

INDIGENOUS LANGUAGES AND TECHNO-SCIENTIFIC DEVELOPMENT IN AFRICA: A CASE FOR PRAGMATIC APPROXIMATION

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Abstract

The quest for techno-scientific development in Africa has been the concern of scholars of diverse origins and disciplines; theories have been pontificated and papers of diverse colours (white, blue, etc.) have also been published; yet the situation remains the same. Our focus in this work is to explore how an often neglected cultural element, language, could be developed, scientificized and used effectively with dominant European languages in the African polity such as English and French in achieving the seemingly herculean task of techno-scientific development. Firstly, we examined the present fate of indigenous African Languages used; next, we analysed various researches conducted in education, communication and psychology on the role of indigenous languages in knowledge acquisition, enhancing cognitive understanding and removing pedagogical barriers in learning. We also evaluated the precarious state of indigenous languages in African states' educational language policies. In conclusion, we suggested how best to achieve an African Languages Scientific Manual using what we called the Pragmatic Approximation.

Keywords: Indigenous languages, Science, Technology, Bilingualism, Africa.

.... No country has ascended a first rank technologically and economic power by excessive dependence on foreign languages. Japan rose to dazzling industrial heights by scientificating the Japanese language and making it the medium of its own industrialization.... Can Africa ever take-off technologically if it remains so overwhelmingly dependent on European languages for discourse on advance learning? Can Africa look to the future if it is not adequately sensitive to the cultural past? Mazrui & Mazrui (2002)

Introduction: the quest for development in Africa

Development, despite years of discourse on the subject, remains largely a buzzword, because its meaning is still elusive, vague and depends on how it is used. However, over the years, it has been tied to any issue focused on how to create a better standard of living (Rist 2007: 485) and makes living fulfilling. And whenever a condition becomes undesirable with the possibility of a better option, then 'development' becomes the ready toast of all. Hence, the present condition of Africa in the comity of continents, when there is the possibility of 'better Africa', has been a source of worry and subject of talks for decades now. Indeed, the state of development in Africa today is such that there is hardly any African (and even non-Africans) who does not crave for a better Africa - an Africa that will be free of the 'third world' genre, an Africa that will not be a dumping ground for sub-standard goods and whose citizens will not be guinea pigs for testing new scientific products and above all, an Africa where there will not be dearth of all that make humans truly human. But then, wishes are not horses, there is the need to match desire with action; this has been the bane of African development.

African leaders have been found wanting in the area of 'matching desire with action'; they have organized and participated in talk-shops (summits, conferences, workshops, etc) where blue and white prints on development have been discussed, yet

there has been no, or very little, result to show in terms of economic, social, cultural and techno-scientific development. Today, like decades ago, many African leaders are still dying in Western hospitals because their national hospitals remain unequipped. Today, although Africa is rich in natural resources, Africans still pay through their nose to import products, such as crude oil produced from other continents. One can go on and on, with the list of this “desire not matched with action’ situations but then, solution rather than belaboring the obvious is far more desired.

The approach suggested in this work is the ‘no country is an island approach’; learning stops at the point of death. Developmental ideas can be shared and then innovation can be supported for the sake of new breakthroughs which will be invaluable for better living. But then, innovation cannot take place in a void, three issues are involved:

- a. application of human knowledge acquired in form of skills, pure theoretical knowledge and techniques
- b. maneuvering of human activities (the uncommon way of doing things); and
- c. finding solution to problems, and creating situation that will make life and living better (Ademowo 2011: 28)

The above outlined issues necessarily follow one from the other. Hence, since there is an existing wide techno-scientific developmental gap, between the West and Africa, Africans need to understand ‘what is’, although they (Africans) could claim that technology started from their domain (‘what was’). To have a grasp of ‘what is’ means they need to understand the present theories and patterns of inventions. And there lies the crux of the lacuna identified (in this work): Africans are not getting the theories right because they do not understand the theories. The ‘so-called language of science in many African countries is colonial, foreign languages such as English, French, Portuguese, etc. The mother tongue despite its proven ability in enhancing cognitive understanding is not prioritized in learning.

Japan is a good example of a country that has realized this indubitable fact. It developed its indigenous language to accommodate techno-scientific terms and this has

resulted in techno-scientific breakthroughs even in the rural areas. Today, less than five decades after adopting and scientificating Japanese language, Japan is one of the world leaders in science and technology. The question is: what can Africa, nay African leaders, learn from this?

Language, knowledge and knowledge acquisition

Language is central to the sustenance of a group of people for it is the vehicle through which other constituents of cultures are communicated. In fact, it is the primary vehicle through which human culture is acquired, shared and transmitted (Hammond 1975: 398). One can then only imagine a society without language. Hence, Richard Schaefer (2000: 52) sees language as the foundation of every culture. To him, it is “an abstract system of word, meaning and symbols for all aspects of culture which includes speech, written characters, numerals, symbols, and gestures and expressions of non-verbal communication”. Language is therefore ‘central to the interactive process’ (Bewaji 2002: 271). Lughram (1975:62) identified four ways by which language is used in the society, namely, as a means of expression, for the purposes of record, to set matter in motion and as an instrument of thinking. Based on these functions that it performs, some scholars are of the view that language, a means of communication, is as vital to human socialization and existence just as blood is vital to the human body. In fact, to them, we will not be wrong if we describe culture as inconceivable outside of language for it is with it that such non-material aspects of cultures, which give identity to a group, such as folklore, proverbs, etc are conceived, shared and transmitted. This explains why languages are “sometimes regarded as a reservoir of culture which controls human thought and behaviour and sets the boundaries of the worldview of its users” (Alamin 2001:84). Language is also so important to the growth and sociability of a people that it is among the very first forms of behaviour that we learn as children, and later when we learn other skills and acquire more knowledge, much of this reaches us only through the medium of language (Burling 1970: 124).

Knowledge, on the other hand, can be described as ‘what is known’. It is the preoccupation of the branch of philosophy called epistemology. This branch of

philosophy deals with the source, extent and limit of “what we claim to know”. Knowledge, according to Baldwin (1960: 603), can be defined in three ways:

1. Knowledge as the cognitive aspect of consciousness in general; where to know means to perceive or apprehend or to understand or comprehend.
2. Knowledge is also used in contrast to mere opinion sometimes called belief. This application it signifies certitude based on adequate grounds. There may be belief or subjective certitude without objective foundation
3. Knowledge is further used for what is ‘known’ as such. Thus we speak of Chemistry as a body of knowledge. Knowledge is used as a synonym for cognition and also to specify cognition. That is the cognition that satisfies three conditions which are (1) Truth (2) self-satisfying and indubitability (3) Logical impossibility.

The three definitions above form the fulcrum of the entire epistemological discourses. The first is on the evaluation of how we, humans, come to *comprehend* or come to know; the second concerns the identification or difference between knowledge and *opinion* or *belief* and the third deals with the body of knowledge, principally on how knowledge is acquired and the extent of their validity vis-a-vis their method of acquisition of knowledge in the fields or endeavours designated as body of knowledge.

In all the cases discussed, language is vital in communicating what we acquire or conceive to be knowledged. For even when we perceive, or become conscious of an object, or conceive an idea, it is only when we have the linguistic capability that we can communicate what ‘we claim to know’. Communicating what is known, para-linguistically, also require the learning of language of signs. Also, our beliefs which sometimes constitute our identity as well as our value system, are so vital to our existence that not having a structured language with “its semantic, syntactic, phonetic, morphemic and semiotic dimensions (Ozumba 2004: 18)” can mar its existence, continuity and even its meaningfulness.

Today, half of global languages have assumed the term 'indigenous languages' because they are fast moving towards extinction. Half of these threatened languages are African languages. Similar lot is likewise befalling 'indigenous' languages of the 'native' Americans. Krauss (1998:5) raised this alarm in one of his works when he informed that "of 175 languages to what is now the United States of America, only 20 are being naturally acquired by children". It will not be out of place if we make an abstraction that when a language disappears, a medium or vehicle of communicating a culture is gone! So, with what will other elements of the culture be adequately communicated? What becomes of the identity of the people, their proverbs, songs and folklores that teach morals, among others? That will be a colossal loss, not only for the affected people but the entire world for a conveyor of knowledge with all its attended machineries of making meaningfulness and meanings of life realities would have been lost. Anyone that appreciates the extent of this colossal loss ought to be appreciative of the efforts, and commitments, of the United Nations Scientific and Cultural Organisation, UNESCO, to promote the sustenance of all mother tongues of the world. The need for this concern is further underscored by the fact that the presently so-called foreign, dominating, languages of today, might become threatened by extinction tomorrow, like the once widely used Latin language, if care is not taken.

In as much as we are quite concerned about the sustenance of mother tongues for the purpose of protecting cultures, with all its constituents, and identity, we are as much more concerned in this work with its effect on knowledge acquisition: its roles in acquisition of knowledge and how this can promote better understanding. Most importantly because we are aware that despite the growing population of speakers of foreign languages, majority of the rural dwellers in countries where foreign languages dominate are still holding, where it has not been totally shrouded in obscurity in the name of modernity, on to their mother tongues. Either taken as 'Lingua Franca' or 'Official' language, we are also concerned that despite realizing the inadequacies of the foreign languages, as glaring in the usages of the indigenous languages during political campaigns and when seeking the support of the locals who are the majority, most African leaders have not deemed it fit to promote the indigenous African languages or, at worst adopted similar mother tongues, for the sake of pursuing and institutionalizing

development within their domains. One question that is likely to surface due to our allegation of neglect against African leaders, nay policy makers, is: are there studies or researches undertaken to substantiate the role of indigenous languages have in knowledge acquisition?

Of course there are and indeed, indigenous languages do have a role. Research results in the fields of education, linguistics, anthropology and cognitive psychology are unequivocal on this: students who enter school with a primary language other than the national or dominant language perform significantly better on academic tasks when they receive consistent and cumulative academic support in the native heritage language (McCarty, 2003:45). When used for instructional purpose, as research results have shown, many scholars have contended that it is capable of enhancing cognitive understanding and removing pedagogical barrier in learning. Let us examine four of such researches, namely, *The Native American Language Research, The University of Bradford Research, The Ife Six-Year Primary Project* and the *Swahili Research*.

We can start with the research conducted by Ramirez in 1998 which shows that of 12,000 students in the San Francisco Unified School District, students who received instructional support in their native language for five years before being transitioned to all-English classes outperformed students in all-English classrooms on the Comprehensive Test of Basic Skills (Ramirez 1998:1). Further, it was also found out that students in long-term or late-exit bilingual education realized a higher overall grade point average and had the highest attendance rates, 'always exceeding the district average'. Here the incredible performance can be explained in terms of the ease with which the students blend the language used with their thought that is firstly in their mother tongue. On attendance, the lack of restriction on when and where the language, which they are at home with, can be spoken cum the similarity between home and school in terms of the language use around them was also found to have resulted in high attendance.

Similar to the above is the research conducted by Thomas and Collier (1997). The research, adjudged as the most extensive longitudinal study of language minority student achievement (1982-1996), found out that for 700,000 students representing 15 languages in five participating school systems, 'the most powerful predictor of academic success'

was schooling for at least four to seven years in the native heritage language. What is important to note about the Thomas and Collier study is that the findings held true for children who entered school with no English background, children raised bilingually from birth, as well as 'children dominant in English who were losing their heritage language. Another research akin to this was reported by Holm & Holm (1995) on the use of Navajo in teaching subjects such as Mathematics, both in Navajo and English, which also recorded excellent result.

Research result on the use of Punjabi in teaching the native Indians in Great Britain conducted by researchers at The Bradford University in 1978 also discovered that the control group which combined the use of Punjabi and English performed better in term of marks scored than the other group of the same origin with which English language was the sole medium of instruction (Klein, 1994). The better performance of students when taught in their mother tongue, most especially in Mathematics, was also confirmed by the result reported by the Ife Six-Year Project (Afolayan, 1976 and Bewaji 2002) in which the use of Yoruba, the mother tongue of the pupils enable them to perform better in 'Isiro' the Yoruba equivalent of 'Mathematics'. The use of Yoruba, it was observed, enables better understanding of mathematical terms such as unit (eyo), tens (idi), etc, which helped the students to excel. Apart from their above average performance in 'Isiro', the control group, those taught all the subjects, except English language, in Yoruba, likewise recorded better result than that of the uncontrolled group.

Although the above researches were primarily targeted at those in their first three - five years of school, the elementary and primary education, result from a research conducted among secondary school circle in Tanzania (Okombo et al in Salawu, 2002) has likewise underscored the superiority of teaching in Swahili rather than in English, the colonial master's language, for effective development of cognitive functions and for better understanding of the topics taught. Furthermore, the research shows that majority of the pupils do not have a better understanding of most of what they were taught in English, which was evidenced in their answers to questions asked for evaluation which are often vague and laden with all indices of lack of proper grasp of the subject, nay topic. Two reasons are adducible for these noticeable cognitive difficulties: lack of understanding of what is taught due to lack of mastery of the language, English; and

problem of communicating their thought even when they understood the question(s) posed. Invariably both are still based on 'mastery problem'. For it is only when a user has firm grasp of the vehicle of communication to be used that understanding will be easier and communication circle complete, with appropriate feedback. Otherwise the whole essence of communication becomes cumbersome and too sketchy for a second language speaker to understand.

What we have been able to show with the research results discussed thus far is that the use of mother tongue, or native heritage, is very important in knowledge acquisition. One, because it helps the pupils/students to be more relaxed, happier, have a better understanding of the subjects taught and therefore responds positively to the teachers' questions. Answering questions in a coherent, creative and correct way has the possibility of boosting the teachers' moral, as they would be gingered to want to do more to assist the pupils/students in learning. Secondly, the pupils are likely to be more motivated to attend school

The bilingual system, which the researches seem to root for, can be described as a method of teaching, or imparting knowledge for the sake of application and creative modification, that prescribed the use of two languages, one native or indigenous language and a 'foreign' or official language, as media of instruction. Their position is indicative of the fact that using the local languages, whether solely at first or combined contemporaneously with the foreign language, is the key to better understanding of the subjects, or the topics. It is therefore not surprising that all the researches discussed above underscored the same points that can be summarized thus:

1. That the mother tongue of the learner is the most effective language to be used in instruction;
2. That rapid transition from mother tongue to second language medium does not allow for satisfactory development of the students' linguistic and cognitive abilities; and
3. That bilingual {and multilingual as the case may be} program integrated into the regular curricular gives the best results (Salawu 2002: 45-58)

According to these scholars, to neglect the native heritage or indigenous languages, in favor of the foreign languages, which are in most cases second language to the learners, is to be courting confusion for the learners. To them, the monolingual system which sanctions the use of only 'foreign' language is not only defective and incapable of enhancing learning, by virtue of the cloudy messages that it sometimes communicates, but also capable of producing only certificated humans who are devoid of undertaking novel creative ventures that can engender meaningful contribution to the discipline of the subject taught. Jettisoning indigenous language in the name of literacy and 'westernization' seems therefore to be an uninformed action. In fact, such submission calls into question the idea of literacy widely held by most Africans who sees 'Literacy' simply as the ability to learn and speak in the 'foreign' languages. For it is nothing but an anomaly to narrow literacy only to the ability to write, read and speak foreign language(s).

The Indigenous Languages' Use and Educational Policies formulation in Africa

Indigenous languages are often neglected and inferioritized in most of African States in every use, the media (See Salawu 2006 and Anchimbe 2006) and educational policies to the benefit of the foreign 'colonial' languages. It is proper here to recognize the effort of the United Nations Scientific and Cultural Organisation (UNESCO), which organized an Intergovernmental Conference on Language Policies in Africa in Harare, Zimbabwe in 1997 (Mohochi, 2004). The product of that conference was a resolution tagged Harare Declaration on Language Policy in Africa which specifically challenged all African governments to review their National Language Policy in such a way that the indigenous languages will have more social, political and educational use in their polity. Without belaboring the obvious, the Harare Declaration like so many others before it, such as the African Languages Bureau, turns out to be a mere rhetoric, at best a shelvable product of a 'sponsored talkshop'. After the Harare Declaration, another conference was organized in 2000 in Asmara, Eritrea. The conference titled "Against All Odds: African Languages and Literature into the 21st Century" produces The Asmara Declaration, which provides a list of recommendations for the promotion of African languages and literature (Bamgbose 2003). Although many governments supported the Asmara

Declaration, very few of its recommendations have been implemented, just like those of former language related declarations (the Phelps-Stokes Report of 1922, Memorandum of Language in African School Education of 1943, UNESCO Report of 1953, etc).

The language policy in African countries, close to three decades after the last African state breathes fresh air of freedom (also known as 'independence') has fervently remain perpetually un-African. Bamgbose (1983) identified six types of barriers militating against effective education in West African languages, which is also true for other African languages:

- a. *socio-historical barriers* which are related with multiplicity of languages and the inherited colonial policies;
- b. *linguistic and pedagogic barriers* that cover necessary language planning activities as well as training and supply of teachers;
- c. *economic barriers* that relate to the "prohibitive cost" of the mother tongue language enterprise, a point which has already been taken up above;
- d. *theoretical barriers* arising from conflicting claims about the superiority of mother tongue language or foreign language policies in bilingual education;
- e. *attitudinal barriers* which could be either political or psychological/social; and
- f. *political attitudinal barrier* relates to the basic attitude of the state to language education, including the pretense to be proclaiming a policy in favor of mother tongue languages while doing nothing to implement the policy (Bamgbose 1983: 23).

Following from the last barrier, one can note today that there are three patterns of language policies in African states (Adegbija 1994:144): namely, amodal, unimodal and multimodal.

a. *Amodal Policy Pattern:* Most policies that follow this pattern are those that extol one foreign language and belittle the other languages, which are mostly indigenous languages. This is the practice in most French and Portuguese ex-colonies such as Senegal, Togo, Angola, Cameroon and Guinea Bissau. This policy is often a product of their colonial master's legacy that cannot often be changed overnight because these policies are often tied to 'juicy' programs, such as the French Assimilation Policy, by the

colonizers. Since it is an amodal system, the colonizer's language, e.g. French, becomes the only acceptable means of communication and that of instruction in social, political and education sphere of the people's life. Indigenous languages become private and inferior languages of the 'uncivilized' and that of the 'locals' in the society.

b. *The Unimodal Policy Pattern:* Here, the policy is weaved around a widely spoken indigenous language that is adopted either as national or official language while the other indigenous languages are allowed to function within their domain, serving other functions such as during political campaigns, public announcements, etc. The adoption of Kirundi in Burundi, Swahili in Tanzania and Somali in Somalia, are very good examples in this direction. Unlike the amodal system wherein the foreign language dominates the entire dealings within the polity, the unimodal policy allows for the use of the foreign language or the colonizer's language, in some sectors of national life, most especially in education.

c. *The Multimodal Policy Pattern:* Under this policy pattern one foreign or exogamous language as well as one or more indigenous 'majority' languages are extolled over and above other 'minority' languages. The concentration on the 'majority' languages in most cases often threatens the continued existence of the 'minority' languages. African countries that operate this kind of policy include Nigeria (with its English, Yoruba, Igbo and Hausa), Kenya (with its English and Swahili), Sierra Leone (with its English and Creole), Ghana (with its English, Akan, Ewe and Moshi-Dogomba), etc.

What is significant for us to note here is that indigenous languages are utterly marginalized in almost all the policy patterns examined above. But one might be tempted to separate the Unimodal Policy Pattern which extols one indigenous language above other languages, yet when the reality of the fact that such languages are not used as "resource for development" (Wiredu 1980, Oladipo, 1996) one is bound to align with the earlier submission. The highest role apportioned to any African language in all of the patterns above is simply social or for wider communication purposes. They are not given any pride of place but limited use in formal education. At most, like in Nigeria, for example, they are mere media of instruction at the lower rung of the education system most especially at the first three years of primary education (NPE, 2001) defectively implemented (Fakeye and Soyinka 2009).

Experiences from the Philippines, Mexico, Wales, Canada, Russia, Yugoslavia and Japan have, however, shown that the indigenous languages are fit for all rung and levels of education as effective media of instruction that is capable of eliminating pedagogical difficulties in learning and thereby enhancing better understanding. Again, this assumption has been quashed by the diverse education and psychological research results examined earlier in this paper. Let us quickly note here that our position is not another project in cultural nationalism but rather an effort towards “cultural cross-breeding”(Oladipo 1996: 81); for we are not advocating a total jettisoning of the foreign languages but rather that which will allow a bilingual kind of teaching arrangement. This, to us, will obliterate the present clandestine use of the method by some zealous African teachers. Approving such will mean that such teachers will have no fear of the system punishing them for introducing ‘vernacular’ where it is not approved. And it will also enable them to teach the science-based subjects effectively.

But the major problem that might hinder whatever effort directed towards this end is how to have adequate manual for translating the scientific terms into the indigenous languages without, or with minimum, loss of meaning. Here we propose the Pragmatic Approximating Process.

Beyond the Policy Rhetoric: Pragmatic Approximation and the Scientification of African Languages

The Pragmatic-Approximating Process can be defined as the “process of painstaking thinking, discussing, explaining and approximating new words in translating scientific concepts and theories from foreign to an indigenous African languages without any possibility of loss in meaning occasioned by cross-cultural translation”(Ademowo 2010: 62). The process involves three stages, namely, explanation stage, thinking stage and approximating stage.

The first stage of the process will involve active dialogue, which entails explanations and discussions on the English meaning of scientific objects, and theories. Questions and clarifications for adequate understanding will also take place at this stage. The second stage will involve deep thinking and personal reflections on the explanations offered at the first stage. This stage will enable participating linguists and scientists, who

are not necessarily of African origin, to personally re-examine the concepts explained, objects described or process narrated. The third and final stage will involve supplying approximates, for the scientific terms under discourse.

Expected to be involved in these stages are scientists, the linguists, the philosophers, the anthropologists and, of course, educationists. All these professionals, involved in PAP, pragmatic approximating process, are bound to respect the three cannons or articles of faith as opined by Robins (in Owolabi 2006: 5). These are:

Exhaustiveness: which means that all the regularities contained in the language (or languages) as manifested in the language material or data, are to be adequately accounted for without leaving the minutest of details.

Precision: long explanations must be avoided hence a shorter and precise statement which utilizes few terms is to be preferred to one that is longer, less precise, or more involved.

Consistency: this means that the different parts of the statements formulated or translated should necessarily agree with each other, so that contradictions will be avoided.

If the tenets of these three canons can be respected and/or adhered to, then the three processes, highlighted earlier will be a huge success and lead us to the actualization of our goal: that of evolving a manual that will make science terms intelligible in native/indigenous languages. The essence of involving these professionals is to ensure that they are agreed on the equivalence of the translated terms or words.

The problem of cross-cultural translation is bound to rear its ugly head during PAP but with the fourteen methods of creating new linguistic terms identified by Owolabi (2006), we are sure to be able to obliterate this obstacle. These 'devices', as identified by Owolabi are: semantic extension, composition, dialect or internal borrowing, loanwords or external borrowing, specification, explication, idiomatization, simple equivalence, acronyms, coinage, description, translation, adaptation and range extension (Owolabi 2006:40).

Pragmatic-Approximating Process rejects all forms of cultural nationalism hence the anthropologist(s) should ensure that this is not allowed during PAP. It encourages, where and when necessary, positive terminology development for ease of translation (Owolabi 2006: 24) and for the enrichment of the language of the approximators. It also advocates the bracketing of all prejudices and eschews neutrality as much as possible. The implication of PAP theory is that it will enable us to be sure that we are translating the original scientific words correctly and also that we are putting the word in the same practical use, as the other scientists worldwide, in our various African languages, and likewise producing the same, and even better, results that could stand universal test which is characteristic of science and technology.

Conclusion

Our efforts thus far have been directed at justifying why and how indigenous African languages should be employed in teaching science and technology-based subjects in our educational system. This, we posited, does not mean that the use of English language or French or Portuguese as education medium should be discontinued; rather what we are advocating is that both be officially approved, and the indigenous languages be developed, and adopted accordingly, as classroom media with consequential provision of scientific books in both languages. The ALSM, African Languages Scientific Manual, we submitted, can be produced in the relevant African languages using the Pragmatic-Approximating Process so that scientific objects, concepts and theories can be more meaningful and easier to understand for students and thereby aid the learning process and ignite the necessary creativity that would induce techno-scientific development in Africa.

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