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# **Integrating Indigenous Knowledge System In Nigerian Primary Science Instructional Strategies: A Panacea For Entrepreneurial Skills Acquisition And Attainment Of Vision 2020**

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## **Abstract**

*Attaining the goals of vision 2020 is possible if our science education instruction trains children to be critical thinkers. This paper discusses Indigenous Knowledge System (IKS) of epistemology and children prior knowledge as ways of instilling entrepreneurial skills in Primary Science. Several examples of IKS activities areas that can be used to teach Primary Science using a constructivist model where identified. Suggestions for improved instructional strategies towards functional science education were proffered.*

## **Introduction**

Every nation of the world wants to attain some level of scientific and technological advancement that will make its people self sufficient in every aspect of life. To achieve this, development targets and plans are usually set. This accounts for why Nigeria apart from its several national development plans, set up vision 2010 which has not been properly pursued and now a new target vision 2020. The vision concept note states that by 2020, Nigeria will be one of the 20 largest economies in the world able to consolidate its leadership role in Africa and establish itself as a significant player in the global economic and political arena. To attain this by year 2020 the following 7 areas were identified as key parameters: Polity, macro-economy, infrastructure, education, health, agriculture and manufacturing as drivers of the visioning goals. While the critical success factors includes, commitment from government, shared ownership of vision by Nigerians, good planning, mobilization and inclusiveness. It is important to note that out of the seven (7) parameters of the vision, education seems to be the backbone of achieving this vision since all the other

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sectors depends on it for manpower training. Since no nation can rise above the quality of its education (FRN, 2004). There is an urgent need to take a cursory look into past attempts of technology transfer and visioning process which has not yielded the desired results. This call for reexamining the kind of education given to our young ones which will make them critical thinkers, inventors and all rounds nationalist we so much desire. The quality of our instruction in science education has to be improved upon. More so, researchers have shown that students attitude to science is poor (Eriba 2000) and our instructional methodology is defective (Anikweze, 2000) with inadequate instructional materials (Jegede and Okebukola, 1995). Nwaka (2006) also acknowledged that the economic crisis of the 1980s and 90s and associated policy failures, widespread poverty, inequality and environmental deterioration has caused renewed interest in new approaches to development which emphasizes the cultural dimension of development and it's often over looked potential. Introducing IKS strategies, which integrates our culture, environment and values into learning/teaching in the form of Childrens' prior knowledge is desirable.

Afolabi (2006) posited that in the development of human knowledge, science has emerged to be one of the greatest and most influential fields' resulting in discoveries, through universal laws which includes observations, experiment, data collection, and analysis and formulation of hypotheses. However, research has shown that African indigenous knowledge systems are excluded from this western type of science. She further asserted that studies though not popularized have revealed that Africa indeed employs science in all her indigenous knowledge systems. This had sustained her before the advent of western science. This calls for an education system that integrates indigenous knowledge. The need to integrate IKS epistemologies in to Primary Science education curriculum stems from the inability to the western science to adequately address the pervasive challenges of poverty, hunger and disease ravaging many African countries. IKS is the single largest knowledge resource not yet mobilized for national and international development. This paper seeks to identify links between IKS and entrepreneurial skills acquisition in Primary Science.

### **IKS and Primary Science Teaching**

It is a known fact that conventional science does not support students learning based on their indigenous knowledge. This Indigenous knowledge is often regarded as non science, while this is what children bring in to the classroom. Thus, the World Bank (2005) encourages that learning environments needs to be adapted to help students build on their indigenous communities knowledge systems, culture and values. It calls for a pedagogy that recognizes and combines the indigenous knowledge students bring with them to learning environment and using this as a stepping stone to help them succeed academically. Thus IK can be seen as the prior knowledge about the community and environment that students bring in to the classroom.

Prior knowledge (students' experiential knowledge) gained from living and working in their communities and homes has been discovered to have a great influence on the way children learn science (Duguryil, 2001). She argued that teaching supported with prior knowledge increases students ability to grasp and retain science concept taught to them. This prior knowledge can be thought of as their IK. Constructivist have provided a theory that builds learning on the position that children construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. This approach often eliminates alternative conceptions which occur when children learn from no knowledge to a concept. Counting on this prior knowledge will motivate children to learn sciences develop personal interest and feel ownership of the information they have learnt. This position is supported by Friere (1993) who opined that allowing children to have ownership of their knowledge is equivalent to respecting their culture, tradition and identity. World Bank (2005) assted that indigenous knowledge can act as a powerful tool in a learning environment to teach students functional skills.

### **Indigenous Knowledge System and Entrepreneurship**

Summer, Talus, Bachman, Barnes, Lynch, & Maetas (2004) defined IKS as knowledge acquired and preserved through generations in an original or local society and is based on experience in working to secure subsistence from nature. African IKS adequately prepared its young for life using skills acquisition. IKS is likely to put in place a learning mechanism that emphasizes training/apprenticeship which makes the young self-reliant. Our current system seems not to adequately address this judging from the structural content of the present Primary science curriculum. To achieve these, Primary Science curriculum should be made adaptable, stimulating and relevant to the needs of the society a purpose which IKS had served before the advent of western science. Educators have recognized the importance of using traditional knowledge in classroom thus placing efforts on culturally relevant curricula. Integrating IKS in our classroom science lessons, activities and projects gives added depth and meaning to difficult concepts and builds communication and respect for community values. More so, this will ensure that teachers harness the pupil's prior knowledge to enhance knowledge acquisition, retention and application. Knowledge with application has been the hallmark of IKS and entrepreneurship.

According to Ezeudo (2008) entrepreneurship education has the following advantages:

- It will help students to form a knowledge base about the formation and operation of a business and develop some level of familiarity and comfort with business environment such as technological change to the micro enterprise.
- It plays a complementary role in developing the occupational knowledge, skills and work experience of learners.
- It offers opportunities for job experiences, earning, investing and a sense of self worth.
- Reduction in unemployment.

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Achieving an entrepreneurial - based science education will involve identifying content areas within contexts of children prior knowledge during all Primary Science instructions.

The table below shows some IKS - related areas of science education significant in teaching Primary Science to children towards critical thinking and entrepreneurial skills acquisition.

**Table1**  
**Indigenous Knowledge Content Areas that can be Applied in Primary Science Teaching in Nigeria**

<b>IKS content/activity</b>	<b>Areas to apply in primary science</b>	<b>State</b>
Divination (par) system	Binary numbers truth fullness, mantic sciences quantum physics, computer sciences and health and healing	Plateau and central Nigeria
Oratory epistemology	Listening/comprehension skills, history health and healing	All
Traditional health care	Health and healing	All
Metallurgy industries	Metals, non-metals	Central Nigeria
IKS pact making	Pacta sunt servanda in international law/science history governance	Uyo Ibibio
Aladimma conflict resolution	Participatory conflict resolution, good governance	Igbo Land
Communication by gong drums etc	Communications in science	All
Eyei leaves	Communications, plants types etc	Ibibio land
Traditional bullet proof system	War, military and health depece system	All
Gin distilling	Fermentation, distillation, purification	All
Lie detection (divination)	Honesty, science attitudes	All
Soap making	Saponification	All
Indigenous numeration	Computations, technique	All
Treatment of defiant illness	Diseases and treatment health and healing	All
Cosmology and healing	Disease aetiology, holistic health	all
Deviant sexual behavior magun	Scientific attitude, reproduction, morality	South west
Clothing and cosmetics	Production, skills	All
Shem cultural salt	Purification, filtration	Central Nigeria
Palm oil making		South states
Pottery	Production, captivation measurement, design	All
Canoe making	Construction, measurement etc	All
IKS architecture	Building, construction etc	All
Fire production	Energy	All
Crafts	Environment, manufacturing	All

	measurement, colors design	
Language/performance arts	Explain diff concepts principle and theories, governance, self-worth	All
Building terraces	Agric, construction	All
Agricultural systems	Conservation, food production food security	All

### **Recommendations for Attaining Vision 2020**

1. Primary science curriculum should be structured to provide IKS - based entrepreneurship education to reduce unemployment and train children as critical thinkers and problem solvers.
2. STM curriculum should demonstrate connection between prior knowledge and existing science to make it relevant.
3. Teachers should integrate IKS to remove alternative conception among children in Primary Science learning.
4. Every lesson should create an opportunity for exploration and free flow of ideas and knowledge.
5. Primary sciences teachers should be sensitive to the cultural gaps that exist between home and school which will foster critical thinking in children.
6. Teachers should be aware of the value of integrating their learners' way of seeing and way of being with existing epistemologies and paradigms used in sciences and technology.
7. Policy makers should create space for teachers to be creative and innovative within the child context. (Van Wyk, 2002).
8. To reflect the inclusiveness and shared knowledge structure of the vision 2020, roles should be assigned to all sectors of the economy. Bulletins, information flyer should be designed to inform Nigerians constantly of progress and directions the vision.

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