FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

SCIENCE EDUCATION AND POLITICS OF L1 – L2 IN NIGERIA: ADOPTING THE TEACHERS' LANGUAGE FOR LIBERATING EDUCATION

By

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1.0 INTRODUCTION

Spiritual Foundation of the Inaugural Lecture Title

O Mankind! We created you from a single (Pair) of a male and a female, and made you into Nations and Tribes, that ye may know each other (Not that ye may despise Each other) Q49: 13.

Consequently, my precise and simple Science Educational interpretation of this Qur'anic verse is that:
"A Nation knows (Educate) itself meaningfully through using its tribes (Languages)."

This is because, to know is to be knowledgeable, and to be knowledgeable, there must be effective communication through the language medium the people have proficiently mastered.

This inaugural lecture focuses attention on educating us on the overall discipline of science education, the Professional Science educator as a professional teacher, and the best way to communicate the Discipline Content Knowledge (DCK) of science education. In Nigeria, language of the immediate community – **Mother-tongue (L1)** has been recognized to be used for instruction in schools for the first four years of basic education and thereafter, English language – **Foreign Language (L2) shall progressively** be used as a medium of instruction and

the language of immediate environment, French and Arabic shall be taught as subjects. This has consistently generated political discourses and researches for and against the policy for a very long period of time. I have conducted researches and also contributed to the theoretical debate. I made recommendations and scientific conclusions from these debates and researches over time. So, today, I am presenting them before you as my contributions to knowledge in form of inaugural lecture.

2.0 SCIENCE EDUCATION: THE PROFESSIONAL SCIENCE EDUCATOR AS A PROFESSIONAL TEACHER

2.1 Science Education

The concept of Science Education can be understood from several perspectives, ranging from: (1) An approach to the study of Science. (2) The concept of Science in Sociological perspective. (3) Science as a cultural process. (4) Aspects of the development of Science. (5) The changing relationship between Science and the Society. (6) The organization of the Scientific Community (Muller, 1973).

However, within the context of the six perspectives, Science education is understood to be the provision of learning experiences in both natural and social sciences such as Biology, Chemistry, Mathematics, Physics, Technology, Engineering and Philosophy, Sociology, Psychology and Geography respectively. All these take place in formal, non-formal and informal Science Education settings.

Formal Science Education Setting: This involved the provision of learning experiences in the natural sciences which is given in Pre - Primary, Primary, Junior Secondary, Senior Secondary and Tertiary - level institutions such as Colleges of Education, Polytechnics and Universities.

Non-Formal Science Education Setting: This type of setting has some basic characteristics of formal science education such as planned programme of action, but it is carried out outside the regular school system. It is used to equip individuals with basic science and technology skills and knowledge that are required for human growth through workshops, seminars, correspondences and apprenticeship etc.

Informal Science Education Setting: These are settings where scientific skills and knowledge are learnt in the homes, farms, markets, mosques, churches, mass media, peer groups etc. through conscious and unconscious interactions.

In all that have been mentioned above, there are two areas that science education focuses attention on; firstly, as an area of study that considers the subject matter (content-knowledge) of science disciplines such as the traditional sciences and technology. Secondly, it focuses attention to the processes that are involved in the teaching and learning of science (Muller, 1973).

Let me quickly mention here that, my earlier mention of Mathematics, Engineering and Technology in the conceptual understanding of Science Education as a discipline and specialization is not just an additive or an afterthought but a deliberate explanation of the true knowledge and scope of science education.

This is demonstrated in the fact that "Science" without the bye-play of "Technology" becomes sterile while "Technology" without "Science" becomes moribund. So, the argument about which of them come first is already a foregone conclusion. This is because; it is common knowledge that the steam engine, for instance, preceded the scientific theory of thermodynamics. This

is in agreement with the two major aspects (as earlier mentioned) or areas of attention in Science teaching, which are: **Disciplined Content Knowledge (DCK)** and **Science Teaching as an Enterprise**.

Nevertheless, science education performs two basic functions: Viz:

1. The training of Specialists for a career in science and science related fields by acquainting the students with certain basic scientific knowledge and skills.

2. To broaden the horizon of non-technical citizens (those that are out of formal school system) through the development and explanations of processes/procedures required for them to acquire basic scientific and technological knowledge for ready application to everyday living. That is, producing a scientifically literate society. e.g. providing knowledge on the operation and maintenance of technological devices in homes and offices.

All these functions are to be performed with the professional skills of an ideal science teacher.

2.2 Who are Professional Science Educators and are Professional Teachers?

In Nigeria, the teacher education programme has been provided for in Section 5 (B) of the National Policy on Education (NPE) (NPE, 2014). Section 5 (B) subsection 92 (b) provides for the minimum entry qualification into the teaching profession and it states that: "The minimum qualification for entry into the teaching profession shall be the Nigeria Certificate in Education (NCE)". While sub-section 94 of the NPE (2014) provides that: "All teachers in educational institutions shall be professionally trained." So, teachers that are trained in educational institutions who have minimum of NCE qualification in the areas of Science

and Technology subjects are qualified to be called professional science educators and become professional teachers after been certified by the Teachers Registration Council of Nigeria (TRCN).

Teaching is a legally recognized profession in Nigeria. In this regard, government has set up the Teachers Registration Council of Nigeria (TRCN) by Act 31 of 1993 to continue to register teachers and regulate teaching profession and practice as stated in Section 5 (B) subsection 100 (a) of the Act. Consequently, subsection 100 (b) states that: Only professionally qualified and registered teachers shall be allowed to practice at all levels. It is important to understand that professionalization of teaching is not only a Nigerian affair; unfortunately, teaching was only accorded the status of a profession in Nigeria in the early 1990s.

In 1984, the international labour organization and UNESCO issued a document titled: **The Status of Teacher: An Instrument for its Improvement.** The document has more than 142 recommendations, covering guiding principles, educational objectives and policies, preparation for the profession, further education for teachers, employment and career, rights and responsibilities of teachers, conditions for effective teaching and learning, teachers' salaries and social security. Recommendation (REC) six (6) states that: Teaching should be regarded as a profession. It is a form of public service which requires **expert knowledge and specialization skills**, acquired and maintained through rigorous and continuing study; it calls also for a sense of personal and corporate responsibility for the education and welfare of the pupils in their charge. Recommendation twenty one (21) states that: All teachers should be prepared in general, special and pedagogical subjects in universities, or institutions on a level compared to universities or else in special institutions for the preparation of teacher. Unfortunately, in Nigeria, any institution one graduates from one can become a teacher

instantly when employed in an educational institution regardless of his/her training.

However, Section 5 (B) sub-section 92 (a) (NPE, 2014) recognized the fact that teacher education shall continue to be emphasized in educational planning and development. Consequently, this implies that, the teacher is central to the development of Nigeria's education system. The quality of the teacher in all ramifications of the education system is a fundamental component of national development. This is why in Nigeria education is an instrument for national development.

To achieve national development, the five main national goals of Nigeria, which are, the building of: (1) A free and democratic society. (2) A Just and egalitarian society. (3) A United, Strong and self - reliant nation. (4) A great and dynamic economy and (5) A land full of bright opportunities for all citizens; must be realized.

These national goals form the necessary foundation for the National Policy on Education (NPE). The NPE is government's way of realizing the national goals using education as a tool. It is also worth reiterating that, the teacher is central to the realization of educational and national goals. This was part of the reasons for professionalizing teaching in Nigeria and the setting of professional standards for Nigerian Teachers. The professional standards are to be used to appraise the professional standing of a teacher in Nigeria. These are:

a. Professional knowledge.
b. Professional skills.
c. Professional values, attitude and conduct, and
d. Professional membership obligations.

Thus, on the basis of these standards Nigerian teachers were

categorized into four (4) groups as follows:

1. Category A (Doctoral Teachers): These are holders of PhD in Education or PhD in other field plus teaching qualification e.g. Postgraduate Diploma in Education (PGDE); Professional Diploma in Education (PDE); and Nigerian Certificate in Education (NCE).

2. Category B (Master Teachers): These are holders of master degree in Education or Master degree in other fields plus a teaching qualification e.g. PGDE, PDE and NCE.

3. Category C (Graduate Teachers): These are holders of Bachelor degree in Education or bachelor degree in other fields plus a teaching qualification e.g. PGDE, PDE and NCE.

4. Category D (NCE Teachers): These are holders of the Nigerian Certificate in Education which is the minimum teaching qualification. This categorization is based on the provisions of the TRCN Act 31 of 1993, Section 2(e). The requirements enumerated above, are what makes one a professional science educator and a professional teacher (TRCN, 2012).

From the categorization, one wonders how many qualified Science, Technology, Engineering and Mathematics (STEM) teachers we have in Nigeria's educational institutions.

3.0 SCIENCE EDUCATION: A GLOBAL PERSPECTIVE

The teaching of science started as far back as 1750 when books containing science materials were first found among the educated members of the Western European Society. This started in primary schools. Science qualifies to future in primary school curriculum and be taught to children of primary school age because children of primary school age are at the concrete operational stage of cognitive development (Asun, 1987). At this

stage, children have the propensity to learn, understand and solve problems using concrete materials and situations. Children are scientists at this stage because they are doers of things, naturally curious, delighting in touching, holding, mixing and throwing things together.

The books that contained the science materials were called "Children literature or didactic writings" which were based on religion and serving to support the arguments of natural theology. By the beginning of the 18th century, science materials were taught as part of a regular school programme in schools and the children's literature was adopted. Towards the end of the 19th century, the development of specific curricula started as a result of increasing demand for elementary school science which was motivated by the need to improve Agriculture and to halt the increasing migration of young people from farms to the cities. This trend gave birth to the "Nature study Movement" between 1890 and 1920, a period when a lot of science teachers in Europe, America and some parts of Africa showed great enthusiasm for the introduction of the study of nature in schools (Bajah, 1988).

From these developments nature study became elementary science which subsequently transformed to primary science. Primary science became a core subject in England and Wales (Lunn & Solomon, 2000) at the time their new national curriculum was set in place in 1899. Much earlier in the United State of America (USA) there were spates of curricula development activities. However, in the 1950s when USA found that it was lagging behind Russia in terms of research and development in science and Technology as a result of Russian's launching of the rocket called "SPUTNIK" in 1957, America got worried about the content of their education.

These events arouse serious attention and interests in curricula

development from Government, Industry, Schools and even Society. Committees, Conferences, research studies, workshops and seminars were held where experts deliberated on the production of relevant curricular materials especially in the sciences. The decades ahead were characterized by radical approach to the teaching of science in the primary schools in USA. These also spread all over the world and out of which different curricular projects were developed, few among which include, viz:

SCIS - The Science Curriculum Improvement Study sponsored by the University of California in 1961.

ESS - The Elementary Science Study sponsored by the educational services incorporated in 1962.

AAAS - A process approach sponsored by the American Association for Advancement of Science which was started in 1963.

ESSP - Elementary School Science Project organized at the Utah State University in 1963.

MINNEMAST - The Minnesota Mathematics and Science Teaching sponsored by the University of Minnesota, USA.

SSCP - The School Science Curriculum Project organized at the University of Illinois in 1963.

ESSP - Elementary School Science Project organized by the University of California in 1959.

ESP - The Elementary Science Project organized by Harvard University.

COPES - Conceptually Oriented Programme for Elementary Science at New-York University.

QUAES - The study of Quantitative Approach in Elementary Science organized at the State University of New York at Stony Brook in 1964.

All these go to show that science educators felt some sense of crisis at the time in the teaching of sciences and it took a major international event to mobilize the entire nation to wake up to the crisis.

In the history of primary science otherwise known initially as elementary science, six names stand out as the pioneers of elementary school science. Each of them made important contributions to the development of primary school science. They are: 1. Wilbur Samuel Jackman (1855 - 1907); 2. Anna Botsford Constock (1854 - 1907); 3. Ephraim Laurence Palmer (1888 - 1970); 4. Gerald Spellman Craig (1895 - ?); 5. Florence Grace Billing (1840 - 1967); and 6. Bertha Morris Parker (1889 - ?).

The works of these six men and women began during the late 19th Century and contributed towards a full understanding of the development of elementary school science during the first half of the 20th century. Consequently, one can see that Science Education began in primary schools in the developed nations.

4.0 SCIENCE EDUCATION: THE AFRICAN PERSPECTIVE

The socio-economic difficulties encountered by the African people immediately after the colonial rulers have departed the shores of Africa was very far worse than what was experienced during the pre-colonial periods. This was shown in the fact that the colonial rulers have plundered with Africa's agricultural supplies and forcefully repatriated them to their countries. The

consequences of these was that Africans were confronted with a lot of problems such as wide spread illiteracy, large population, limited and underdeveloped resources and above all, very huge corruption which was created and nurtured by both military and civilian opportunistic bureaucratic dictatorial leaders. These leaders continue to connive with their foreign partners to create a conducive atmosphere for imperialism through which the people's wealth continued to be siphoned to the countries outside Africa even in this 21st Century.

Nevertheless, these are what brought about the precarious conditions in African villages, towns and cities thereby paralyzing African culture and traditions. Africa has not recovered from these cultural shocks because not enough momentum was gathered through education even in this 21st Century.

From 1960s when many African countries gained independence, there were a lot number of Ministerial continental and regional conferences for the development and advancement of S & T under the auspices of UNESCO and the then Organization of African Unity (OAU) now African Union (AU). These conferences came up with several declarations, such as Dakar and Lagos Plan of Actions, Addis Ababa, Rome and Rehoboth Declarations in 1960 (Lewin, 2000).

There were concerns and contentions about the nature of S & T education in Africa. These were what led to the crystallization of at least two perspectives of Science and Technology education in Africa. The first perspective is the orthodox perspective which emphasized the importance of discovery, enquiry, inventions and general undertakings of the natural world. While the second perspective, argues for the need to tailor S & T education to the needs and the environment of the African people. This perspective rests on the need for S & T to be social - context

driven. This means S & T should be for application and not just for the sake of it. The illustrations of these perspectives are presented in Figures I and II below: Figure I below shows the orthodox perspective of S&T in Africa as a Top-Down approach.

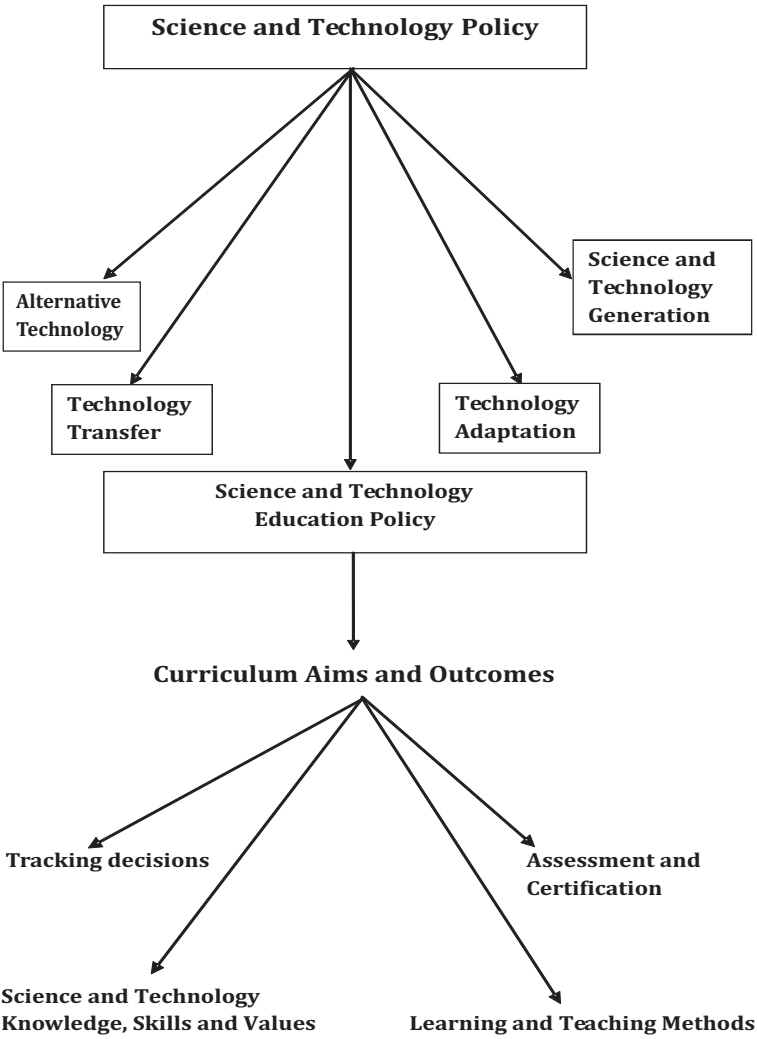

Fig.1: The Orthodox Perspective of S & T as a Top-Down Approach (Lewin, 2000).

So, S & T education in this context is a component of Science and Technology policy. The major weakness of this approach is that, it is a product of a few bureaucrats from government ministries and does not adequately address the needs of the people and their African environment. This figure below illustrates the social context perspective of science in Africa as a Bottom-Up approach.

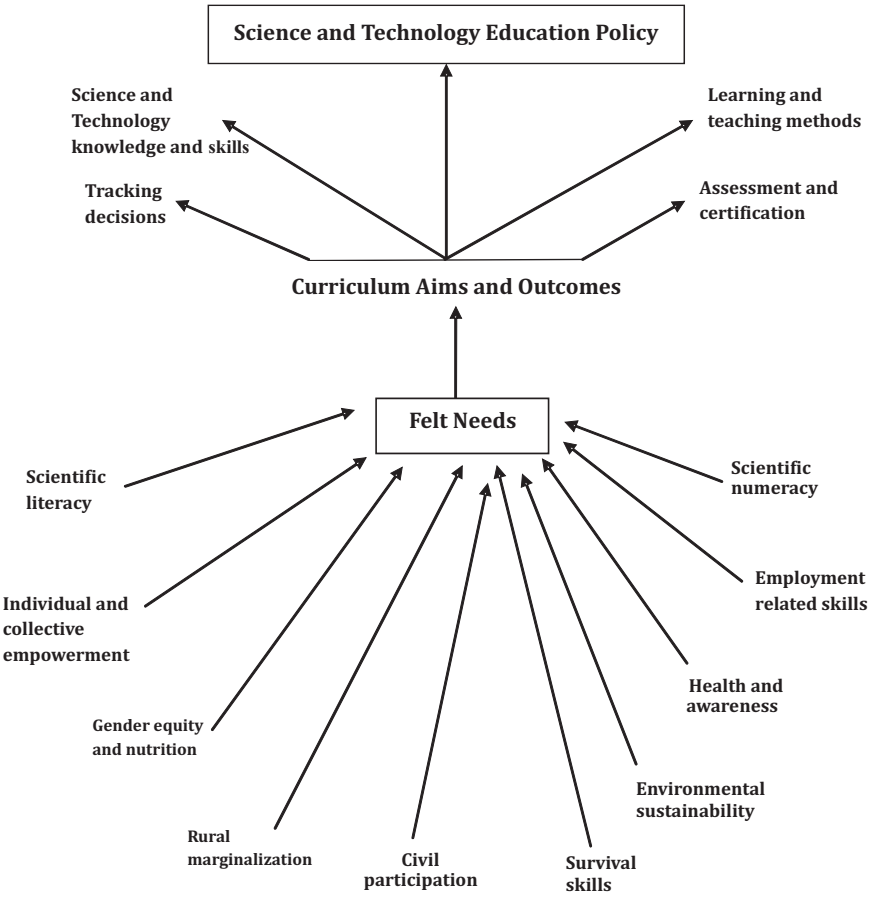

Fig. 2: Science and Technology Education from Bottom-Up Approach (Social Context Driven) (Lewin, 2000).

These two perspectives have been responsible for the formation of S & T Policy in Africa (Lewin, 2000). The choice of any of these perspectives has always been dependent on individual African nation. As it is presently, Africa's inventive profile as manifested in patents indicates that, Africa produces less than one thousand of the world's inventions and 88% of its inventive activity is concentrated in South Africa (Pouris & Pouris, 2008). This trend still persists even after 17 years of this study.

However, whatever the choice of the perspective may be, it is imperative to understand that, the paths for recovery shall only be when genuine and concerted efforts are put in place in order to build both indigenous and endogenous Science and Technology education bridges that would be capable of providing quick and continuous crossings to the new – world – culture of globalization which is undoubtedly Science and Technology (S & T) driven (Ardo, 2004).

These are bridges that should adapt the western Science and Technology and integrate it into the native culture of Africa and in tandem ensures its continuous and increasing growth through the development of internal mechanisms that enhances and increases its growth. This is the model adopted by China as spear-headed by their first Minister of Education, Prof CAI Yuanpei, in 1911. It became a model for the Asian Tigers.

5.0 SCIENCE EDUCATION: THE NIGERIAN PERSPECTIVE

There is a slight difference in the account of experts on the period Science Education started in Nigeria. Omolewa (1977) traced it back to 1859 when missionaries established secondary schools in Lagos, the rudiments of science were introduced. Abdullahi (1982) claimed that the foundations of Science teaching were laid in Nigeria between 1861 and 1897 when the rudiments of science featured in some missionary schools' time tables. Kings

College, Lagos, established in 1909, was the first school to have a Chemistry laboratory.

Nevertheless, Hans Vischer alias Dan-Hausa, after studying the system of education in the Sudan, Egypt and the Gold Coast (Ghana) came back and established the Nassarawa School in 1909 at Kano. With his seven objectives of education for the North, the teaching of subjects such as Agricultural Science with particular reference to Crop Cultivation, Carpentry, Leather Work and Smithery (Fafunwa, 2002) started.

However, Northern Nigeria had its first Secondary School in 1937 with the population of 65 students. At the same period the south had 26 schools with 4,285 students (Ogunleye, 1999). One could see vividly the possibility of when organized science teaching started in Northern Nigeria.

In the 1960s, immediately after Nigeria's independence, there was focus on a process of curriculum reforms adaptation and innovations, which led to the introduction of the then primary science core curriculum. This idea emanated in 1977 out of concern by the Federal Government of Nigeria to improve the quality of workshop that was held between 20^{th} – 30^{th} September 1977 in Dar-es-Salaam, Tanzania on the production of low cost science equipment (FME, 1991). The interest in curriculum development projects in Nigeria was about to take shape at this period even though the new world concept on primary science were quick to find their way into African countries, they never really found a foothold in the continent. The hygiene curriculum which was changed to the nature study curriculum was still in operation. Nevertheless, these activities led to the production of such curriculum materials as:

i. the african primary science programme (apsp)

ii. Bendel Primary Science Project (BPSP).

iii. Science Programme of the Primary Education Improvement Project (PEIP) of the Nineteen Northern states developed in ABU Zaria.

iv. The Ife Six year Yoruba Primary Science Project "SAYENSI" launched in 1970 at the Institute of Education, University of Ife (Yoloye, 1980).

v. The National Primary Science and Mathematics Project (NPSMP) conceived by the Federal Ministry of Education in 1978.

The African Primary Science Programme was one of the first innovative curriculum projects in Science education at the primary school level. It was aimed at considering the interest of the African child in the learning of science through the use of African Environment. This was launched in Kano in January 1965, by USAID, Ford Foundation of America and the Education Development Centre (EDC) of Massachusetts.

The Bendel Primary Science Project (BPSP) had produced in 1972 series of pupils' textbooks known as "SCIENCE IS DISCOVERING" together with its Teachers guide. This was coordinated at the Science Curriculum Development Centre, Abraka. The project emphasized the use of discovery method, the child's environment, development of scientific attitude, interest and certain basic concepts. This was initiated in Benin City in 1966 (where modern education started in Oba's palace in the year 1515) UNESCO, UNICEF and UNDP sponsored the project.

The Science programme of the Primary Education Improvement Project (PEIP) produced science curriculum materials, series of pupils' textbooks (Books, 1 – 6) and teachers guide that provided

all the necessary information for the teacher on how to carry out science activities as specified in the pupils' text. This project was initiated at the institute of Education, Ahmadu Bello University, Zaria in 1970 with assistance from UNESCO, UNICEF, USAID and British Council.

The Ife six year Yoruba Primary Science Project "SAYENSI" initiated in 1970 at the University of Ife under the chairmanship of Late Professor Aliyu Babatunde Fafunwa, the then Director of the Institute of Education, exploited the use of mother-tongue (Yoruba language) in the teaching of ten (10) primary school subjects which included English language, Mathematics and Elementary Science. The project was financed by Ford Foundation of America and the former Western State Ministry of Education.

The National Primary Science and Mathematics Project was initiated in 1978 by the Federal Ministry of Education, who set up a curriculum panel under the chairmanship of Dr. B. C. E Nwosu, the then Chief Education officer in the Ministry, with representatives from NERDC, Universities of Ife, Zaria, Lagos, Nsukka and from the states of Ondo, Lagos, Sokoto, Imo, Benue and Bauchi. The panel, produced a core – curriculum content for primary science with instructional units organized for the first time into six columns of topic, performance objectives, contents, activities, equipment, materials and evaluation (Ogunleye, 1999).

6.0 SECONDARY SCIENCE EDUCATION IN NIGERIA

At the secondary school level, the science curriculum existing at the level prior to and after Nigeria's independence in 1960 was traditionally oriented in outlook and in practice. The content had no enough learning experiences for students in order for them to become useful to the society. The curriculum was intended to

serve the interest of Cambridge University by WAEC and designed to meet the requirements of its external examinations in Science. At this period, Science was presented as bits and pieces of information that have no conceptual relationships.

The first series of curricular innovations in Science at the secondary school level came as a result of the approaches and response to the then new 3 – 3 system of secondary education by STAN, WAEC, NERC and CESAC. Their efforts resulted in the following science curriculum projects:

1. The Basic Science for Nigerian Secondary Schools (BSNSS)
2. The Nigerian Integrated Science Project (NISP)
3. The Nigerian Secondary Schools Science Project (NSSSP)
4. The National Science Curriculum for Senior Secondary School

The Basic Science for Nigerian Secondary Schools (BSNSS) was the pioneering science development project in Nigeria between 1962 and 1967 at the Comprehensive High School, Aiyetoro. This project was jointly financed by the Ford Foundation of America and the Nigeria Western Regional Government at the time and coordinated by the Comparative Education Study and Adaptation Centre (CESAC) of the University of Lagos. The BSNSS was a curriculum in general science which covered the first two years of Secondary School. The philosophy of the programme was "Doing Science the way Scientists do it." Unfortunately, this programme was not widely adopted in schools, so, it did not go beyond the pilot-testing stage.

The Nigerian Integrated Science Project (NISP) was the first series of Science Curriculum Project developed by the Science Teachers Association of Nigeria (STAN) in 1970. The philosophy of the integration was to help the child to: (a) Gain the concept of fundamental unity of science. (b) Gain the commonality of

approach to problems of scientific nature. (c) Gain an understanding of the role and function of science in everyday life, and the world in which the students lives.

Unfortunately, this has been overtaken by the concept of Basic Science and Technology in schools as a result of the introduction of the 9, 3, 4 system of basic education. While the programme was replaced globally by UNESCO through the introduction of Science, Technology and Society (STS) subject in schools.

The Nigerian Secondary School Science Project (NSSSP) was developed in 1970 by CESAC as an alternative syllabus for forms III – V of secondary schools all over Nigeria in subjects such as Biology, Chemistry and Physics. Its objectives was to obtain a proper understanding of the basic concepts of science, develop scientific skills (manipulative) and acquire the right attitude to science such as honesty, tolerance, objectivity and cooperation.

In 1981, the National Policy on Education was revised and as a result of the demand of the 6 - 3 - 3 - 4 system, a new curriculum was developed in every subject area for both the junior and senior secondary levels of education. So, in science, new curricula were developed in Physics, Chemistry and Biology for senior secondary schools. The entire science curriculum for the senior secondary schools emanated from the critique of the draft copy of the Nigerian Secondary School Science Project (NSSSP) which was earlier submitted by CESAC to the Joint Consultative Committee on Education (JCCE). This was what was responsible for the Science curriculum in senior secondary schools in Nigeria today.

7.0 SCIENCE EDUCATION IN HIGHER INSTITUTIONS IN NIGERIA

By the end of 1800s, the Nigerian public began to demand for

higher Educational institutions where youth could receive higher training without having to go abroad. This led to the establishment of Yaba Higher College in 1932 at Yaba, Lagos. It is the first Nigeria's higher educational institution and was changed to Yaba College of Technology in 1947. It attained autonomous status by virtue of Decree 23 of 1969, which gave it the mandate to run courses of instruction in Technology, Applied Science, and Commerce etc relevant to the needs of the development of Nigeria. While, in 1948 the University College, Ibadan was established as a result of the reports of Asquith and Elliot Commissions submitted on 25th March, 1945, which was set up by the British Government in 1943. The University College took off with three founding faculties of Arts, Science and Medicine.

Also, in the field of Science and Engineering, the Nigerian Colleges of Arts, Science and Technology were opened in January 1952 at Ibadan, Enugu and Zaria (Ardo, 2004). The expansion of higher education institutions continued, to the extent that, as at the year 2021, Nigeria has forty- three (43) federal universities, fifty two (52) state universities and Ninety-Nine (99) approved private universities which makes a total of one hundred and Ninety-four (194) universities in Nigeria. Hitherto! There are one hundred and fifty-two (152) Colleges of Education in Nigeria as approved by the National Commission for Colleges of Education. Twenty one (21) of them are Federal, eighty two (82) private and forty nine (49) states owned. There are also one hundred and ninety four (194) polytechnics and colleges of Agriculture. Monotechnics (26), Polytechnics (132) and Colleges of Agriculture (36) across Federal, States and Private sector in Nigeria.

In all the categories of higher educational institutions mentioned above, there are more than one hundred and fifty seven (157)

different courses under science faculties/ schools in Nigerian Universities (Johnson, 2020). More than seventy (70) science related courses offered in Nigerian Monotechnics, Polytechnics and Colleges of Agriculture and more than forty (40) different science related combinations in the Nigerian Colleges of Education (Abass, 2021). Consequently, from these numbers of higher educational institutions and the numerous science related courses offered in these institutions, also, considering public and private Nursery, Primary and Secondary Schools offering science and technology related courses, one can imagine, how many number of science teachers are involved. This is spread across many STEM programmes from Pre-Primary to the University levels. The question to be asked is: **How many of these science teachers are professionally qualified to teach by professional standards?** This is one quantum problem of Nigeria's education system. **The irony is that, many people in non-teacher education disciplines who are involved in teaching do not see the need for qualifying to teach.**

Government and private individuals are investing considerably in the provision of functional Science and Technology education; yet, the results from these investments in education **are not adequately** contributing to individual growth and development; and the advancement of national economy.

These inadequacies were part of what informed Federal Government TETFUND and implementation of the NEEDS assessment report which exposed tremendous inadequacies in Nigeria's University education system. In fact, Ezekwesili (2006) attributed the deplorable socio-economic status of Nigeria to the dysfunctional state of the Nigerian education system. So, if this is the case, what are the problems that led to this dysfunctional state?

8.0 THE PROBLEMS OF SCIENCE AND TECHNOLOGY EDUCATION IN NIGERIA

Experts in the field of Science Education have identified several problems inhibiting the growth of Science and Technology Education. Some of these problems vary depending on the perspective the expert focuses his/her attention. Some of these problems include:

a. The inadequacies of National Policy on Education (NPE) to address the needs and aspirations of people from the multicultural dimensions of Nigeria.
b. The underfunding of Education by government.
c. Declining standards of education as a result of clear evidence of poor academic performance in Science and Technology examinations.
d. Deplorable conditions of science learning infrastructures such as inadequate or lack of laboratories, Science textbooks, libraries, internet facility, science equipment and reagents.
e. Large class size which coupled with lack of adequate seats and bedding materials in the hostels.
f. Inadequate qualified science teachers and science teacher based training institutions.
g. Low salary/remuneration for science teachers.
h. Bad attitude to work due to poor motivation of science teachers. This frustrates the development of scientific attitude.
i. Mismanagement and corruption resulting from dishonesty, bribery, embezzlement and looting of public funds. This fosters lack of commitment and political will to fund science and technology education (Wushishi, 2007; Jongur & Kabutu, 2009) and
j. Lack of effective classroom communication.

The simple and most clear evidence of the problems of Science and Technology Education is seen in the poor performance of

students in Examinations at all levels of education. For example: West African Examination Council (WAEC) performance of candidates in Chemistry from 2014 - 2019 in Nigeria shown in Table I and Figure III below:

Table I: WAEC 2014 – 2019 SSCE Chemistry Results

Year	A1 – C6 %	D7 – E8 %	% Pass	% Fail
2014	42.25	19.11	61.36	38.64
2015	34.35	23.31	57.66	42.34
2016	34.27	23.54	57.81	47.19
2017	25.20	15.80	41.00	59.00
2018	16.89	11.87	28.76	71.24
2019	18.02	11.99	22.01	77.99

Source: *WAEC 2014 - 2019*

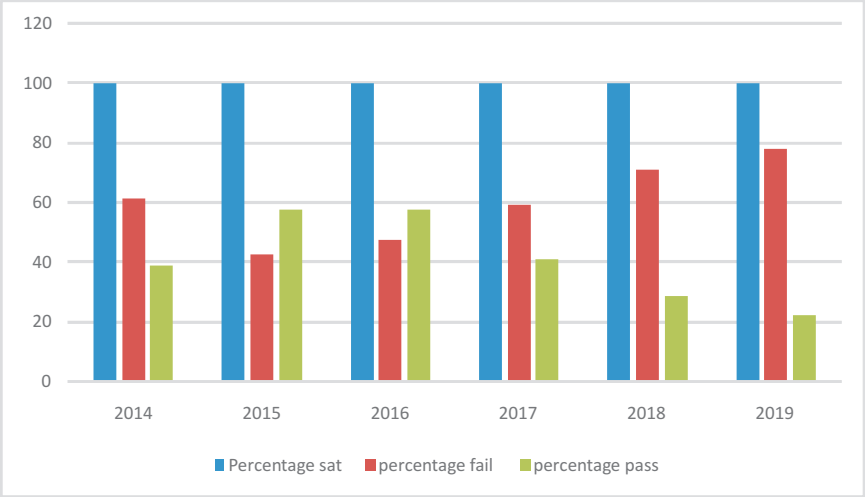

Fig. III: WAEC 2014 – 2019 SSCE Chemistry Results Bar chart showing Percentage pass.

All these problems affecting Science and Technology education in Nigeria are not encouraging and could be responsible for the slow pace of development in almost all the sectors of the Nigerian

economy. This is because, historically, science has had a much greater influence on recent world history than any other single factor. For example:

1. Science was influential in the origins of the industrial revolution and its subsequent development. It fosters large scale manufacturing industries.

2. Science fostered the idea of progress and of peoples' potential ability to control both nature and their destiny. It influenced political revolutions of America in 1776 with its declaration of independence, the French in 1789 with its famous slogan of liberty, equality and fraternity and Russia in 1917 which has probably influenced the political systems of several countries of the world before its balkanization in 1991.

3. Science has had an enormous influence on man's idea of his place in the universe and of his relationship to other forms of life (John, 1983).

Therefore, for Science and Technology education to have greater influence and contribute greatly to the Nigerian national economic prosperity, individual citizens must be empowered through **functional liberating education** to develop competencies, skills and knowledge capacity to be resourceful. i.e liberation from: Colonial mentality, the bondage of a stagnant behaviorists' education system and inferiority complex of cultural heritage. To achieve these requires that, most, if not all of the problems of Science and Technology education in Nigeria must be effectively tackled and the attendant challenges must also be surmounted.

In my view, to address some of the problems of Science and Technology education identified by science educators in Nigeria there is the need to first and foremost re-direct the National

Policy on Education to adequately address the needs and aspirations of Nigerian Society from the multicultural dimensions of Nigeria. This is because in the views of Ardo and Junaid (1990) in Ardo (2004):

> It is beyond any contestations that the ethnic groups in Nigeria are neither homogenous nor claim to any cultural institution that is common to all of them. It is important to critically disagree with the notion of improving education, without talking about the political economy of the existence of people particularly their culture. It makes the whole talk untenable. This is so, because, education cannot be improved when there are cultural barriers, fetters or impediments. You cannot improve education if your culture is not receptive to it. Education thrives where it is in harmony with people's culture, this must be so, because education is necessarily value laden. That is, to say, the vitality of education is always created and sustained by culture.

Therefore, in the context of the submission above, the relevance of Science and Technology education as the driving force for development is equally culturally value-driven. Hitherto! Nigerian leaders should realize that the development of the country is tied to the development of an education system that embeds the cultural antecedents of Nigeria. This is equally possible when the National Policy on Education (NPE) reflects the multicultural dimensions of Nigeria.

9.0 NATIONAL POLICY ON EDUCATION: THE LANGUAGE OF INSTRUCTION POLICY AS A CULTURAL ABERRATION

It has been earlier mentioned that the inadequacies of the National Policy on Education (NPE) to address the needs and aspirations of Nigerian people from the multicultural

dimensions of Nigeria is one of the major problems of Nigeria and its education system. There is no doubt about the fact that Nigeria is a multicultural nation. However, Multiculturalism has been used in many different ways. On one hand, it has been used to mean cultural diversity while on the other hand it signifies the rights of different ethnic groups to respect, recognition, positive endorsement and the celebration of cultural diversity to the benefits of the larger society. Others see multiculturalism as the coexistence of many cultures in a society (Cyril, 2019).

In the context of multiculturalism, Nigeria has Five Hundred and Twenty One (521) languages (UNESCO, 2014) each of which are a means of communication and an easy means of identifying the different cultures or cultural diversity in Nigeria. Out of these languages, three languages have been predominantly identified in three regions of Nigeria. These languages include: Hausa, Yoruba and Igbo.

What is Language?

The most cogent form of symbol and central feature of human culture is language. It is the most powerful means of communication between human being. It is a system of communication that consists of sets of sounds and written symbols used by people of a particular country or region for talking or writing (Collins, 2019).

Also, language is a sign system that fulfills the cognitive and communicative functions in the entire process of human activity. The word cognitive refers to the process of acquiring knowledge through **reasoning, intuition or perception** (Tabitha, Alice & Elizabeth, 2012). In this context, without language human being will not have the ability to communicate. Bruner, a psycholinguistic, suggests that the school is a very important determiner of the use of language to facilitate the growth of the process of acquiring knowledge (Brown, 2000). These are the

reasons for language becoming a critically important factor in the process of schooling and why it is central in instruction in educational policies of global societies.

The National Policy on Education (NPE) introduced in Nigeria and first published in 1977 underwent series of reviews up to the current Sixth Edition, first printed in 2013 and reprinted in 2014 (NPE, 2014). The NPE contained Nigeria's philosophy of education which is based on some beliefs of the people from the diverse cultures of Nigeria among which include, the belief that, education is to be qualitative, comprehensive, functional and relevant to the needs of the society. When fully realized, it is hoped that this belief will lead to the achievement of the five main national goals and the goals of education in Nigeria. Such educational goals include, the "total integration of the individual into the immediate community, the Nigerian Society and the world." While one of the specific goals of education in Nigeria is to ensure periodic review, effectiveness and relevance of the curriculum at all levels to meet the needs of society and world of work (NPE, 2014).

However, to achieve both the national goals, general and specific goals of education "every child shall be taught in the **mother tongue or language of the immediate community (L1)** for the first four years of basic education" (NPE, 2014). The structure of basic education in Nigeria is: A. 1 Year of Pre-Primary. B. 6 Years of Primary and C. 3 Years of Junior Secondary education. This language policy also covered the Early Child Care Development and Education (ECCDE) given to children from age 0 – 4 Years in a crèche or Nursery school. This means that, language of communication in the process of education is key to achieving all the sets goals. This is with the belief that "education is an instrument for national development and social change" (NPE, 2014).

It is acknowledged here that, this policy provision at this level is necessary and adequate because education flourishes where there are no cultural barriers, fetters and impediments. This provision is relevant to the communication needs and consequently, the development needs of each culture in Nigeria. Nevertheless, the implementation of the policy provision has been beclouded by the feeling and fact that, English language has been recognized as the official language of communication. This recognition given to English language by the elite grossly affected the implementation of the policy provision for the production of textbooks, supplementary readers and other instructional materials in Nigerian languages in various subject areas at these levels. So, one sees teachers trained in English language as teachers of pupils at these levels. The teachers teach students using mix languages – Hausa and English, Yoruba and English; and Igbo and English languages (see - Special Report of the International Center for Investigative Reporting 3rd February, 2018). This is indeed a cultural aberration. So, what do you expect?

As if this is not enough, still, within the framework of the basic education system, the NPE, made provisions for Primary classes; that **"from the fourth year, English language shall progressively be used as a medium of instruction and the language of immediate environment, French and Arabic shall be taught as subjects."** This provision of English language as a medium of instruction not only covered the primary 4 – 6 but consequently, all other subsequent levels of education in Nigeria – the post basic and tertiary education levels. This is an **antithesis to the cultural antecedent of Nigeria** and consequently, a cultural aberration that is retarding the process of development in Nigeria. For instance: The transition from the use of **mother-tongue (L1)** to the progressive use of **English language (L2)** creates the following problems for learners at all

the levels of education in Nigeria:

> Learners find learning of English language difficult because of the sudden break from the familiar language (mother – tongue) to the non – familiar one as a result of phonetics (mispronunciation), syntactic (grammatical), morphological and semantic errors. These create confusion for students and make them to learn basic grammar for the purpose of passing tests and examinations and not for real life situations (Kannan, 2009).

This led to the development of an alternative language called **Pidgin English language** in Nigeria.

10.0 ADVANTAGES OF MOTHER-TONGUE (L1) FOR SCIENCE INSTRUCTION IN NIGERIAN SCHOOLS

There have been several researches across the world that highlighted the advantages of L1 for science instruction across the globe such as Smits, *et. al.* (2018). In Nigeria, there have been several of them too such as Wushishi, Yusha'u & Hassan (2013b). Some of the advantages include:

1. Improving access to education. 2. Improving reading and learning outcome. 3. Facilitation of learning a second or foreign language. 4. Improving internal educational efficiency. 5. Improving learners' self-concept and identity. 6. Supporting local culture and parental involvement.

Improving Access to Education: The students who understand the language of instruction are more likely to enroll in school at school-age and also attend school regularly. These students are less likely to drop out than those who receive instruction in a foreign language. Researchers involving 22 developing countries and 160 languages confirmed this (Smits, *et. al.* 2018).

Improving Reading and Learning – Outcome: Research

reports on language and literacy concluded that becoming literate and FLUENT in one's first language is critical for overall language and cognitive development as well as academic achievement (Ball, 2010). This was equally so in countries such as Cameroon, India, Mali, the Philippines, South Africa and Vietnam (Chuo & Walter, 2011).

Facilitation of Learning a Second or Foreign Language (L2): The mastering of a first language and core learning concepts promotes general cognitive development that is required to easily and rapidly learn a second language. This is because language and reading are closely related; ability to read in one's first language facilitates reading in the second language. This is for the fact that, many key skills related to reading are transferable from ones first language to another. This is facilitated by formal consistent and robust instruction in the L2.

Improving Internal Educational Efficiency: Internal educational efficiency is improved through increased efficiency resulting from fewer students repeating a class, dropping out of school or failing to learn. Also, mother-tongue instruction or education is more cost effective than education in foreign language models. This is because it reduces costs of education budgets. This was reported by World Bank in Mali and some other countries of the world (Bender et. al. 2005 and Alidou *et. al*, 2006).

Improving Learners' Self- Concept and Identity: Learning through the mother-tongue validates and reinforces students' home culture and traditional knowledge. Students become more aware of their potentials, are more confident and motivated; and possess strong sense of their identity. Such students usually achieve better in schools and life than children who are forced to learn in an unknown and strange language (Ball, 2010).

Supporting Local Culture and Parental Involvement: The use of mother tongue for instruction validates local culture and knowledge i.e. it makes them has value, recognition and respect. This creates a bridge between the formal school system and students home and community environment. Thus, in turn, facilitates parental involvement and also strengthens community support for education, since, language is not a barrier to participation in children's schooling.

11.0 HISTORY OF MOTHER-TONGUE (L1) USAGE IN NIGERIA

Literature on mother tongue usage in Nigeria is voluminous beginning from 1843 at Badagry in the first school in Nigeria called **"School for the Infant Child"** and later in 1865 when the Christian Missionary Society (CMS) established a school at Lokoja and taught in Hausa and Nupe languages. From then, several researches and theoretical papers have been published on the importance of using Nigeria's indigenous languages for instruction.

There have been contributions from the Nigerian media and international efforts by UNICEF to popularize its adoption by different countries since 1953 but it was to no avail in Nigeria. This is despite physical evidence that all developed countries of the world achieve their feet with indigenous languages as medium of instruction in their schools. Unfortunately, some Nigerian elites who study abroad have to learn the language of instruction of their hosts' countries before they are able to study in those countries. Today, some of those developed countries are the ones assisting to preserve our languages through different media outlets and investing massive finances in that regard such as Voice of America, BBC, Radio France International, Deutche Welle, Iran, Turkey, China and Japan in Hausa, Yoruba and Igbo broadcast on Radio and Televisions. The inability to implement and foster mother-tongue based languages of instructions in

Nigeria is not far from the politicization of the language of instruction matter.

12.0 THE POLITICS OF L1 – L2 IN NIGERIA

Teaching in mother-tongue (L1) was first experimented in the first school in Nigeria which was established at Badagry in 1843 (Bamgbose, 1976). Thereafter, the CMS School in Lokoja used Hausa and Nupe beginning from 1865 as earlier mentioned. However, France and Britain suggested the use of local languages in primary schools from 1920s. This was not effectively implemented because the aim of colonial education was an instrument to serve the European capitalists class in its exploitation of Africa (Rodney, 1986). This trend continued in form of neo-colonialism, imperialism and globalization in this 21st century. So, the controversy over mother tongue usage in science instruction is not only educational but also political.

Nigeria is a multilingual nation with more than 521 languages. This creates language problems (Okafor, 2003). Those in favour of the mother tongue language policy in the NPE across all levels of education in Nigeria are always quick at citing empirical evidences about the effectiveness of mother tongue in teaching Science, Technology and Mathematics (STM) (Bambgose, 1976). Countries such as those in Europe, North America and China, Malaysia, India, Iran, Iraq, Sri Lanka, Japan and Korea are where activities such as commerce and education are conducted in mother-tongue (Redbord & Sachetti, 2004).

In Africa: Egypt, Algeria, Libya and other countries in the North adopted Arabic as a language of instruction even though there are different dialects and are also former colonies of colonial powers. Also, the multilingual nation of Somalia developed the Somali language to replace Italian and English languages. It is today used as a medium of instruction up to the secondary school

since 1970s. In Tanzania, the Kiswahili language was developed and made the language of instruction (Awoniyi, 1976).

The opponents of mother tongue usage are always quick to posit that learning in the mother tongue cannot expose the child to the ideals and cultures of other ethnic groups or other world civilizations. That, English language has made inter-ethnic communications easy and has facilitated contact between peoples of diverse language backgrounds. It was argued that, English language fills a huge communication gap. It is the official language of Nigeria, the language of documentation (Ndukwe, 2003).

The anti-mother-tongue usage also argued that Nigerians will resist any single language selected to replace English language since it will be foreign to them and, therefore, has to be learned afresh (Amao, 2001). Orode (2004) asked about what would be done to the speakers of hundreds of the other languages that would be left out.

The political debate is still raging. “The Minister of Education, Alhaji Adamu Adamu, recently expressed worry at the level of illiteracy in the country. This was during his visit to Kebbi State. He was surprised to see that those children he classified as illiterate can possibly be fluent in Arabic and Hausa, for instance. Why insist on teaching them in English?

In Nigeria, anyone who cannot speak English is an illiterate. “It is a known fact that over 95 percent of Nigerian children do not speak English at home and they never hear English outside the school so they don't have the comprehension. And yet English is the medium of assessing their educational attainment. Is it then a surprise that they do not perform well in public examinations? Poor and bad performance by learners who use a foreign official

language in a multilingual situation could very well be partly a result of language inadequacies arising from total or near total marginalization of their mother tongues" (Leadership Newspaper, 2017).

Consequently, upon the raging debate on mother tongue medium of instruction in Nigerian schools and in order to contribute my quota in solving the problem of lack of effective communication in the classroom between the teacher and learners of science. I have added literature to the on-going debate through different researches.

13.0 MY CONTRIBUTIONS IN SCIENCE EDUCATION

My first journal publication and contribution to knowledge in science education started in the year 2000 before I joined the University as a lecturer in 2004. So far, I have contributed to the development of knowledge in science education through Sixty-Five journal publications and many conference proceedings within and outside Nigeria. Thirty-Six (36) of the journal publications were research articles while Twenty-Nine (29) of them were theoretical/position papers. They bothered on perception, Attitude, Achievement/performance, Ability, Policy and language of instruction issues. Wushishi, (2007a, 2007b & 2010a, 2010b) and Wushishi, *et al*. (2013), Wushishi, *et al*. (2013) and Wushishi, *et al*. (2016).

I discovered that, the language of instruction policy adopted in Nigeria, which is English language, is affecting the process of education negatively in all the areas researched above. This is because in most of the researches carried out, they were done to seek ways of improving these areas positively in order to enhance the process of teaching and learning. Alas, it was observed that, the influence of English language in the process of knowledge acquisition in Nigeria is not sufficiently enhancing

and nurturing educational development as a result of the importance of language influence on educational variables for knowledge acquisition. Figure IV below shows the influence of language on educational variables.

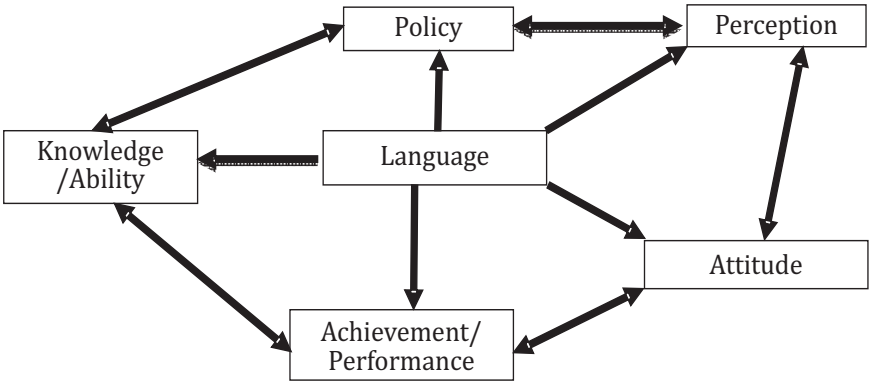

Figure IV: Shows language influence on Educational variables from all directions

So, my contributions in the area of language of instruction called mother-tongue (L1) but referred to as **"the Teachers' Language** "in this lecture is as follows:

1. Effects of Computer Assisted Instruction in Nupe language on pupils Achievement in Mathematics in Bida Local Government Area of Niger State. We found that pupils taught Mathematics with the use of Computer Assisted Instruction in Nupe language performed better than those taught using lecture method in English language (Wushishi, Yusha'u & Hassan, 2013).

2. Effects of Hausa language of instruction on secondary school Biology Academic performance in Sokoto State, Nigeria. It was found that the students that were taught Biology in Hausa language performed better than those taught in English language

(Wushishi, Abdulrahman & Oluranti, 2016).

3. Effects of Computer-Assisted Instruction in Yoruba Language on Junior Secondary School Students' Achievement and Retention in Mathematics in Lokoja, Kogi State, Nigeria. It was found that those taught mathematics in Yoruba language performed better than those taught in English Language (Wushishi & Olorunnishola, 2016).

4. Analysis of the Role of English language on Science Students' Failure in Senior Secondary School Certificate Examinations (SSCE) in Minna Metropolis, Niger State, Nigeria. It was found that:

(a) English language is a factor for Science Students failure in SSCE.

(b) Science teachers do not prefer teaching in native language. This is as a result of lack of orientation to do so in native language.

(c) Science students preferred to be taught Science subjects in the local (native) language than in English language for effective learning. This is as a result of lack of understanding of the English language (Wushishi, Gimba & Abdulkadir, 2016).

5. Effects of Developed Web-based Instructional Package in Hausa Language on Academic Achievement of Upper Basic Students in Geometry in Niger State. We found that those students taught Geometry with the web-based instructional package developed in Hausa language at the upper Basic level performed better than those taught with lecture method in English language. This is the global contribution of Federal University of Technology, Minna to the development of Nigerian language for classroom instruction. You can learn geometry on the internet using this web address:

http://www.bashiwushifutmin-lissafi.com (Usman, Wushishi, Gambari & Olayinka, 2017).

14.0 RECOMMENDATIONS

The following recommendations have been offered:

1. There is the need for Nigeria to adopt the **"Teachers' Language"** as a medium of instruction across all levels of education. A professor of Chemistry presented his inaugural lecture on this podium and dedicated it to his parents by saying: **"To my parents – My MOTHER, for being my first teacher on earth..."** little did he know that he was making a fundamental statement in education. It is this **Teacher – the Mother** who's language otherwise called **- Teachers' Language** in this lecture **is** regarded as the most suitable for instruction in schools. Nigeria can adopt the Chinese model in this regard, across each of the six geo-political zones.

2. There should be a comprehensive Nigerian language policy for instruction in schools across all the levels of education in Nigeria.

3. Science curricular materials should be massively produced in Nigerian languages and teachers across the six geo-political zones should be trained in the major languages of each of the zones for proper implementation of the policy across all levels of schooling.

4. There should be a paradigm shift from a curriculum model that is objective in nature which is currently in practice to a curriculum model that will nurture a **liberating education for Nigeria.**

Liberating education is an education that fosters the students' ability to differentiate between what is true and what is false. This involves many different analytical schemes. Such as: scientific, artistic, humanistic, quantitative and qualitative

schemes. It assists students to understand that to measure something indicates it is valued, but that, it is not everything of value that can be measured.

A liberating education has several attributes / characteristics. From a liberating education students gain confidence that is needed to take initiative, solve problems, and formulate ideas. They also develop skills in language, learning and leadership. They learn about domestic and foreign cultures, history, mathematics, science and technology. This broad approach emphasizes reasoning in different modes and directions, clear and good expression in written, oral and visual communication, organizational ability, tolerance and flexibility, creativity and sensitivity to the concerns of others, and to ethical and aesthetic values.

It aspires to teach students to be cultured people; to develop in students the capacity to check assumptions and to understand the value-laden choices that await them as consumers, decision-makers, and arbiters of ethical choices at home, at work, and at the ballot box; to help students understand and build a civilization compatible with the nature and aspirations of human beings and the limitations of the cultural environment. These ideals are not exclusive to any department or school, but rather they inform the entire curriculum. So, to achieve a liberating education requires that a liberating curriculum be designed.

A liberating curriculum is a preparation for living, for wondering why. Its purpose is not just to teach one how to earn a living, but also how to live. It draws upon all of the talents and abilities of each student to make him or her more fully human. It connects students with the traditions that provide the foundation for the social and political world, while at the same time preparing them to deliberate wisely and make decisions

that further these traditions – the student culture.

A liberating curriculum, moreover, is also one, that transforms the inner constitution of a person's character so that he/she can lead a life full of reason, reflection, deliberation, and above all happiness. It offers instruction and experience in both technique and vision – which is the ultimate combination in education. Such curriculum does not just happen, but, it must be intentionally designed. It is a means, and its ends and purposes must be considered as part of the basic design. So, simplicity must be foremost, humane value must transcend technological values, and democratic values must also overcome the desire for exclusion.

15.0 CONCLUSION

The conclusion of this inaugural lecture signifies the fundamental importance of the CREST of Federal University of Technology, Minna (FUTMIN) to Nigerian culture.

THE UNIVERSITY CREST

The Crest is a symbol designed to project and serve as an instant means of identification and authority of the University. The Crest was designed by Prof. Jimoh Akolo of the Institute of Education, Ahmadu Bello University, Zaria in February, 1983. The crest signifies Nigerian culture and the wheel in the crest represents

technology. Therefore, the institution's crest reflects technology within the Nigerian culture. This was how Professor Akolo described the FUTMINNA crest (FUTMIN, Brochure 2011-2015). So, in the context of the crest, our entire Science and Technology education processes should be a derivative of the Nigerian culture. The fundamental symbol of any culture is **"Language of Communication" and by implication, adopting the teachers' language in Nigeria as a means of instruction at all the levels of schooling will be the most effective for national development.** This is one way Nigeria could achieve a liberating education and consequently real technology for real empowerment.

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However, to my first Qur'anic teacher – Malam Kawu Babba and schoolmates who didn't have the opportunity for formal education, I remain grateful particularly Malam Madu Turji and Mohammed Ndazan. I am grateful to my primary school mates between 1973 and 1979 and all my primary school teachers particularly Late Malama Ayashe, Malam Isah Kitabu my primary one and two teachers; and Malam Abubakar Muye our primary seven (7) teacher respectively. The second set of school mates are my secondary school mates at Government Science College, Izom between 1979 and 1984. And all my teachers particularly my Chemistry teacher and Chemistry mentor Late Mr. Mireku from Ghana, who retired and lived in Izom town and died on the 18th of June, 2020 after a protracted sickness.

To Sharif Yusuf Mohammad Jigawa National Chairman of First Aid Group of Ahli Tawassaliyya Association of Nigeria

(FAGATAN), I say to you, thank you for all the concern. I also acknowledge all my friends, both male and female whose names are too numerous to mention here. Thank you for the good companionship.

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Allah has given me very delightful families, my wife – Halima Ibrahim who was incidentally my undergraduate student at UDUSOK. She gave birth to seven children for now (Abdullahi, Habibullahi, Aminatullahi, the Queen of the house – late Nana Firdausi who passed away on the 9th of January, 2020; Fatima, Mohammad Nafsuz – Zakiyya and Umar; you provided me with all the comfort that is seeing me through all the good, the bad and the ugly sides of life. Thank you for being there at all the times of my needs.

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BRIEF PROFILE OF THE INAUGURAL LECTURER

Prof. WUSHISHI, Dantani Ibrahim is a professor of Science Education, specialized in the area of Chemistry Education. I was born and brought up in Wushishi town, the headquarters of Wushishi Local Government Area of Niger State and attended Central Primary School, Wushishi; Government Secondary School, Izom and Niger State College of Education, Minna. I obtained Doctor of Philosophy (PhD), Master of Education (M.Ed) and Bachelor of Science (B.Sc Ed) degrees in Science Education from the Usmanu Danfodiyo University, Sokoto in the years 2005, 2001 and 1998 respectively. These are in addition to the Nigeria Certificate in Education (N.C.E.) in Chemistry/Physics earned in the year 1987 from Ahmadu Bello University, Zaria.

My teaching career spans over three decades out of which I have spent close to two decades in the University system for now. Through my experiences in the University system to date, I have supervised Ten (10) PhD theses, Fifty (50) Master degree dissertations and several Postgraduate Diploma and Undergraduate projects. I have close to Seventy (70) published articles in International, National and Local reputable journals across the globe. I have also attended International, National and Local conferences and workshops across the world with articles appearing in proceedings.

I have held several academic administrative positions in Usmanu Danfodiyo University, Sokoto and Federal University of Technology, Minna. In this regard, I have served in over thirty (30) University committees and boards as either member or

chairman. I was Head of Department, Sub-Dean of former School of Science Education, External Examiner to University of South Africa, Pretoria. I participated in many National assignments as assigned by institutions such as National Examinations Council (NECO) and the National Universities Commission (NUC). I have been given over Ten (10) awards and certificates of recognitions for academic excellence by reputable institutions in Nigeria, including the National Universities Commission.

I belong to several reputable professional organizations such as the Science Teachers Association of Nigeria (STAN) the Teachers Registration Council of Nigeria (TRCN), and Honorary Rosalind Member of London Journals Press, United Kingdom.

Nevertheless, through my professional career, I have been involved severally in Curriculum Content Developments in Science Education, Environmental Education and Computer Education. My research interests/areas include: Curriculum issues, Language of Instruction (Mother Tongue), Environmental Education and Computer Education.

I currently lived and work with Federal University of Technology in Minna, the Niger State Capital. I have been married with children.

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