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The Integration Of Ethno Physics Into School Curriculum For Skill Acquisition Among Secondary School Students In Nigeria

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Abstract: ***This paper presents a holistic approach towards the integration of ethno physics into school curriculum for skill acquisition among secondary school students in Nigeria. Specifically the paper discussed the meaning of ethno physics, rationale for integration of ethno physics into formal school curriculum, ethno physics and skill acquisition. . Ethno physics deals with the knowledge of indigenous culture, it serves as a base for the construction of reality by linking culture to advanced scientific knowledge. The students through ethno physics are taught how to utilize local technology to develop music, enhance the production of brandy, and the use of trap making to catch animals The paper recommends among others that all institution and agencies involved in indigenous knowledge system should establish without further delay, appropriate linkages with schools to ensure proper synergy between science education programs and existing indigenous systems for effective hybridization, incubation, skill acquisition and sustainable development.***

I. INTRODUCTION

Over the years there have been several initiatives by teachers in the various professions to make a revolutionary change in the curricular content of science oriented subjects. Creation of mobility and exchange of experience is needed in Nigeria, not only between universities, but also between the business world, where greater sharing of knowledge and acquisition of skills could be practiced (Ige, 2009). The difficulties faced by the Faculty of Natural Sciences in the process of teaching different subjects in the field of physics related to the behavior of the students and their attitudes towards the importance and the role of physics in society, as well as their understanding of several physical concepts and phenomena indicates that the way the students learned physics at secondary school must be changed.

Palmer (1995) argues that students feel physics to be something alien to their lives, and at the same time they find it difficult to apply their knowledge to the resolution of practical every day problems. Staff and students appreciate that the aforementioned situation is not only as a result of poor teaching conditions, but also of the necessity to bring this science closer to the cultural environment of the students, integrating technology such as ethno physics into classroom instruction means more than teaching basic concepts such as electricity or light (Erekson and Shurnway, 2002). Effective integration must happen across the curriculum in ways that research will deepen and enhance the learning process. In particular, it must support four key components of learning: active engagement, participation in groups, frequent interaction and feed back and connection to real world experts.

Effective ethno physics integration is achieved when the use of local technology is routine and transparent and supports the curricular goals (La Porte and Sanders, 1995). Learning through projects allows students to be intellectuality challenged which provides them with a realistic snapshot of what the modern office looks like. Through projects, students acquire and refine their analysis and problem-solving skills as they work individually and in teams to find, process and synthesize data they have found locally or online. In the past education was deeply rooted in the traditional, cultural and vocational skills of operating communities (Ikpesu, 2008). These vocational and economic skills, though, vary among communities, inculcate in the children the character, personalities and competences for future survival.

According to Ige (2009), parents prepared their children for handicraft exercises and to master the production techniques even before reporting to school. The school only

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continues what the children have been exposed to at home and this makes learning very interesting. Basically, the school curriculum in the past specially operated the use of local crafts in instruction, particularly in the outline subjects. For instance, students and pupils were productively trained and engaged in handicraft such as wood work, weaving, basket making rope making, broom production etc (Onstenk 2003). The inclusion of ethno physics into the school curriculum for the actualization of skill acquisition programme must be seen in the context of bringing science closer to the students' cultural environment. This will enable us to understand the natural phenomena and how it works and what concepts are used. It will also help us understand how people traditionally solve practical every day problems and how the techniques were used, The paper highlights the rationale of ethno physics in modern curriculum, and ethno physics and the skill acquisition, conclusions and recommendations were made to propagate effective skill acquisition programme for our students using local technology.

II. MEANING OF ETHNO PHYSICS

According to Oxford learner's dictionary ethnology is the study of the characteristics of different people and the differences and relationship between them. Ethno-physics describes the peoples, environment and cultures. The integration of ethno-physics in the school curriculum affords Students the opportunity to exhibit the potentials and talents inherent in them. The fundamental principle in ethno physics is that it is an aspect of an indigenous knowledge system in which basic concepts and practices are enshrined in environmentally dependent and culturally reinforced knowledge myths and supernatural (Abonyi, 1999) ethno physics classroom involves designing practical models of integration of indigenous and cosmoposlitan knowledge systems with a view of more balanced processes of development and change.

As Warren et al (1995) noted, that the study of ethno physics encompasses five major aspects:

- ✓ the prehistorical assessment of a particular community or society in its natural and cultural setting.
- ✓ the culture specific or culture bound references of the term.
- ✓ the holistic approach towards the inclusion of a range of sub-systems of knowledge and technology in other sectors.
- ✓ the more dynamic assessment of the concepts of culture in terms of a configuration of interacting western and non-western knowledge system.
- ✓ the comparative of normative western and non-western inspired orientation towards the development process in certain regions or cultures.

RATIONALE FOR INTEGRATION OF ETHNO PHYSICS INTO FORMAL SCHOOL CURRICULUM

Science begins with preconception, with the culture and with the common sense. Kneeler (1991) views ethno physics as a process through which a child constructs the pictures of his environment in the light of his own experience provided that he reaches the objective picture of the universe and to bridge the gap between the learners and the world of reality.

Abonyi (1999), Ajikobi and Bello, (1991) hinge their argument that ethno physics offers the following to learners.

- ✓ A basis for construction of reality. Since ethno physics deals with the knowledge of indigenous culture, it serves as a base for the construction of reality by linking culture to advanced scientific knowledge. It therefore serves as a middle man between fantasy and exact knowledge or between drama and technology. Ethno physics, like magic, turns men's mind to the external world, it suggests the need for manipulation and observation.
- ✓ A useful means of systematizing certain aspects of anthropological data. Ethno physics serves as a bridge through which children from various cultural backgrounds cross over to modern conventional or western science. The exposure of the child to certain aspects of anthropological data reinforces his supernatural ability and the prevalent role learning will be avoided in learners as children can now compare, contrasts and create links in the ethno physics classrooms.
- ✓ Clears false belief about science. Studies in ethno physics helps to reflect the different intellectual traditions of various cultures as well as the scientific problems of each scoeity. The western scientists have constantly played down the validity of ethno physics based on the assumption that it does not submit totally to their laid down method and procedure. Adams (1983) noted that nobody has a monopoly of truth. There is no correct way of knowing except through conceptual methodology and intuitive methodology that has emerged as a result of multi-cultural science classrooms.

III. ETHNO PHYSICS AND SKILL ACQUISITION

Fafunwa, (1983) Adesoji and Akpan (1991) noted that science taught in Nigeria and African schools generally make us academic foreigners in our own country. Fafunwa explains that for a child to accept and adapt to a new field of knowledge the gap between him/his culture and the new field of knowledge has to be bridged. The introduction of ethno physics into the school curriculum will develop practical models on indigenous and cosmopolitan knowledge which will bring a balanced process of development and change to the door steps of the students.

The integration of ethno physics into the school curriculum will develop students skills in the following areas:

- ✓ Music – Through ethno physics students can describe the traditional musical instruments, explain the concepts and ideas about the principal parts of the instruments, the function, sound production and the way of playing them, for example how the musician tune his instrument and also the comparison between the processes of music teaching in Nigerian traditional culture and their relationship to Euro-music teaching.
- ✓ Brandy-Making: Students can acquire skills in brandy making through the distillation process. The technology is explained by an expert, who interprets the process of

distillation and its evaluation by producers. The traditional distillation process is linked to relevant topics in the physics programme at the secondary schools.

- ✓ Traps-Making: The mechanism of trap making and process of production can enhance the skills of students in local trap making. Their experiences are evaluated by getting small animals to fall into the traps. The expert uses these mechanical devices to challenge the students in the classroom about the physical interpretation with reference to the forces involved and take measurements of strengths and force.

It is believed that with the involvement of students in the acquisition of these skills, will give them the opportunity to better understand their environment and develop new ideas about physics.

IV. PROCEDURES FOR INTEGRATING ETHNO PHYSICS INTO SCHOOL CURRICULUM

Physics which has been found to be the bedrock of scientific and technological development worldwide in both developed and developing countries alike, has some features which are generally accepted and believed to widen the knowledge and increase the horizon of understanding of physics by the learners (Adeyemo, 2010:29) These features are made essential because it is believed that, if they are duly and critically integrated into the school curriculum it will be able to make this subject easy to comprehend by learners.

To introduce sustainable innovation in ethno physics, appropriate procedures should be taken in the following directions:

- ✓ Designing a network of concept of hybrid with proper integration and linkage across boundaries – Constance et al (1995) are of the opinion that school science programe should be designed to ensure hybridization of concepts and processes across cultural boundaries. This involves establishment of linkages with international institutions on indigenous knowledge like the Centre for Indigenous Knowledge for Agriculture and Rural Development (CIKARD). Nigerian Institute of School and Economic Research (NISER) and others, by so doing science classroom especially physics will become technology incubators and pioneer innovation for sustainable development.
- ✓ Development of instructional models for community science education based on indigenous concepts, practice and products. Warren, et al (1995) suggests that based on the outcome of the global network and linkages between local and international centres on indigenous knowledge, a new classroom module will be generated. This will lead to the emergence of more integrated and united knowledge system devoid of sectoral barriers.
- ✓ Building Science Classroom with specific focus on local entrepreneurship. A number of indigenous technologies were identified by CIKARD, NISER and others. The questions is how do we build these technologies into our formal science classroom processes, so that they can be improved upon and internationalized. This can also be achieved through the establishment of indigenous technology centres.
- ✓ Introduction of Multilingual Science education module to facilitate access and utilization of Indigenous Knowledge System (IKS) across culture and ensure intercontinental partnership-most Indigenous Knowledge Systems (IKS) and concepts are presented in folks languages. It is pertinent that networking centres on indigenous systems, work hand in hand with education ministries and schools to ensure that language does not pose a barrier to effective consumption of inter cultural knowledge and skills.

V. CONCLUSION

It is pertinent to draw conclusion that the involvement of students in activities that will give them an opportunity for better understanding of their environment and for developing new ideas about physics, will contribute to the reduction of the gap between school curricular and the social and cultural environment of the students. The science education (ethno physics) should be made more relevant to the perceived needs and interests of the students where they can engage in skill acquisition programmes that are found within the community and which has some cultural affiliation. The integration of ethno physics into the formal school curriculum will enhance the development of cultural skills such as brandy making, trap making and so on. The study of ethno physics helps to reflect the different intellectual traditions of various cultures as well as the scientific problems of each society.

VI. RECOMMENDATIONS

Based on the relevance of ethno physics in the propagation of indigenous technologies, the following recommendations were made:

- ✓ All Institutions and agencies involved in indigenous knowledge system should establish without further delay, appropriate linkages with schools to ensure synergy between science education programmes and existing indigenous system for proper and effective hybridization incubation and sustainable development.
- ✓ Skill Acquisition Programmes should be established in all institutions where ethno physics curriculum will be integrated and improved upon to an international standard.
- ✓ The ethno physics curriculum forms part of the learning experiences students are expected to achieve, the teachers should therefore provide opportunities for students to understand the important interrelationships among science technology, society and the cultural environment.

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