educational system. Any educational system that is effective and functional as to develop and equip the citizens with the skills to interact and contribute to the development of the society can be said to give qualitative education. A qualify education system, therefore, is one that succeeds in meeting its goals; one that is relevant to the needs of children, community and society; and one that fosters the ability of children to acquire knowledge and critical learning skills. These include creativity, analytic thinking among others.

Integrated Science: The Meaning of the Concept

Considerable interests have been shown by scientists and science educators, regarding the teaching and learning of integrated science since its introduction into the school curriculum. For better understanding, many science educators have attempted to define the term integrated science.

Khabela in Bajah (1978) defined integrated science as an approach to the teaching of science in which concepts and principles are presented so as to express the fundamental unity of scientific thought and avoid pre-mature or undue stress on the distinctions between the various scientific fields. Also stressing the unified nature of science, Cohen (1977) had this to say:

> An integrated science course eliminates the repetition of the subject matter from the various sciences and does not recognize the traditional subject boundaries when presenting topics or (hemes.

Howell (1970) also alluded to integrated science when he wrote that the essence of beginning course in science is to begin to teach students what science is and how scientists work. Integrated science fulfilled these functions and can be regarded as a form of unified science.

Proponents of single subject disciplines perceive integration as "an undesirable trend if not a vain hope". They argued that it is impossible to devise an integrated science scheme in which the separate science disciplines arc not recognizable.

Philosophical and Psychological Bases for Integrated Science Teaching

One of the philosophical arguments for teaching Integrated Science is the satisfactions implicit in the holistic explanations and perceptions of natural phenomena.

The story of some blind men who went to identify an elephant according to Aniodoh (2001), underscores the importance of the holistic approach in understanding of science phenomena. These men touched the various parts of the elephant and then argued among themselves what they felt the elephant was like. Each reported something quite different from the other. For example, the one who touched the ear said that the animal was like a fan. The one who touched the body said it was like a tree. Although these men individually were able to identify the various parts of the elephant, each of them was correct so far as he went, but their overall knowledge about the big animals was fragmentary and incomplete. None of them could make an accurate description of the whole animal. An accurate holistic view could only be approached by pooling all the specialized observations and even then, some features would be missing.

This illustrates the weakness of learning by parts as against 'learning by whole'. The holistic approach to science teaching and learning is strongly recommended since science is a unity.

In perceiving science as a unity, Rutheford (1978), wrote:

> The natural world is a unified whole. Our present lack of knowledge may prohibit us from perceiving that unity in all its complexities, but to the extent possible, science should try to illuminate the whole rather than more fragments that each separate discipline concern itself with.

The psychological basis of teaching integrated science as a unity is derived from the gestaltic theory of learning. According to Gestaltic theory, learning is not addictive. It is not a matter of separate elements joined together until the whole is built up. Meaningfulness resides in the totality. Proponents of the gestaltic theory of learning oppose the dissecting of the whole into meaningless parts. In their view, the learner begins by perceiving the whole; learning begins with primary undifferentiated wholes out of which specialized aspects are progressively differentiated.

Learning in multiple contexts, which typifies most of the approaches to teaching science as a unity facilitates learner transfer of what has been learned. For example, if a child were to learn something about the concept of equilibrium by way of examples from physiology, chemistry, ecology, physics, geology and psychology, he or she would be psychologically better prepared to use the concept in a real life situation than if the concept has been learned in just one context such as chemistry or biology.

The Benefits of the Quality of Integrated Science Education

Quality integrated science education has many benefits. Richmond in Dienye and Gbamanja-(1990) rightly observed that if we want to train students to become functional in the society, they must-study science of an integrated nature. According to him, integrated science helps one understand the, possibilities and limitations of science. It also helps one understand natural phenomena. Baez and Ping in Mkpa (1991) listed some other advantages of integrated science, which has made it survive in the curriculum of many countries. Some of these advantages include: The savings in time, personnel and resources when duplications are eliminated, the availability of scientific education for non-specialists; the satisfaction of needs of young learners whose logic differ from the logic of single subject disciplines; a more accurate picture of processes which constitute science; and increased potential for problem solving.

A quality integrated science programme has been designed in such a way that school learners would acquire at the end of their porgrmme not only some academic training, but meaningful skills which would make them most functional and usable in the society. Integrated science graduates should be able to apply their knowledge of science to real life situations.

From quality integrated science education come healthy children who can write critically and have access to science and technology and other skills for life. Other outcomes are enhanced human and national development that is life long, and effective participation in solving societal problems.

The curricula and materials ensure that learners can read, use numbers and can be able to use life skills in real life. These include using ethno-mathematical methods, knowledge about rights, gender, health, HIV/AIDS prevention etc.

A quality integrated science should concern itself with the development of the learner, with the development of the job skills, general education skills and with the production of scientifically literate citizens. In addition, such science curricula should enable pupils to demonstrate understanding, application and interpretation of scientific knowledge through direct experiences.

Strategies for Improving Qualify Integrated Science Education

A number of suggestions have been made with regards to improving the quality of integrated science education in Nigeria. Maduabum (1990) came up with a number of suggestions which include:

1. Mounting vacation courses for non-integrated science specialist teachers presently engaged in the teaching of the subject in other to improve their standard.
2. Setting up integrated science as full-fledged departments in all colleges of education with staff recruited especially to teach the subject.
3. Making sure that science education department of all federal and state universities mount courses in integrated science for the production of integrated science graduates.

Another measure of improving the quality of integrated science teaching is through the adoption of team teaching. In the team teaching approach according to Aniodoh (1990), individual teachers pool their resources, interests and expertise together in order to devise and implement a scheme of work suitable to the needs of their pupils and the facilities of their school.

Ezeife and Okeke (199U) recommended the teaching of integrated science outside the classroom as one of the ways of improving the quality of integrated science education. According to them, outside the classroom include such places as the school-fields, the farm, the garden, adjourning plots of land, and indeed any open space close to or far from the school. The familiar out of school science activities like field trips or excursions, open air exhibitions and fairs, are other forms of outdoor integrated science engagements.

Also, improvisation cannot be overlooked if teaching and learning of integrated science is to be made meaningful and interesting. More periods of say, five for a week should be allocated for integrated science teaching on the school time-table,

Conclusion

Quality education has been described as any educational system that is effective and functional as to develop and equip the citizens with the skills to interact and contribute to the development of the society. To improve the quality of integrated science education in Nigeria, there is

need for mounting of vocation courses for non integrated science specialist teachers, presently engaged in the teaching of integrated science. Integrated science should also be established as a full-fledged department in all the colleges of education and universities.

References

Aniodoh, H. C. O. (1990). Discipline in a Classroom. Unpublished Memograph. Anambra State University of Science and Technology, Enugu.

Aniodoh, H. C. O. (2001). Meaning and Philosophy of Integrated Science. *Journal of Science Teachers' Association of Nigeria.* (6)2.

Dienye, N. E. and Gbamanja S. F. T. (1990). *Science Education: Theory and Practice.* Owerri -Nigeria: Totan Publishers.

Ezeife, A. N. and Okeke, E. A. C. (199). Teaching Integrated Science Outside the Classroom. *Journal of Science Teachers Association of Nigeria.* 26(1).

Ezewu, E. E. (1999). Professionalization of Teaching: the Basic for Stable and Qualitative Education in Nigeria.

Federal Ministry of Education (1998). *National Policy on Education.* Abuja: NRDC.

Howell, G. (1970) (Ed). *Curriculum Development Newsletter No I Integrated Science.* Ibadan: Yokele - Pekun Press.

Hornby, A. S. (1995). *Oxford Advance Learners of Current English.* Crowther Jonathan (ed). Newyork: Oxford University Press.

Nkpa, N. (1991). Selecting and Retaining Science Teachers for Integrated Science Teaching. *Journal of Science Teachers' Association of Nigeria.* (27) 1.

Okeke, M. U. (2004). Quality Education for All: The Role of the Teacher. *The Science Teacher Today, Journal of School of Science.* F. C. E. Eha-Amufu. (2) 1.

Rutherford, F. J. (1978). Reflections on the Implementation of Integrated Science Teaching:" Integrated Science Worldwide. *Proceedings from International Conference.* Nijmegen, Netherlands.