

BASIC SCIENCE AND TECHNOLOGY EDUCATION AND DEVELOPMENT IN NIGERIA BEYOND 2020

Stella Ejoywoke Ewesor and Beatrice Itie

Abstract

This paper highlighted basic science and technology education and development in Nigeria beyond 2020. It tried to explain what is basic science and technology education, objectives and developmental role of basic science and technology education in Nigeria, and teaching basic science and technology education in Nigeria. The paper further described various useful recommendations which are: government should provide modern / current science textbooks in primary schools in order to enhance basic science and technology education; government, policy makers and administrators should provide laboratories, laptops and computer for teaching - learning in basic science and technology education in Nigeria. Primary schools should be made to focus on teaching of basic science and technology education and to admit only the number they can effectively cope with so as not to water down the standard of education and the efficiency of basic science and technology education as a means of technological advancement etc.

All over the world, attention has been focused on science and technology so that there can be social, economic and even political development. Nigeria is no exception to this drive. The National Policy on Education (FRN 2013) and the Universal Basic Education (UBE) Act of 2004 reflect this global desire. Indeed the UBE Act 2004 (p 16) stipulated that:

“Every learner who has gone through nine years of basic education should have numeracy, manipulation, communities and lifelong skills; as well as ethical, moral and civic values needed for laying a solid foundation for lifelong learning; as the basic for scientific and reflective thinking”.

The National Policy on Education (FRN 2013) and the UBE both provide for 6 years of primary school and 3 years of junior secondary school. One of the subjects through which the aim of education could be achieved in the first six years is basic science and technology. Science is simply the study of our environment. This body of knowledge has two components - the process skills and the content. The process skills involve the ways by which the knowledge is gathered and these are observation, inference, measurement, classification, prediction and communication. The knowledge gathered make up the content of the subject to teach is to help someone acquire skill, attitude, knowledge, appreciating information and ideas. Teaching includes provision of conditions that can promote the building of attitudes, skills development and other aspects of learning. Unless learning takes place as a result of some efforts, we cannot conclude that teaching has taken place. In the teaching - learning process, both the teacher and the learner must be active. Basic science and technology is the foundation upon which the bulk of present technological breakthrough is built. It is through the application of basic science and technology that man ensures the longevity of his existence. Basic science and technology teachers should always seize the opportunity of making pupils appreciate the fact of the subject as a means of achieving technological development and economic survival (Ewesor 2015).

This paper would therefore be addressed under the following headings:

[I] What is Basic Science and Technology Education

- [ii] Objectives of Basic Science and Technology Education in Nigeria.
- [iii] Developmental role in Basic Science and Technology Education in Nigeria
- [iv] Teaching Basic Science and Technology Education in Nigeria
- [v] Conclusions
- [vi] The way forward for Basic Science and Technology Education in Nigeria beyond 2020

1. **What is Basic Science and Technology Education?**

Basic Science and Technology Education is the way in which children /learners in primary schools tries to learn and understand their environment, observed and explores the world around them. Science should be introduced to children even before they get to primary school in order for the children to learn fast when they are in primary school. Children between the age of birth and eight learn rapidly using all their senses and the whole body to take sensation and to experience the world around them. In this period of their lives, they engage in play which they spent most of their waking time on. Through play activities their exploration cuts across areas of development, like social, emotional, motor, language and physical developments.

Wynneled (1985) declared that the brain of the child has to be developed in order to learn science that will help him/her to understand the world around them. Concenzio and French (2002) categorically declared that children are biologically prepared to learn the world. They are inquisitive and eager to satisfy their curiosity at the slightest opportunity. As observed by Ogunsanwo (2004), children play with water, mud, insects, whatever they can touch, smell or hear. As they play with these things, a lot of scientific skills such as observing and making references are learnt.

Objectives of Basic Science and Technology Education in Nigeria

Basic Science and Technology Education in Nigeria intended to:-

- [i] Help pupils observe and explore the environment
- [ii] Make pupils develop basic science process skills including observing, classifying, experimenting and manipulating.
- [iii] Develop a functional knowledge of basic science concepts and principles.
- [iv] Develop scientific attitudes; including curiosity, honesty, perseverance, willingness to change, opinion and critical reflection.
- [v] Develop self - confidence and self reliance through problem - solving activities in science.
- [vi] Develop functional awareness of sensitivity to the orderliness and beauty in nature.
- [vii] Develop attitudes and values consistent with the management and conservation of life.
- [viii] Lay a good foundation for the learning of science in the future.
- [ix] Enable the child develop the ability to apply the knowledge and skills gained in science to solving everyday problems in his/her environment.
- [x] Enable the child keep pace with technological advancement.
- [xi] Adaptation of the child to desirable changes around him/her.

Source: FME 1998, Umudhe 1998, 69.

Scientific literacy acquired through science - learning enhances the production of citizens who can effectively participate in and contribute to the life of the society. While objectivity, open - mindedness and honesty are some of the values which are cultivated by those who learn science, the better appreciation and understanding of the environment developed desire and ability to adapt. As part of such adaptation, children develop early in life correct or sound attitudes towards problems and problem - solving. The mechanical skills acquired through science - learning includes manipulation and ability to handle things. Also, science - learning provides children with useful experiences which enhance and facilitates mental development

Developmental Role of Basic Science and Technology Education in Nigeria

In Nigeria, Science teaching has its roots in the primary schools unlike most Western countries where science started from the universities and extended to high schools. The Mission Schools were regarded by their founders as centres for teaching the bible and for promoting Christianity and because of these, science teaching was completely not in existence in primary schools during the early days of formal education in Nigeria. This could be as a result of the nature of the real goals and objectives of the missionaries and the colonial government, the prevalent status of Basic Science and Technology Education in Europe at that time and the personal conviction of some key persons in the colonial administration.

During the first half of the 19th century in Europe, science was not taught in primary schools because the teaching of science was then regarded as heretical. The teaching was seen as teaching against religion been that the government and the church in Europe have closed relationship. So, science was not taught in primary schools at that time. Another reason, was that the missionaries were not known to be scientists or science teachers but they were trained in the arts of preaching and teaching the bible and not as science teachers.

Most of our colonial administrators also had their share in delaying the introduction of science in our primary schools. Persons such as Lord Lugard, Omolewa (1976) thought that Nigerians were so “biologically inferior” that they would not be able to cope with the specialized vocabulary and mode of inquiry characteristic of science.

During 19th century (1850’s), the missionaries added rural or agricultural science, home craft, hygiene and nature study in the primary school curriculum. In 1909, Mr. Hanns Vischer opened the first government school in Nassarawa near Kano where he added science in its curriculum. Not every child had the opportunity to attend that except sons of well-to-do persons and some Mallams learning “rudimentary science and Geography”, Arithmetic, History etc, and by 1926, nature study had featured prominently in some primary schools in the North.

The teaching of science, hygiene and nature study in primary schools before the 1960s was only based on lecture method, practical activities were not involved. Later, in 1959, the first proper primary science was introduced in C.M.S. School, Lagos in the form of nature study where the involvement of teacher and their pupils learning about their environment by observing plants, animals and non-living things.

In 1964, Babs A. Fafunwa organized a series of primary science workshops at Nsukka, where he was then the Dean of Education with funds from the Ford Foundation. He started the Elementary Science project. In Nigeria, APSP (African Primary Science Programme) was promoted through various workshops organized by the then Nigeria Educational Research Council (NERC) and some very good materials gotten from these workshops. The workshops now gave rise to some popular primary science of the primary education improvement programme at the Institute of Education, Ahmadu Bello University, Zaria. Another is series science is discovery of the Bendel State Primary Science Programme (BPSP) which was initially called Midwest Primary Science Programme (MPSP). These programmes, at the ABU and in Bendel State, were UNESCO/UNICEF sponsored. There was also the Nsukka group under Professor Fafunwa, which emphasized the use of locally available materials for primary science teaching.

This group developed a few units which were tried out in the local schools around Nsukka. Although, their materials have not survived in their original form but they become very useful in the later years of primary science development in various programmes all over the country. The materials are suitable for both pre-service and serving teachers, workshops for training teachers of the in-service type, have been held all over the country.

Lastly, the Science Teachers’ Association of Nigeria (STAN) as a body had promoted primary science very much and it has a curriculum committee on primary science as well as devoting some of the annual conference to the issues of primary science education in Nigeria today.

Teaching Basic Science and Technology Education in Nigeria

The primary school teacher who is engaged in the teaching of basic science and technology, needs to be very careful because this is the age or level where children come across science and technology for the first time in their life. The teacher also needs to design ways of making children develop interest in science and thus, overcome any negative influence towards their learning of science. The teacher must strive to develop teaching materials that will be highly motivating to catch the interest of the children when they are still young. The teacher should aim at developing the cognitive, affective and psychomotor abilities of the child because education is supposed to effect the development of the child. That is why science should not be taught with a chalk-talk method alone.

The teacher needs to be familiar with the reasons for teaching science at the primary school level, and should also make the pupils and their parents to get to know this since they are to work together to ensure effective teaching and learning of the subject.

Reasons for teaching basic science and technology at this level?

It is because it:-

- * helps pupils to explain events in nature
- * enables pupils to think and reasons in a logical manner
- * teach pupils to solve simple problems they encounter on a daily basis.
- * helps pupils to develop social skills e.g. establishing friendship while working co-operatively in groups.
- * helps pupils satisfy their natural curiosity through opportunities in carrying out scientific investigations.
- * helps pupils to employ scientific knowledge and concepts to better their environment
- * helps pupils to use their brain and hands
- * helps pupils to develop positive attitude towards work, makes work easier and productive.
- * encourage critical thinking and creativity (National Teachers Institute 2006): 69 - 70

In addition to taking cognizance for teaching basic science and technology, the teacher should try to give the pupils opportunities to:

- [i] Observe and explore the environment;
- [ii] Develop basic science process skills including observing, manipulating, classifying, communicating, inferring, hypothesizing, interpreting data and formulating models.
- [iii] Develop a functional knowledge of science and science concepts and principles;
- [iv] Explain simple natural phenomena;
- [v] Develop a scientific attitude including curiosity, critical thinking and objectivity;
- [vi] Apply the skill and knowledge gained through science in solving everyday problems in his/her environment.
- [vii] Develop self confidence and self reliance through problem solving activities in science; and
- [viii] Develop a functional awareness of sensitivity to the orderliness and beauty in nature (FME 1998): 70

The Basic science and technology education has its own peculiar nature and demands that while teaching it, the teacher should take note of the pupils' feelings, beliefs, attitudes, integrity, cleanness, punctuality and respect for elders. Science is discovery while technology is doing or ways of doing something, and not just saying, (i.e. Active learning has to take place). Conclusively, science teaching at the primary school should involve observing pupils behaviour on tasks resembling those commonly require functioning in the world outside the school.

Conclusion

Children are the leaders of tomorrow, so for a country like Nigeria to be well developed, children deserved a solid educational foundation to prepare them for solid future. Therefore, there is the need for

basic science and technology education to be taught in primary schools in order to prepare the child early to become a potential scientist.

This paper has attempted to highlight what is basic science and technology education, developmental role of basic science and technology education, teaching basic science and technology education and the way forward for basic science and technology education in Nigeria beyond 2020. This will facilitate the teaching and learning of basic science and technology education in primary schools.

The Way Forward for Basic Science and Technology Education in Nigeria Beyond 2020.

The teaching and learning of basic science and technology education in Nigeria has suffered series of set back as a result of not following the laid down policies, programmes and recommendations of experts. Basic science and technology education may be improved in the following ways:

[i] Government should ensure that all teachers in primary schools are professionals. This is in consonance with Baikie (2002), who asserted that only the teachers who possess the necessary technical competence and professional skills can rise to meet the challenges of educational changes.

[ii] Government should establish effective and efficient institutional framework for monitoring teaching and learning process at primary schools at other levels.

[iii] Government and other stakeholders should ensure adequate financing for basic science and technology education and the various determinants of the level of teacher - pupil ratio carefully evaluated.

[iv] Primary schools should be made to focus on teaching of basic science and technology education and to admit only the number they can effectively cope with so as not to water down the standard of education and the efficacy of basic science and technology education as a means of technological advancement.

[v] Motivate primary school teachers through prompt payment of salary and allowances, also establish special salary for them.

[vi] Re-orientation of primary school teachers towards societal expectation of their role performance through organized retreat, workshops, seminars, conferences e.g. (STAN) on trend of teaching profession in a globalized economy.

[vii] Government should provide modern/current science textbooks in primary schools in order to enhance basic science and technology education.

[viii] Government, policy makers and administrators should provide laboratories, laptops and computers for teaching - learning of basic science and technology education in Nigeria.

References

- Adiotomre, J.E. (2009): Putting the Pieces Together. Systematic Secondary Education Reform in Nigeria. *Journal of Teacher Perspective* 3 (2) 375.
- Baike, A. (2002), *Recruitment Issues in Nigerian Education* - Zaria: Tamaza Publishing Company Ltd.
- Ekwevugbe, A.O., Money, V.O. (2006); Ensuring An Approved Teacher Pupil Ratio for Effective Science Education in Secondary Schools. *Multidisciplinary Journal of Research Development (NARD)* 7 (1) 61 – 65
- Ewesor, S.E, & Atomatofa, R.O, (2009) Primary School Education As a Building Block in 9-3-4 School System of Education in Nigeria. *Journal of Teacher Perspective* 3 (2) 400 - 409.
- Ewesor, (2015) Innovations and Transformation in Teaching and Learning of Basic Science in Nigeria. *Journal of Teacher Perspective* 9(2) 471 - 478.
- Fafunwa, A. (1974) *History of Education in Nigeria*, London: George Allen and Union Ltd.
- Federal Ministry of Education (1998): *Core Curriculum for Primary Science*, Lagos. Iduma Printing Company.
- Federal Ministry of Education (2013): *National Policy on Education* Abuja: NERDC
- National Teachers' Institute (2007): Manual for the Re-Training of Primary School Teachers. Basic Science and Technology. A Millennium Development Goals Project Kaduna. National Teachers' Institute.
- Ogunsanwo, T. (2004): Developing Children's Scientific Skills through Play Based Outdoor Environment. *Journal of Early Childhood Association of Nigeria*. 2 (2) 118 - 124.
- Omolewa, M. (1977), Some Earliest Problems of Science Education in Nigeria, 1859 -1932. *Journal of the Science Teachers' Association of Nigeria*, 15 (3), 72 - 92.
- Universal Basic Education Commission (2008): Training Manual on the New 9 - year Basic Education Curriculum. *Universal Basic Education Commission*, Abuja, Nigeria
- Umudhe, S.E. (1997) History of the Development of Science Teaching in Nigeria in Teaching Integrated Science in Nigeria Schools. In E.A, Inomiesa, U.L, Ezenweani, S.E, Umudhe, N.S, Okoye, *Teaching Integrated Science in Nigeria* Warri: Abotu Research Publishers.
- Umudhe, S.E. (1998). *A Guide Book for Science Teachers' in Nigeria*. Warri, Abotu Research Publishers.
- Wynneled (1985) *Primary Science; Training the Plunge*. London: Heinemann Educational Publishers.

