

THE ROLE OF LANGUAGE AND COGNITIVE FACTORS IN LEARNING AND NATIONAL DEVELOPMENT: NIGERIAN LEADERSHIP QUESTION

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Abstract

This paper explores the contribution of language to learning and research that will propel development of a nation and the role the Federal Government plays in ensuring the development of orthographies of indigenous languages vis-à-vis enhancement of research. The paper examines how individuals' linguistic behaviors help them in learning and evaluation of the rigors in any fields of study, especially sciences, they venture into. It discusses two interrelated and interdependent linguistic variables; cognitive factors; the activities of neural networks in the brain and what individuals in turned use language in learning and research as a panacea for enhancement of research and development in the society. The method used in collecting the data was through the distribution of questionnaire to random students of Engineering, Computing and other science courses in Nigerian Army University, Biu, Borno State. Findings reveal that, indeed, students would fare better in research if their indigenous languages were given pedagogical priority in line with the National Language Policy on Education. This would go a long way in enhancing research and development in Nigeria.

Keywords: Language acquisition and learning, cognitive factors, language and the brain, national development, Nigerian leadership question.

1.1. INTRODUCTION

Language is a concept which defines and distinguishes human from other beings. It is a means at which messages are sent and received. The use of language can take diverse forms, depending on the context of communication. Through the use of language, many things are achieved, all wrapped in sending or receiving a message in form of persuasion, education, exploration, entertainment et cetera. Language, as the core of this paper, has been variously defined by different scholars in different fields. For instance, philosophers see language as an imperfect way of expressing logical ideas. To a

psychologist, language is a key to understanding of the mind. A Linguist, however, does not have a definite definition of language. Rather, he looks at language in terms of what language does for us, on the one hand and what we, humans, do with language, on the other, (Nwogu 2004).

Language acquisition and learning are a concept cardinal to language use in a multilingual society like Nigeria. Various researches have demonstrated how language acquisition and learning, and language development have contributed towards development of individual's intelligent quotient and, by extension, development of a society. According to

Erika Hoff (2001: 17), verbal skills also play an enviable role in the success of any society. Verbal skills here are equated to competence and performance of individual multilinguals who possess all the communication skills and can perform language tasks in at least two languages, including their First Language (L₁) or Mother Tongue (MT). These multilinguals have been discovered, through post-mortem studies, to have the neural activities of their brain activated to broaden their thoughts to enhance learning and research towards maximum productivity (Thomas Adeyenju 2003). This is why MacBride (ed) (1980) (qtd. in Babatunde (2002: 32), argues that “Communication maintains and animates life, an expression of social activity and civilization . . . it creates a pool of ideas, strengthens the feelings of togetherness. . .”

The aim of this paper, therefore, is to look at language in two ways; to explore the function of language in the human brain and how that, in turned, helps individuals, especially multilinguals, to use language effectively towards creativity, as well as enhancement of research and development of the society. This is pertinent because, over the years, inadequacy in comprehension, as well as competence and performance in the English language, which is mostly learnt as a second language (L₂) and, invariably, the language of instruction in Nigerian schools, seems to affect the quality of researches carried out to enhance development. This is why despite the artistic expressions of the many indigenous languages inherently imbedded with logic and ideas, Nigeria is yet to record a major breakthrough in any field of research especially science and technology. The objective of the paper is, therefore, to examine how acquisition of First Language (L₁) and subsequent learning of the second and more languages affect learning and research to foster creativity which may eventually lead to enhancement of research and development in Nigeria as a

multilingual nation. Secondly, the research also looks at the roles of successive leaderships in the country in the implementation of the National Language Policy on Education of 1977 and 1981, respectively. This is with a view to determining whether or not the policy, if implemented, can give birth to multilinguals who can use their repertoire in, especially L₁, for learning and research that can enhance technological advancement and national development. This is because of the fact that one is at his best in the language he is most proficient. The study is, thus, significant because it will synthesize the relationship between the function of language through language acquisition and how such acquisition activates the neural systems towards learning, research and development in a multilingual society like Nigeria. It will also reinvigorate the leadership in Nigeria to revisit the document on the National Language Policy on Education of 1977 and 1981 with a view to implementing the recommendations therein for national development.

2.0 Literature Review

2.1 Conceptual Review and Theoretical Framework

The concept of language, which is the underlying factor in this paper, is an inevitable means of communication, learning and research. As explained earlier, this research will look at the function of language in two perspectives; what it does to human brain and what humans do with the language for existential purposes, including research and development. In terms of what language does to the human brain, the research will examine cognitive processes in language acquisition and the function of the neural networks in the brain towards cognitive ability like language comprehension and how it develops human thoughts and enables individual's perception and conceptualization of things. On what human does with language, it will

synthesize how individuals use language in learning and research situations towards enhancement of professionalism and societal development.

2.2 Cognitive Process in Language Acquisition

Acquisition of language starts from childhood or infant age, which is majorly influenced by cognitive processing through the neural networks and brain plasticity, according to Henrike Blumenfeld and Viorica Marian (2009: 23). The second acquisition takes place at adolescent or adult age where the neural activities are majorly influenced by experience-dependent changes in our cognition. Recent researches have shown that there is a knit relationship between language development and cognitive processing in a child, in the sense that they mutually influence each other. This normally happens when there is usually a simultaneous or sequential activation of an integrated linguistic code or two linguistic codes in the brain of the child (especially bilingual children) which results in such children acquiring a higher cognitive processing load during language acquisition or mechanism compared to monolingual children (Henrike Blumenfeld and Viorica Marian 2009: 24).

First, it was established that children are born with innate mechanism for acquiring their first language, according to mentalist theory of language acquisition. Recent researches also postulate that children who grow up in bilingual or multilingual societies have built-in cognitive mechanism for processing the languages they acquire. This is where the arguments on whether such children have two linguistic codes or an integrated codes come in. But this does not vitiate the fact that language acquisition and cognitive processing in children are inseparable. In tune with Chomsky's notion of innate mechanism in child language acquisition, therefore, children have a cognitive processing mechanism known as "mental organ", according to Noam

Chomsky (1988) which influences and is also influenced by language development symbols once the child is exposed to one or more language systems or linguistic codes. These symbols start from phonological contrasts, morpho-syntactic identification and semantic sensitivity.

At adult age, again, recent researches have also shown that there is a knit relationship between experience and cognition whereby human social interactions, as well as formal education, has significant impact in modification of the brain (Peretz and Zatorre, 2005, and Bavelier and Davidson, 2013). It has, thus, been argued that if experience can shape brain structure and cognitive ability, multiple language acquisition can also be influenced by such neuroplasticity. This is because language use is the most sustained and most interactive experience human can engage in. Human verbal behavior is structured in such a way that when we engage in communication (learning inclusive), our brain conceptualizes and interprets semantic networks so as to assign meaning to linguistic features. Our experience, through our interpersonal interactions and daily activities, invoke the neural networks in the brain which activate the sensory motor parts such as frontal lobe, temporal lobe, parietal lobe, as well as some posterior regions of the brain to impact on our verbal behavior (Friederici, 2011). This cognitive processing has a great impact in the individual as he grows to apply such language skills to other activities such as conceptualization of issues, critical thinking, problem-solving tasks and analytical skills.

This is why it was postulated that the brain of a multilingual or polyglot has remarkable anatomical advantage in language processing, comprehension and task finishing compared to that of a monolingual. According to Hana Koubova (2022: 7), the activity of the brain in relation to language acquisition shows that the brain of a polyglot "uses small amount

of neural networks when exposed to language than that of a monolingual. . ." and that the brain parts such as the Broca's region and the Wernicke's region, both located at the left hemisphere (left temporal lobe) and responsible for speech production and language development and comprehension, are more activated in multilinguals than in their monolingual counterparts. This makes the individual multilingual complete tasks such as; language understanding, memorization and learning of new language activities faster than a monolingual. In addition, because the neural activities of a multilingual are, according to Adeyenu (2003) "markedly farrowed", he conceptualizes things easily and fast in thinking and problem-solving. To buttress this, Ping Li (2017) argued that the brain of a polyglot, or multilingual, is continually being 'remodeled' to successfully another language due to integrated neural network displayed by certain parts of the brain. By so doing, it increases the density of both the grey matter and white matter in the brain such that it takes the multilingual less efforts, almost automatically, to process new language and, by extension, memory retrieval and conceptualization of issues.

2.3 The Role of Language in Learning and Research

As explained earlier, the study is segmented into two; what language (acquisition) does to human brain and what we in turned do with the language. In the previous segment, the research has looked at the cognitive vis-à-vis multilingual factors in the individuals in language acquisition and the function they perform in the brain. In this segment, it will look at how the language(s) in individual's repertoire is used to achieve existential goals, especially learning and research for development. Accordingly, it will review role of language, which Edward Sapir (1921: 28) says "is purely human and non-instinctive method of communicating ideas, emotions and desires by means of

voluntary produced symbols" in research and development. The postulate by Sapir implies our ability to express our thoughts and the influence of these thoughts on others, as concurred by (Geoffrey Leech 1983: 49). On what language does for us also, Trager (1949: 13) says it is "a system of arbitrary vocal symbols by means of which members of a society interact in terms of their culture", In other words, language functions to shape our thinking through our experience of the world, what Janda (2010: 15-16) calls "perceptual experience".

To infer from the postulates above, the research is inclined to say that language, as a means of communicating ideas, perceptions, emotions and desires, shapes human thoughts towards perception of things and, indeed, conceptualization of ideas which, by extension, helps to enhance individual's ability for learning. In this regard, two aspects of psycholinguistics are fundamental, to be able to use and understand language effectively. These are explicit knowledge of language, and cognitive processes such as perception, thinking or memory reinforcement in understanding say; lectures, speeches or what we read (Nwogu 2004). Explicit knowledge of language is the knowledge of the rules of linguistics in general. These include grammatical rules, semantics (or meaning), and pragmatics (context of utterance). In other words, without such rules, we find it difficult to perceive or understand a lecture, or what we read in a book of any discipline to shape our thought. Cognitive processing, on the other hand, is our ability to understand what is said to us or read in relation to our understanding of other issues that share common property that enable us from our perceptions and conceptualization of ideas (Lakoff and Johnson 2003: 59).

The question, therefore, is how explicit is the students' knowledge of the language they use in, especially reading instructional or research materials that are meant to

shape their thoughts and build them with ideas? Similarly, how developed is their cognitive process in perception and conceptualization of issues imbedded in a language of which they do not have explicit knowledge?

According to Hoff (2001: 24), “It is necessary to understand how the mind works in order to explain human behaviors.” That is to say that human behavior is a mental process to which language plays a crucial role. This is because “acquisition of language”, Hoff argues “is through reinforcement or successive approximation of grammatical sentences”. What this implies is that, to understand what goes on in what we read or listen to, there should be an agreement between our cognitive behaviors and our ability to understand the rules of linguistics. This, as we may infer, is what shapes individuals’ thoughts towards understanding the subject matter which in turned brews their minds with ideas worth evaluating for research and development.

It is important to argue here that these infusion - of linguistic knowledge and cognitive process - take place in an individual through language acquisition and learning. While language acquisition has its root at individual’s infant stage, termed Mother Tongue or L₁, learning takes place when the individual is exposed to formal environment of teaching and learning. This is what Noam Chomsky (1957) means when he posits that a child is born with an innate mechanism known as Language Acquisition Device (LAD) which enables him to acquire his Mother Tongue without difficulty. Newport (1990: 32) also puts in that “the age at which children acquire certain aspects of language is correlated with acquisition itself”. In other words, the earlier the exposure to language, the greater the level of acquiring that language. This explains why adults find it more difficult to learn a new language than children. This is why Lenneberg E. H. also urges that;

Language acquisition is a maturationally controlled behavior that is not triggered by external factors - children generally begin to combine words at about the age of two and by five, they can talk fluently. By the age of ten, they would have mastered the syntax and morphological structures of their language. (Lenneberg 1967: 17).

This goes to underscore the fact that language acquisition, if well nurtured, could instill in the child, explicit knowledge that can develop his cognitive process. Hoff (2001: 42) also suggests that “success in modern industrialized societies depends on the verbal skills, and in acquiring verbal skills, what a society requires is problematic for children”. What all this means is that children from lower socio-economic strata enter the formal system of learning with different language skills from the official language. This is because they have already developed linguistic skills of their Mother Tongue before enrolling into the formal system. The resultant effect, therefore, is that these children, who form the majority in the society, would be successful in their verbal skills of the mainstream language (in this case, English) if they start learning the L₂ with an explicit knowledge (rules of syntax) of their L₁. If, however, they are only tacit speakers of their L₁, then there is a great tendency that learning the L₂ will be a herculean task. And if such happens, which is mostly the case in multilingual Nigeria, it will continue to affect their comprehension of any subject matter taught in the school and, by extension, their inability to make any breakthrough in any research for development.

The bigger problem, thus, arises when they are enrolled in more advanced schools later in life where their learning goes along with thinking – cognitive process. Because their L₁ has already maturationally controlled their behavior” according to Lenneberg (1967: 22), they would be lacking in the verbal skills of the L₂ to “communicate

their ideas, emotions and desires” which form the basis of their thinking. Put differently, because their communicative competence in L₂ which, according to MacBride (ed) (1980: 61) “animates life, expresses social activity and civilization. . . and creates pools of ideas. . .”, has been impeded by their competence in their L₁ without the corresponding explicit knowledge of the language, it will affect their performance in the language of instruction, to be able to shape their thoughts towards research and development.

It is, however, important to echo the opinions of scholars that bilingualism, or more appropriately, multilingualism, develops a person’s brain more than a monolingual. According to Adeyanju (2003), for instance, a multilingual person is a more integrated citizen that freely expresses his opinions to societal issues. This is because, according to the argument, a post-mortem study of the human brain has shown the neuron of a multilingual to be more acute and “markedly furrowed” which enables him to learn more quickly than a monolingual. This, as statistics have shown, when a language is taught as a subject, the tendency is that multilingual speakers who have also undergone pedagogical processes of learning both or all the languages they speak (explicit knowledge) would be able to do some comparative and or contrastive analyses, thereby subsuming the lexical items of the other languages into the language at hand to bring about quick grasp of the subject matter. The irony, however, is that Nigeria, with its multiplicity of languages, has only few with orthographies that can be taught at pedagogical levels. This is where Government has a big role to play.

2.4 The Role of Government in Language Development

Over the years, successive governments have come up with language policies to be enshrined into the overall education policy

of Nigeria. In 1977, precisely, the Obasanjo’s military government set up a National Language Policy on Education with a view to coming up with recommendations that will guide government in formulating policies for language planning to tackle the multilingual situation in Nigeria. In 1981, the policy was revisited by Shagari’s government with slide changes. In the Policy, it was suggested that the first 3 years for the foundational education of a child, the language of instruction shall be in Mother Tongue or language of immediate community; that the English Language shall replace the L₁ at secondary school level. Secondly, the proceedings in the National and State houses of assembly shall be conducted in the indigenous languages, in addition to the English language (Bangbose, Ayo 1992: 11).

It is instructive to state that these language policies have continued to face summersaults because, needless to say, the leadership always seems to gloss over language issues and ignore the fact that developing the orthographies of indigenous languages is as important as developing economic blueprint. The Udoji Commission set up in 1974 to look into the problem of the Public Service reported that the negligence of language policy looms with “implication in the performance of workers” which in turned affects administration in Nigeria. According to Nwachukwu (2003), because the governments put their weight in political and economic development issues, they fail to realize that language problem is no less a disaster to the nation’s development.

Perhaps, the report of the Commission might be what triggered the language policy in 1977 and 1981, respectively. Section 1, paragraph 9 of that policy states that “for the interest of the country, every child shall be taught three languages in addition to his own mother tongue” (Adegbite 2003: 26). This policy statement has been repeated in subsequent policy documents up to the

1999 constitution of the Federal Republic of Nigeria currently in use. The assumption here is that since the English language, which is the colonial legacy, has come to stay, children should be taught, alongside the English language, the languages of their immediate communities. This way, they will be able to be explicit speakers of both their L₁ and L₂.

The purveyors of multilingualism are of the view that the attainment of such proficiency in both competence and performance in the bilingual or multilingual is a sure way for their brain to be cognitively active (Adeyenju 2003). Bangbose, for instance, opines that “the local languages be used to domesticate low-level technology while the official language be used to transmit high-level technology” (Bangbose, 1992: 14). A very important problem, however, is that few out of the hundreds of indigenous languages in Nigeria can claim to have a well-developed orthography suitable for teaching and learning that may trigger research and development. This might be one of the reasons for the drawback in the implementation of language policy on education in Nigeria. Similarly, successive education curricular have continued to ignore the teaching and learning of L₁ in the formative years of children in schools before learning the L₂ as articulated in the language policy document. This setback makes language experts in the various indigenous languages become unenthusiastic towards developing orthographies of the local languages. This and other inherent problems contribute greatly in the lack of institutionalization of such policy that will help in developing verbal skills of children and, by extension, increase their perceptual or cognitive abilities for research and development.

3.1 Research Methodology

In collecting the data for this research, two sources were used. The first was the primary source which were the questionnaires distributed to about 50

students of Engineering, Computing and other science and applied science courses in the Nigerian Army University who are either bilingual or multilingual, with a few of them being monolingual. The reason for selection of these students is to sample the responses of science-based students with one or more linguistic codes. In this regard, their responses were evaluated with a view to relating such with their ability or inability to carry out research using their L₂. The secondary source comprises the various literature that explore the issues designated for the study. These include literature materials on language, psycholinguistics, multilingualism and Nigerian language policies. The aim of this is to determine whether or not these sources could provide accurate description of the language issues designated for the study.

4.1 Analysis/findings

From the data collated, it was found out that, out of the fifty (50) students that formed the respondents to the research, twenty-nine (29) claimed that the language of instruction used in administering research such as laboratory tests, calculations, et cetera, has technical and scientific terms or formulas that require that they must understand them to be able to carry out tests and or calculations that will produce desired results. So, most of the times, they have to memorize the terms and formulas, instead of understanding them, to be able to apply them effectively. Seventeen (17) out of the total students (respondents) said they have no problem using the English language for the laboratory tests and or calculations because they have been using such terminologies since their secondary schools. The remaining four (4) students were indifferent or seemed not to have a grasp of the questionnaires administered. Below is a table showing the percentage ratio of the three categories of the respondents:

S/N	Language Problem	No Problem	Lang. Indifferent	Percentage
1	29 students			58%
2		17 students		34%
3			4 students	8%

From the table above, it shows that 58% of the students claim to have problem understanding the scientific/mathematical terms in the language of research (English). 34% claim they do not have such problem while 8% either have the problem or they do not have or, even, they do not even understand the questionnaire. This implies that more students have a problem comprehending the L₂ which is used in the research. This, thus, will definitely affect the quality of whatever research they venture to carry out simply because of the language barrier. This is simply arrived at because of the fact that there is no language equivalence of those terminologies in their various indigenous languages (L₁).

5.1 Conclusion

The study looks at the role of language and cognitive factors in learning and national development. It synthesizes the corpus using two interdependent and interrelated factors; what language does to the human brain or cognition and what we, in turned, do with language. On what language, or simply put, language acquisition does to the brain, it was argued that the neural networks in the brain of, especially a multilingual or polyglot, expands with every vocabulary input. This is because of the fact that the two regions responsible for assessing information and language development, namely; the Broca's region and the Wernicke's region, both located at the left hemisphere, help a great deal in the neuroplasticity of the brain such that the more an individual acquires a new language, the wider his brain in perception and conceptualization of ideas. This realization is, willy-nilly, an asset to a multilingual society like Nigeria.

The second interdependent variable is what we do with language which is encompassed in the role of language in learning and research as a panacea for national development. In this regard, the research looks at how the language(s) in individual's repertoire is used to achieve existential goals, especially learning and research for development. This is inclined to say that language, as a means of communicating ideas, emotions and desires, shapes human thoughts towards perception of things and, indeed, conceptualization of ideas which, by extension, helps to enhance individual's ability for learning. The focal point here is that, given the relatedness of the function of the brain or cognition and language development which enhances learning and research, the study concludes that government could play a major role in ensuring that the recommendations in the National Language Policy on Education of 1977 and 1981 are implemented to the letter. This is taking cognizance of the fact that, if the L₁ or mother tongue of individual multilinguals is given due recognition, he or she would be enabled proficiency in both speaking and writing of his native language. This will afford his neural system to perceive and conceptualize ideas that will germinate to tangible research breakthroughs.

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