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EDUCATIONAL EMBODIED COGNITION: NIGERIAN EDUCATION CHANGE AGENT

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Abstract
In the past decade, the concept of embodied cognition have been well explored in educational research ranging among research on children's language processing, enhancing memory performance, relationship between psychology and education amongst many others. However, this paper focuses on the introduction of the concept of embodied cognition as a change agent to solve the problems facing the Nigerian Education System. The Nigerian Education System is one that is seen to be faced with a number of challenges and shortcomings. These challenges have affected the system at various levels, be it primary, secondary or tertiary. Hence, this paper presents a review of how the educational system in Nigeria has evolved over the years and some major challenges faced in those periods. Finally, it presents the concept of embodied cognition which emphasizes the need to have a reconsideration of the way cognition is adopted in the present existent Nigerian educational structure.

Introduction

The progressions experienced economically, socially and politically in most developing and some developed nations of the world have opened the gap for a need to continually enhance and think

of educational changes, most particularly in a nation like Nigeria (Adamu, 2014). As Durkheim (1938) contended, educational changes are dependably the outcome and the manifestation of social changes. In a bid for nations to feel at a specific minute in time the need to change its educational system, it is important that new thoughts and ideas have risen in which the previous system is no more satisfactory (Agbaje and Eyo, 2011).

This is a similar scenario experienced in developing nations where from the late fifties to mid-seventies the gaining of independence, and now and again newly discovered riches in the area of natural resources have added to a redefinition of its objectives. Fagerlind and Saha (1982) spoke about this and stated that, in spite of the fact that it is hard to pinpoint when solid connections between education, social and economic development started, nonetheless, it is sure that by the late fifties and mid-sixties there was general understanding among government officials, educational and social organizers and schools that education was a key agent of change in these societies (Fagerlind and Saha, 2014).

Likewise, considering this same circumstance, the expansion and improvement of educational provision grew to be the limelight of development efforts, most especially in developing countries such as Nigeria, as a means of increasing productivity and acquiring new skills. Another cogent rationale behind the large investment given to the educational sector is presented by Adams (1977), where the author also argued that the educational system is meant to produce the skilled manpower and the new knowledge requisite for technological advancement and economic growth. This argument can be backed up as seen in a review of several documents issued between the fifties and sixties in a number of Asian, Latin American and African countries. These documents were presented as plans for the nations, expressing the desire to adopt educational provision as a means of economic development (Lewin 1984). Commonly, the theme or norm had been that education is not seen to be pursuing relevant goals, hence the need to introduce educational innovations as a means of making education more functional and effective Diverse theoretical fields have generated from this with the aim of breeding innovations that would make the educational systems more relevant (Adamu,

2014). Amongst these fields breeds the theory of embodied cognition and this article will explore its application in the educational system of Nigeria.

The concept of cognition is most definitely perfectly connected with education. But most importantly, one needs to understand the concept of cognition in its entirety (Gomila, & Calvo, 2008). Smith and Sheya (2010) stated that cognition is no longer considered to be far from perception and action but rather cognition is observed as being dependent on the body, that is bodily actions, emotions and morphology (Barsalou, 2008; Schubert, & Semin, 2009;Clark, 2008; Laakso,2011). One of the approaches that gives a proper articulation and support to this school of thought is the embodied cognition approach. This approach presents the body as the main actor and a vital and important factor in shaping cognition (Ionescu & Dermina, 2014). The movement of the body, such as bodily gestures provides a variation in the angle of learning for students and this will further assist the students in easier understanding of learning materials (Hostetter & Alibali, 2008; Tellier, 2008;Wilson, 2002).

Viewing it from this angle, the main reason for using these bodily gestures is to assist the students in their learning process by improving their comprehension and building a connection between the bodily gestures and the learning materials. In addition, these gestures can be adopted for the development of more detailed memories in relation to the students' learning materials (Riseborough, 1981; Tellier, 2008; So, Sim & Low, 2011). For instance, when people apply actions during learning events, such as performing an action like exercising while saying, "Let's do exercise", it has been observed that there has been better performance or higher rate of performance when recalled to perform the task. This concept has been discussed by a number of literatures, including Goldin-Meadow, McNeil and Singleton (1996), Ratner,Foley and McCaskill, (2001) and Stevanoni and Salmon, (2005), showing how effective the use of bodily gestures is on cognitive tasks such as learning.

In the field of cognitive science, the concept of embodied cognition is known to be a very important area as it deals with the connection between human mental representations and their physical environments (Gibbs, 2006). Studies by Glenberg, Gutierrez, Levin,

Japuntich and Kaschak, (2004) and Ramini and Siegler, (2008) have shown that the operations of real objects which are grounded on the theory of embodied cognition, can sustain and support the process of learning and thinking. Students enjoy better and more meaningful learning experiences when the application of physical movement and touching of stimulus materials is adopted. This is because a more cognitive elaboration is produced when there is a direct experience and engagement with the environment. For example, there is a better experience of reaction to real objects in physical contexts with the perception that the interaction with the objects is first-hand and the real-life behaviour is very natural for them (Wu and Shaffer, 1987; Lombard, 1995).

As a result of these findings, the concept of gesture-based approaches in facilitating the cognitive process of learning has been put into use. An example is the work by Chang, Chien, Chiang, Lin, and Lai (2013) who adopted gesture-based multimedia for teaching students the Gardner's theory concepts of multiple intelligences. From the results presented by the authors, it was seen that the retention of the concepts learned were satisfactory as measured by the delayed test and the immediate test. Although gesture-based technologies in education and the merging of the embodiment and direct manipulation of real objects, along with interacting with technology, has been seen to enrichmental representations and produce a higher retention level for students (Shams &Seitz, 2008), only a number of studies have scientifically examined the promising and prospective results derived from the effectiveness of body-motion interfaces as learning tools, and the application to the present educational system existing in Nigeria is even yet to be considered (Chao, Huang, Fang, & Chen, 2013). Thus, this present study hopes to contribute to the current literature by introducing the theory of embodied cognition as a change agent to help solve rising problems in the educational system of Nigeria

History of Nigerian Educational System

The Nigerian Educational System has gone through two noteworthy stages, the colonial and post-independence periods. In the northern parts of the country, Islam was profoundly established in both in

the religious conviction and educational introduction of the general population who had a uniform Qur'anic education arrangement (Ozigi and Ocho, 1981). In the southern parts however, every ethnicity had its own particular customary type of education in view of its own way of life and convention (Taiwo, 1980). The educational program which is informal involves developing the child's physical ability, character, scholarly aptitudes and feeling of having a place with the community and additionally teaching admiration for elders, and giving particular professional training and the comprehension and appreciation of the community's cultural heritage (Fafunwa, 2004). This was the situation in 1842, when the Christian missionaries arrived in Nigeria and presented western education. The aim, as given by the missionaries, was to empower beneficiaries to know how to read the Bible in English and the in their dialect. Ozigi and Ocho (1981) noticed that despite the fact that the Christian missionaries' significant goal of building up schools was the spread of Christianity, their most noteworthy legacy was their educational work and improvement of indigenous dialects into writing.

Evaluating the educational approach under colonialism, the period from year 1944 to independence in the year 1960, it was a period when the duty of state and that of the missionaries in the administration of education was founded (Fabunmi, 2005; Fafunwa, 2004; Tikly, 2001; Aliu, 1997). The mix of the plural traditions was not attended to by the strategy, which subsequently birthed the presentation of universal primary education in the fifties in the western and eastern locales of the nation (Fabunmi, 2005; Taiwo, 1980; Sasnett and Sepmeyer, 1967). Alongside, the western, Qur'anic and customary education flourished as parallel modes with Qur'anic education being the favoured mode in the Muslim north (Odukoya, 2009; Imam, 2003; Ogunsola, 1982; Ozigi and Ocho, 1981).

Going ahead and observing the educational system in Nigeria amid the initial thirteen years of independence, the following are quite notable: the impact of political change on the educational strategy; the functions of the federal and states government in the control and regulation of education; the advancement of education to the level of an enormous government by the expansion of the access to education so as to increase enrolments and probably close the educational gap

(Osili, 2005; Nwagwu, 2011; Odukoya, 2009).

Nigeria's first indigenous educational policy was the 1977 National Policy on Education which was outfitted towards addressing the issues of the relevance of education to the needs and desires of Nigerians and in addition advancing Nigeria's unity and establishing the framework for national integration (Woolman, 2001; Fafunwa, 2004; Umar and Tahir, 2000; Imam, 2001). Likewise, as a result of the high rate of underdevelopment in the country, this educational policy aimed at growing an independent country to meet the nation's developmental needs. So as to accomplish these objectives, this policy made education in Nigeria the Federal Government's obligation as far as incorporated control and financing of education is concerned. Such centralization was a take-off from the frontier education policy of financing of education in view of cost sharing between the restrictive bodies, parents, local communities and the government (Nwagwu, 2007; Odukoya, 2009; Buchmann and Hannum, 2001; Buchmann 1999; Parrado 1998). Taiwo (1980) has made reference to the goal-oriented nature of the National Policy on Education which was considered at a time when Nigeria's national economy was at its pinnacle, however conceived in a time of economic decay. The approach presented the 6-3-3-4 educational system modelled after the American system of 6 years of primary education, 3 years of junior secondary school, 3 years of senior secondary school, and 4 years of college education (Nwagwu, 2007). Although primary education was free, it was not obligatory and the policy tried to make universal free primary education (UPE) mandatory for all children (Igbuzor, 2006; Olaniyan and Obadara, 2008).

On the heels of the 1999 Constitution of the Federal Republic of Nigeria, came the 1998 revised policy on education. This policy introduced the nation's third attempt at democracy and the constitution re-affirmed the goals of education in Nigeria as initially contained in the 1979 constitution and the policy on Education. The Constitution attached much importance to guaranteeing satisfactory educational opportunities for all students at all levels of the educational system, like ensuring advancement of science and technology, eradicating illiteracy by providing free mandatory universal primary education, and free college education. In 2004, the National Policy on Education

was reconsidered afresh again and this is the most recently modified educational policy existent in the country.

Generally, the National Policy of Education in Nigeria is based on the dynamic model of formulating educational policies, which is adaptive to changes and most appropriate for a developing country and multi-ethnic nation, like Nigeria. The policy has the following peculiarities: it set specific objectives for the nation and its education; it addressed the problem of unity and laid foundation for national integration; it aimed at realising a self-reliant and self-sufficient nation to meet the country's developmental needs. It gave a comprehensive structure of educational system and laid the foundation for the 6-3-3-4 system of education in Nigeria (i.e. six years primary schooling, three years junior secondary education, three years senior secondary school and four years university education); It made education in Nigeria the government's responsibility in terms of centralized control and funding of education; It had a broad curriculum which aimed at creating learning opportunity for all children, irrespective of their sex, peculiar background or ability; and it also specified the functions of adult education, non-formal education, special education and open and distance learning (Federal Government of Nigeria, 1977; revised 1981; 1998; 2004).

This policy, which is presently in operation, prescribes an inclusive education to take care of children recognized as having special needs. It, in addition, addresses the needs of itinerant pupils through the prescription of the integrated Qur'anic school programme as well as programmes for out-of-school children. The policy reiterates the Government's commitment to the implementation of the UBE programme and the 9-3-4 system of education. Basic education is given in the form of six years primary education after which pupils proceed to the Junior secondary school where they spend three years. The policy saw the disarticulation of junior secondary school from the senior secondary to form basic education schools. In terms of the school curricula design, the responsibility for basic education and senior secondary school curricula rests with the Federal Government through its organ, the Nigerian Educational Research and Development Council (NERDC). However, each locality is expected to adapt the implementation of the national policy to suit their local

conditions based on the national curricula. At the basic education level, the curricula comprises English language, Mathematics, Religious Studies (depending on the faith of pupils' parents), academic subjects like Basic Science and Technology, and Social Studies. The prevocational subjects offered include Cultural and Creative Arts, Computer Studies, Agriculture, Home Economics and Physical and Health Education. One major Nigeria language (Hausa, Igbo or Yoruba) has been added to the list of curricula offerings, and where there are available teachers French or Arabic is offered, making a total of fourteen subjects. At the end of the nine years basic education, in the final class of the junior secondary school, all pupils sit for an external examination and certification. The assessment is by a combination of 40 per cent continuous assessment and 60 per cent performance in the examination. Pupils' performance in the Junior Secondary School Certificate Examination (JSSCE) determines whether they go on to the senior secondary school level.

The senior secondary school is streamed into Arts and Social Science, Sciences and Vocational and Technical Education, and students at this level are placed in a stream based on their performance in the JSSCE and interests. The curriculum at the SSS level comprises compulsory subjects which are English Language and Mathematics, one major Nigerian language, one vocational subject and a selection of three subjects from the subject area of interest in the Arts and Social Science, Sciences, Vocational studies or Technical Education. All students sit for external examinations. The certification at this level is based on 40 per cent continuous assessment and 60 per cent examination and on successful completion, students graduate with the Senior Secondary School Certificate/General Certificate of Education (O' levels). The emphasis is still on certification (Imam, 2012).

Despite the continuous and conscious efforts to improve the educational system in Nigeria, be it by the introduction of new schemes or the reviewing of existing policies, the concept of adopting gesture-based means of learning which is the adoption of the concept of embodied cognition is yet to be implemented, hence, the need for this research.

Issues in Nigerian Educational System

The Nigerian Educational System has been encountering challenges as far back as its history goes, one of the first problems encountered came up when the amalgamation of the Northern and Southern protectorates of Nigeria came about in the year 1914. This amalgamation brought together people of different ethnic groups and faith together, as one country thereby creating a pluralistic society that necessitated the adoption of a federal structure for Nigeria. However, the British policy of indirect rule restricted the activities of the missionaries who were present to spread education in Nigeria in the predominately Muslim Northern protectorate thereby, curtailing the spread of western education in the north (Fabumi, 2005), leading to a considerable educational gap between the northern and the southern parts of Nigeria (Ogunsola, 1982). This problem which dates as far back as over a century ago is still reflected in the country as there is still an existence of a wide gap between the educational system level in the northern part of the country in comparison to the other parts of the country.

Likewise, at that same period of the amalgamation, when grants in aid were given to missions and voluntary agencies' schools, the Qur'anic schools were excluded because of their peculiar curriculum (Imam, 2003; Ogunsola, 1982). Since then educational policy in Nigeria has been shaped by the quest for national development based on political and socio-economic considerations. However, the integration of the plural traditions were not addressed by the policy and sowed the seeds of mistrust, hatred and suspicion amongst the various peoples from the different parts of the country; religious intolerance was born, and the introduction of universal primary education in the 1950s in western and eastern regions of the country further widened the existing education gap between the north and southern parts of the country (Fabunmi, 2005; Taiwo, 1980; Sasnett & Sepmeyer, 1967; Odukoya, 2009; Imam, 2003; Ogunsola, 1982; Ozigi & Ocho, 1981).

Going forward to viewing the educational policy in Nigeria at independence, the country was most concerned with using schools to develop manpower for economic development and Africanisation of the civil service (Woolman, 2001). The legacies of colonialism underline the many problems of nation building facing the Federal Republic of Nigeria since independence in 1960. This has led to a shaky democratic foundation which resulted in the first military coup in 1966 and three

counter coups during the period in focus. Further, the educational policy was narrow in scope and did not meet the hopes and aspirations of Nigerians. Criticisms of the educational policy include irrelevant curricula, obsolete methods, high drop-out and repetition rates, and the fact that many graduates were dependent, and low on initiative (Rwomire, 1998). Similarly, Uchendu (1979) identified problems that included inequality of access, rural-urban disparities, the educational gap between ethnic groups and differences in the curriculum of mission and non-mission based education.

More recent challenges facing the Nigerian Educational System as seen in literature include the numerous issues and problems involved in the management of primary education system in Nigeria as highlighted by George, Olayiwola, Adewole and Osabuohien (2013). The authors stated that the major problem with Nigeria's primary education is the fact that public funding is at lower ebb of 11% in 2007 compared to the UNESCO standard of 26%. This low funding is compounded by problems associated with lack of access to service providers, misappropriation, fund leakages and diversions. Consequently, the provision of education materials for effective teaching and learning remains a major challenge of Nigeria's public primary schools. Also, Nwachukwu (2014) stated that the production of adequate and competent technological manpower is a major challenge in Nigerian education industry. The education industry in the country has been battling with various aspects of infrastructure development challenges for improving the quality of education and expanding access. The various government efforts to improve infrastructure in educational institutions include construction of classrooms, lecture halls, laboratories and staff quarters as well as supply of water and electricity to improve quality of education and manpower production. Hence, Nwachukwu in his research examined the condition of science and technology infrastructure in secondary schools in Nigeria.

Education is very crucial to the development of citizens and since 1944, during the colonial era, governments in Nigeria have expressed a commitment to education, in the belief that overcoming illiteracy and ignorance will form a basis for accelerated national development as evidenced by British Colonial participation in educational provision,

the UPE of the western and eastern region in the 1950s, the 1976 national UPE and the current UBE programmes. Nigeria, however, has problems such as inequalities in access to education, an educational gap between the north and south, dwindling financial resources, and inadequate infrastructure, and these barriers continue to impede the effectiveness of the educational system (Imam, 2012)

Educational Embodied Cognition Concept

In traditional cognitivism, cognition is all about thinking and very different from sensing and acting (Barsalou, Breazeal, & Smith, 2007). In essence, cognition was seen as symbolic processing (Bickhard, 2008; Pylyshyn, 1980). One of the most important aspects of the human cognitive system is the ability to represent things, and moreover to have abstract representations. But the traditional view failed so far to explain how this ability arises in the developing cognitive system, and how and where abstract representations are implemented in the brain (Barsalou, 2008; Gallese, & Lakoff, 2005). Also, we do not know yet how do symbols get their meaning, and this is known as the symbol grounding problem (Harnad, 1990). Considering the cognitive system a purely symbolic one makes it difficult to pinpoint its specific mechanisms and their precise locations in the brain, and to understand its connection to the real world.

An accruing body of evidence supports a different view: an embodied view of cognition (Barsalou, Simmons, Barbey, & C. D. Wilson, 2003; Crollen, Dormal, Seron, Lepore, & Collignon, 2013; Maouene, & Ionescu, 2011; Riegler, 2002; Schubert, & Semin, 2009; M. Wilson, 2002). Data on numerical cognition (Crollen et al., 2013), conceptual knowledge (Barsalou et al., 2003; Boncoddo, Dixon, & Kelley, 2010; Borghi, Glenberg, & Kaschak, 2004; Vankov, & Kokinov, 2013), learning mathematics (Goldin-Meadow, & Singer, 2003; Goldin-Meadow, Wagner Cook, & Mitchell, 2009), language comprehension (Glenberg, Sato, Cattaneo, Riggio, Palumbo, & Buccino, 2008), language learning (Maouene, Sethuraman, Laakso, &Maouene, 2011), and cognitive development (Smith, 2009) show that the embodied cognitive system is highly dependent on sensing and acting.

The main features of the embodied cognition approach can be summarized in two general statements: firstly, cognition is not abstract

and amodal - in other words, representations are multimodal and thus fundamentally grounded in the sensorial modalities of the brain and in our actions (Barsalou, 2003, 2008; Boncoddo et al., 2010; Glenberg et al., 2008); secondly, cognition is not just about thinking - in other words, if we recognize the important role of perceiving and acting for cognition, than we have to include the non-cognitive in the very definition of cognition (Barsalou et al., 2007; L. B. Smith, & Sheya, 2010). Emotions and affective processes are also an important contributor to cognition. As a consequence, our understanding of thinking will have to go beyond information processing in the symbolic sense (Boroditsky & Prinz, 2008; M. Wilson, 2008).

Embodied cognition (EC) is a broad term used to describe a class of theories within cognitive science, many of which emphasize the importance of our bodily interactions with the environment for acquiring and representing conceptual knowledge (Borghi and Cimatti, 2010). That is, contrary to classical cognitive theories, which deemphasize the importance of the body for cognitive processing and posited that cognition strictly involved the processing of abstract and amodal symbols, EC theories tend to assume that our actions and bodily experiences are crucial to our cognitive processing. According to EC theories, direct interactions are essential for gaining knowledge and developing cognitive capabilities (Engel et al.,2013), and higher order and offline cognitive processing (i.e., removed from the environment) involve re-enactment of the bodily states from previous experience (Foglia and Wilson, 2013).

Theories of EC have become a prominent way of conceptualizing cognitive processing and have been particularly influential in reconceptualising and explaining adult language processing. A large number of studies have now provided evidence that when comprehending language, humans simulate the meaning implied in words and sentences [e.g., implied motion (Glenberg and Kaschak, 2002), object orientation (Stanfield and Zwaan, 2001)]. Thus, using the information gained through their experiences with the world to represent concepts and comprehend language. There are now a number of variants of EC theories that posit different degrees of embodiment and disembodiment (e.g., Mahon and Caramazza, 2008; Meteyardetal, 2012).

The disembodied end of the spectrum is represented by what is essentially the classical cognitive perspective described above, which posits that sensorimotor experiences are not involved in cognitive processing (Meteyard et al., 2012). From a developmental perspective, this end of the spectrum would be represented by the view that, while these experiences might be important for infants' earliest learning, cognition becomes progressively more abstract and less embodied with development. At the other end of the spectrum, a strong embodied account suggests that cognition is constituted in action (Glenberg and Gallese, 2012), and that our conceptual representations are dependent on sensorimotor experiences. From a strong embodied perspective, cognitive processing involves a recreation of direct sensory experience (Meteyard et al., 2012).

EC theories can be viewed along a continuum with regards to the emphasis placed on the role of embodied experience, and numerous studies have demonstrated that embodied knowledge plays some sort of role in learning concepts and language processing. However, there has been less research conducted to examine embodied effects in learning processes, and less discussion of the implications for EC theories in research examining cognitive development. Kontra et al (2012) proposed that "theories of embodied cognition have the potential to deepen our understanding of the mechanisms underlying early developmental changes driven by action experience". In addition, we propose that to refine theories of EC, it is essential to consider the insights that can be gleaned from developmental research and how those experiences shape knowledge.

In the western philosophical tradition, the fact that we have bodies has been mostly regardedas irrelevant or peripheral to the understanding of knowledge and cognition. Hence, the adoption of bodily gestures for teaching and learning processes is an idea that would seem out of place in a traditional society such as Nigeria. However, this approach as seen in various studies discussed earlier in this article is one that does not only aid the learning process but triggers a part of the brain that improves retention of knowledge.

It is true that various other challenges are facing the present educational system in Nigeria, including inequality in educational standards, lack of standard science and technology facilities,

problem of stability of power, amongst many others. But focusing on introducing a better approach for instilling the knowledge in students, this concept of embodied cognition is one that will certainly do the future educational system of Nigeria so much good. Proponents of the view known as 'embodied cognition', by contrast, emphasizes the role of sensory and motor functions in cognition itself. By viewing the mind as grounded in the details of its sensory motor embodiment, they model cognitive skills as the product of a dynamic interplay between neural and non-neural processes. On this view, there is no fracture between cognition, the agent's body, and real-life contexts. Consequently, the body intrinsically constrains, regulates, and shapes the nature of mental activity. Call this view the embodiment thesis about cognition.

This paper has definitely not experimented how effective and welcoming the introduction of embodied cognition will be in the Nigerian system. However, it is opening an insight to an approach that will certainly be of positive impact to the teaching and learning process of the educational system in Nigeria.

Conclusion

Embodied cognition being an approach to adopting bodily gestures in improving the cognitive process of learning has been introduced in this work. The area of application was aimed at the educational system of Nigeria. This educational system is one that is seen to be presently with a number of challenges, although more emphasis in previous literature has been placed on the environment such as introduction of better science and technological gadgets and less emphasis on how the learning process and the retaining ability of students can be improved. This article has looked into that aspect by introducing the concept of embodied cognition in improving and creating a better future for the Nigerian educational system.

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