

# THE VISION AND MISSION OF PRIMARY SCIENCE EDUCATION IN THE 21ST CENTURY: THE ROLE OF TEACHERS AND PARENTS

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## **Abstract**

It is now widely recognized that the vision of primary education involves children's developmental and manipulative skills for attitude and at the same time forming of ideas about the world around them. National development and economic emancipation which is very much dependent on technological advancement is the aim of Primary Science Education. This paper highlights the psychological development of the child, importance of science in primary education as well as the role of the teachers and parents in this crucial development process of the child's education. Included are recommendations for achieving this noble goal.

## **Introduction**

One view put forward by scholars is that Africa lacks the capability and potential in the field of scientific discovery, technological innovation and practical application. According to Lewis (1972) at the sixth **Leverhulme** Inter-Universities Conference on School Science Education in Africa held at the Universities of Malawi in March 1968, the following general response are offered as aims of science education in Africa. These include:

1. To ensure that every person has such a grasp of science as to be ready to co-operate with understanding of the application of science to man's need.
2. To ensure a sound foundation of the basic principles and the facts of science in those who seek to make their careers and serve society as scientists or technologists.
3. To develop scientific attitude, acquire knowledge and understanding and master certain skills.

The Science Education Programme for Africa (SEFA) has emphasized on an 'activity approach' (do not lecture the child, instead find something for him to do) which rejects specialization in favor of the integration of many areas of scientific knowledge (Bajah, 1981). This gives room for 'minds-on and hands-on' activity in order to actual is the primary aims of science education in Africa.

Sequel to Nigeria's urgent need for technological development, like many other developing countries in the world, the priority for science education cannot be over emphasized. According to Fafunwa (1971), "We are living in a world where science and technology have become an integral part of the world's culture and any nation that over looks this significant truism does so at its own peril".

Science education as stipulated by the National Policy on Education is to equip students to live effectively in a modern age of science and technology (NPE, 1981). This goal becomes a reality when practical demonstration and experiments buttress the theoretical scientific concept. The role of the teachers and parents becomes very important. According to Oriafu (1997), science has a transferable value to many other situations of life. It becomes alive when the learner is given the opportunity to experience science through active participation. Preparing the child early in life for this scientific and technological advancement becomes important.

Some studies (Kube, 1963; Billeh and Pella, 1970; Helgeson, 1968) have found that it is possible to lay a foundation early enough for much of the knowledge essential for the understanding of more complex and abstract concepts in science.

## **Psychological Development of the Child**

The developmental psychology literature confirms that nearly all children follow the same developmental path and pass the same milestone along the way. However, different children travel different parts on this path at different speeds. The kinds of changes that take place and bring these differences about are circumscribed by both generic and environmental factors, particularly the kind of stimulation a child receives during the early formative years (Anthony, 2001).

Psychological development of the child is multi-dimensional process, with physical, cognitive, social, psychological and cultural facets. Different dimensions assume greater or lesser prominence at different stages of childhood development.

As the child reaches the age of about six, he or she enters a new stage of growth and development. Physical growth continues, but at a slower pace, and then the child is ready for formal education in a school setting. The primary school years which officially encompass the age range from six to eleven, but which has extended in practice to a much later age for many children in Nigeria, should provide the child with a basic foundation in numerical, literal, basic life skills, and general knowledge that will help lay a basis for success in later life. As the child develops the love and curiosity for learning early in life, the attitude of parents/teachers towards meeting this great intellectual needs embedded in the early world of learning, cannot be over-emphasized. One of the major features of early childhood is the development of the brain. The child needs to be psychologically fine to study science in this modern age of science and technology (Awake, 2005).

### **Importance of Science in Primary Education in Nigeria**

There is an extrinsic justification for science teaching that emphasizes the role of science in society and its utilitarian value.

In many countries of the world, science has had an extensive effect on lives of the people. The knowledge and skills needed by any individual in dealing with electrical, plumbing and human first aid may be cited as some of the justification for including the teaching of science in the school curriculum.

Science also plays another significant role in the society. We depend upon scientific knowledge and understanding for economic and material advancement. Science has provided us many aids for 'the good life' from bicycles to jet aircraft, antiseptics to antibiotics, radar to colored television and fertilizers to plant growth hormones including the use of computer and G.S.M. (information technology). Despite the hazards caused by these large-scale application of science and technology in terms of a net environmental damage, the fact is, we will need science both to rectify these hazards and to enable men and women to live in this planet as dignified beings (Whitefield, 1974). There is the need to reap the benefits of scientific product/services.

The teaching of primary school science in Nigeria is necessary in order to stimulate and prepare scholars in the scientific disciplines and to provide the educational background required of individuals entering technology occupations or professions.

Science is a discipline. Learning science in primary education helps children to develop ways of understanding the world around them. According to Kuhn in Donnelly (1979), science has to be defined in terms of paradigms and in the absence of paradigms there is no such thing as science. For this, concepts have to be built up, which help the children link their experiences together, ways of gaining and organizing information and applying and testing ideas must be learnt. These contribute not only to children's ability to making better sense of things around them but prepare them to deal more effectively with wider decision making and problem-solving in their lives. Science is a basic part of education both numerically and literally. It becomes more important daily as the complexity of technology increases and touches every part of our lives. Hence, the need for primary science education in preparing the child early in life to face the technological advancement becomes imperative.

Learning science can bring a double benefit because science is both a method and a set of ideas, it is both a process and a product of ideas. The process of science provides a way of finding out information, testing ideas and seeking explanations, while the product of science are ideas which can be applied in helping to understand new experience (Wynne et al, 1985).

There are two important points which underline the value of including science in primary education. The first is that whether we teach children science or not, they will be developing ideas about the world around them from their earliest years. If these ideas are based on casual observation, non investigated events and the acceptance of 'hear say', then they are likely to be non-scientific, and just 'every day' ideas.

The second point is about attitudes to the subject. There is evidence that attitudes to science seem to be formed earlier and children tend to have taken a definite position with regard to their liking of the subject by the age of eleven or twelve (Wynne (ed) 1985). It is not surprising that many find

science confusing and difficult. Such reactions undoubtedly affect their later performance in science. It is clear that primary science education can do much to avoid this crisis at the primary/secondary levels of formal education in Nigeria.

The importance of beginning primary science education early in life is two fold. Firstly, the children begin to realize that useful ideas must fit into the evidence. Secondly, they are less likely to form and to accept everyday ideas which can be shown to be in direct conflict with evidence and scientific concepts. Many children in Nigeria come to secondary school science not merely lacking the scientific ideas they need but possessing alternative ideas, which are barriers in understanding their science lessons.

Science begins for children when they realize that they can find things out for themselves by their own actions. The ideas they may have at the start of such actions may be changed as a result of what they do, what they see, and how they interpret what happens. So, the kind of science we are talking about concerns basic ideas, which can emerge from simple investigation of objects and materials around. Hence, primary science education is imperative in this present Nigeria, since Nigeria is crying for scientific and technological development, it becomes very imperative to start science education in early childhood stage.

#### The role of the Teacher

The task of the teacher in bringing out the best potentials in children is as important as that of the parents.

The first task of the teacher is to understand that he/she is a facilitator and a motivator of learning. The teacher should not only create in children the desire to learn science successfully, but should also provide appropriate materials for their learning.

It is important that the teacher knows the children he/she is teaching as well as their home backgrounds. The teacher should

- identify their strengths and weaknesses,
- put the children in groups of abilities and interest,
- study carefully the materials he is about to use for teaching (Elstgeesl et al, 1985),
- highlight the interesting points to motivate the children.

The greatest motivation for children is demonstration of interest and excitement by the teacher in the topic or subject at hand. When their curiosity is whipped up, they immediately want to know. Attractive books and other learning aids help to motivate the children. According to Imogie (2002:7), teachers are categorized thus:

- The mediocre teacher 'tells'.
- The good teacher 'explains'.
- The superior teacher 'demonstrates'.
- The great teacher 'inspires'.

The science teacher must take into account the way children learn at the primary level, that is, with thinking and doing things closely related (hands-on and minds-on activities). The teacher should note that activity must be a vehicle for experience and thought, and thought, is promoted by communication. The teacher's role in this process is crucial to children's learning of science.

The teacher is the professional educationist charged with pedagogical and androgynous responsibilities for the learners. He is a catalyst who introduces concepts, ideas, information, and truths to the learner, and creates the actions that lead to the changes in the inward and outward behaviors of a child. The teacher knows why, when, where, and how the changing variables are initiated, emphasized and used through listening, answering, corresponding, conversing and interacting, as well as letting the learner to learn, to investigate and see for himself what is important (Symington et al, 1985).

#### The Role of Parents/Guardians

The parents are the fathers and mothers who biologically brought the children (pupils) into the world. They constitute the chief stakeholders in the lives of the children. In law, a father is bound to

maintain and take care of his children until they reach the age of adult hood and when the children are properly educated. The immediate roles of the parents are to ensure that their children are brought to school regularly and punctually, giving the child food to eat, providing books for the child and writing materials to work with, looking after their physical fitness, and visiting the schools to know their teachers and check their performance in the curricular activities. According to Awake (2005), one of parent's many functions is that of educator of his/her children. A child's first word and its pattern of speech are usually learned from its parent. Thus, a person's first language is often referred to as his mother tongue. Since the parent spends more time with their children, each day, it makes them chief teachers as well as principal disciplinarians of the child. Thus, the Maxiran proverb "Education is breast fed" honors the important role of mothers (Awake, 2005).

Parents should ensure that a good part of their life-earned resources should be invested and committed into the education of their children who are the fathers of tomorrow, and must hate to see lapses with the executors of the education programmes. This confirms the popular saying that "education is the best legacy parents can give to their child/children".

### **Recommendations**

This paper presents the following recommendations:

- (1) The teacher should treat the child like an adult, providing them with independence, freedom, and respect, for example, giving them the chance to discuss, argue, and present their own views but always within the framework of classroom control.
- (2) The teacher should help the children discover their strengths and weaknesses through their classroom work.
- (3) The teacher should develop a strategy whereby a "minds-on and hands-on" activity is being used.
- (4) The teacher should try and use materials that are challenging, inspiring and that are both biologically and physically appropriate.
- (5) Parents should be actively involved in teaching their children at home.
- (6) Since a child's brain grows dramatically in size, structure, and function during the first few years, both parents and teachers should make use of that advantage to build in the child a scientific attitude and interest. At this stage, attentions and stimulations will change the child's future (Awake, 2005).
- (7) The government should organize workshops and seminars, in-service training for science teachers to up-grade them on the pedagogical way of teaching primary science.
- (8) Government should provide modern/current science textbooks in primary science schools in order to enhance primary science education.
- (9) Science clubs should be introduced in primary schools to encourage the pupils towards science subjects.
- (IO)The government should involve associations, private companies, and Non-Governmental Agencies (NGOs) to assist in the provision of science equipment. (1 I)There should be incentives of scholarship for both student/teachers by the government.

The above recommendations will go a long way, in improving science and technology in Nigeria in the 21st century if well implemented.

### **Conclusion**

Since science has made a remarkable improvement on our society and its leading role in a technologically developed society cannot be over emphasized. No nation can talk of industrialization without focusing and investing on science. Therefore, there is the need for primary science education, in other to prepare the child early to become a potential scientist. In actualizing this vision, the teachers and parents have a mission to fulfill. This is because the emphasis on scientific processes, skills, attitudes and interests places particular importance on the roles of the teachers and that of the parents.

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