The paper argues that UBE programme must have an expanded vision to include and emphasise science, technology and society education. Areas of science technology and society education necessary for ‘Science for the UBE Programme’ are discussed. The implication for Science Curriculum and teaching methodology are examined and issues of teacher preparation and policy considerations are discussed. The paper concludes by recommending that Science and Technology Literacy Education must be part of the universal basic education. For any society that neglects all or at best does so only in a state of extreme dependency.

Introduction
According to WCEFA/Preamble, 1990: the goal of basic education is to help ensure a safer, healthier and more prosperous and environmentally sound society. To accomplish this, every child, youth and adult needs to participate in educational opportunities designed to meet their basic learning needs. They need the knowledge, skills, views and attitudes required to be able to survive, live and work in dignity in today’s world; Every person needs the knowledge to make informed decision, to improve the quality of their own life and to continue learning.

The UBE programme launched in 1999 is in consonance with the vision of WCEFA. Its objective include ensuring the acquisition of the appropriate levels of literacy, numeracy, manipulative, communicate and life skills as well as the ethical, moral and civil values needed for laying a solid foundation for life-long learning - among others is consistent with the declarations of World Conference of Education For All. Traditional basic education with emphasis on literacy and numeracy or the 3’Rs (reading, ‘writing and ‘arithmetic) appears to be insufficient for providing access to solid learning to match the rapid pace of technological change going on in this millenium. Citizens in every society and every nation need to be scientifically and technologically literate to be able to survive in this competitive world. Therefore an expanded vision of the universal basic education must be conceptualized to include and emphasise science, technology and society education. Key personnel (Science Curriculum developers and science teacher educators) should come together for the purpose of helping develop an understanding of the ‘Science for the UBE concept and its implications regarding skills and attitudes for classroom practices and teacher training.

Areas Of Science, Technology And Society Education
A number of areas of activity and innovations in science, technology and society education can be identified. In science, the areas of special interest should concern the planet earth and the universe, living phenomena and the structure of matter. In technology areas of interest may include computers and communications, energy and materials, conservation and preservation of our natural environment. In society education areas of interest include humanity, ethics and values, social responsibility, population and the living environment.

A set of basic topics for scientific and technological literacy was identified and investigated for applicability for teaching for the goal of development (Bangalore Conference on Science and Technology Education and Future Human Needs, 1987).

The basic science /technology knowledge topics are:
1. Health (2) Food and Agriculture (3) Energy 4. Land, water and mineral resources.
4. Industry and technology

Knowledge in these topics has the potential of improving traditional ways of carrying out economic or life-sustaining activities. This knowledge can also bring new possibilities for livelihood and offer the prospects for an improved community life overall (Bowyer, 1990).

**Implication For Science Curriculum**

A science/technology curriculum should be developed and this ought to be society/community based. The first step involves a needs and resources assessment of the community. Data from the assessment are then analysed to identify specific local problems and implications for curriculum planning. The third step involves developing a teachable curriculum to reflect the specific problem of the locality within the school and community environments. The fourth step is apply the curriculum in teaching so as to create awareness of the identified problem. The learners are engaged in discussing the problem and the solutions. Then learners and the community are involved in solving the problem. The fifth step is to assess the effect of the curriculum on the learners/community (society) and implication for a science and technology literacy. Example of such science/technology development here may prove some point.

The people of Obrikom, an oil producing community near Omoku Rivers State have the problem of drinking water. Sources of drinking water for families in the area have been the Obrikom River, shallow wells and a few containers for catching rain water running off from the ever rusting galvanized zinc roofs of houses. Identified problem. The local drinking water from the river contains an extremely high number of foliform bacteria. Oil drainage resulting from the oil exploitation and high acidity caused by the gas flaring in the area make water from these sources unsafe for consumption.

The subsequent curriculum content developed for the Obrikom Community Secondary School should include the following:

1. Awareness of the micro-organisms in the community’s water supply.
2. Knowledge about the micro-organisms and their role in the spread of disease.
3. Methods of monitoring or testing acidity and identifying oil spillage.
4. Effects of acid water on the environment.
5. Methods for keeping water safe to drink.
6. Solar distillation of water to demonstrate the purification of water.
7. The water cycle and the production of pure water for consumption.

Curriculum content for adult learners should occur more things adults can do to solve the problem. These include:

1. Contacting the Local Government Council to present the community’s problems to the oil companies and State or Federal Government.
2. Designing sanitation activities to keep water free from faecal or animal contamination.
3. Designing ways to make water potable: boiling using clean container or sinking of bore holes, to distribute pipe-borne water to families.
4. Designing a system to monitor and evaluate the results of the water supply.
5. Knowledge of health implication.

By such innovative curriculum modelling, the educational content becomes flexible to local needs and adaptation.

By such approach, scientific and technological literacy can be transmitted to the students, adults and the society.

**Implication For Science Teaching**

For implementation of UBE through the application of STS education we discuss here two teaching approaches.
Enhancing the Universal Basic Education Programme Through Scientific and Technological Literacy: Implication For Science Education.

Content Teaching Model
Context Teaching method promotes an understanding of STS Literacy. Context teaching approach is a method in which concepts are treated out of the confines of the classrooms to a real life (world) situations.

A teaching of the curriculum contents developed for the Obrikom Community Secondary School need not be confined to the classroom. The students and adults can be taken to the Obrikom river, the oil rigs and gas flaring area and the concepts explained in content. Students, teachers and adults can meet in the community hall to discuss the problems and work out solutions.

It is not enough to tell the student in a classroom about textbook teaching of Haber or contact or Oswald processes of production of ammonia or tetraoxosul phate (vi) acid or trioxonitrate (v) acid. The students should be taken literally from the classroom to an industrial setting where these processes are applied in actual production. Context teaching helps make the learner eager to learn and this de-mystifies science and technology.

Research has shown that context teaching is more effective than content teaching in the development of scientific and technological literacy. The more the context is real and related to the learner and society, the more the motivation enhances achievement.

Human Teaching Approach
The nature of science and technology as human activities aims at individual and collective societal development. The role of science is to enlighten humanity and the role of technology is to use existing knowledge to serve humanity (Boweyer, 1990).

Therefore humanistic teaching approach is aimed at making the teaching of science and technology learner and society centered.

Science and technology should be presented to the learner as a social enterprise, forming an integral part of human and society. According to Bowyer (1990) science has a humanistic and moral influence on the society as it addresses values and ethics in the society.

For an instruction to be effective and motivational, the student must see what is being taught as having real value for him as individual and as a member of the community.

Issues Of Teacher Preparation And Policy Considerations
There is no doubt that the introduction of new subject matter and methodologies in science, numeracy and technology in the new UBE programme will require some scope of changes necessary in the teaching profession. Two areas relevant to this change are identified as:

1. Fundamental knowledge that the teacher must understand in order to be effective.
2. Appropriate changes in actual teaching environments that will facilitate teacher development at the preservice and in service levels.

Research by Hashwel (1985), and Schulman, (1987), showed that effective teachers must have expertise in both subject matter knowledge and in teacher knowledge. Subject matter knowledge refers to expert knowledge of the entire field as well as specific expertise in individual topics. Subject matter expertise in the area of science, numeracy and technology in both the formal and non-formal sectors requires teachers to be:

1. Knowledgeable in one or more science subjects.
2. Knowledgeable in numeracy.
3. Knowledgeable in the appropriate technology of the society or country.
4. Knowledgeable in the relationships between science, numeracy and technology.
5. Knowledgeable about the social and economic implications of science and technology.

Teacher knowledge refers to expertise in the complex pedagogical knowledge and skills needed to transform specific subject matter into a form which learner can understand.
Chuks A. Okoro

It has been suggested that providing teachers and students opportunity to work in community technology projects is an excellent way of upgrading teacher’s subject matter knowledge particularly with regard to science and technology.

Research has shown that teacher knowledge in addition to subject matter knowledge is necessary for optimum learning to occur.

The implementation of the UBE programme may have suffered in initial misplacement. Teachers for this programme ought to have been trained in the Science Technology and Vocational Colleges, (Federal Colleges of Education (Technical), located in various geographical areas of the country. Colleges of Education nationwide with science and technology bias are more equipped and appropriate to train the trainee teachers for UBE rather than the NTL which has no domicile teacher trainers, no infrastructural facilities and no equipment.

**Recommendation**

It has been recommended by this author elsewhere that the states and Federal Government should establish science teachers resource centers in every state and science and technology ‘villages’ in every local government area. The centre would serve as re-training group for serving teachers in scientific and technological principles and methodologies via short-term in-service courses seminars and work shops. The science and technology villages would provide the teachers and learners (students and adults) the opportunity to engage in school-community technology based projects.

These can help upgrade teachers’ subject matter knowledge, as well as teacher knowledge, disposition and reflection for effective teaching of science for STS literacy for the UBE programme.

**Conclusion**

Education is a fundamental, right of every human being. It provides the keys to unlocking knowledge and experience from previous generations and to unlocking doors to future generations to harness new knowledge for the service of the society.

According to Povalyaev (1989) education unprotected by society will fail to protect society itself. Scientific and technological literacy must be a fundamental part of this basic education. Any society that neglects science and technology education (that society) does not develop at all or at best does so only in a state of extreme dependency.

**References**


University.


