NIGER DELTA
JOURNAL
OF EDUCATION

A PUBLICATION OF
THE FACULTY OF EDUCATION
NIGER DELTA UNIVERSITY
WILBERFORCE ISLAND, BAYELSA STATE, NIGERIA.

NIGER DELTA JOURNAL OF EDUCATION

CONTENTS

CONTENTS

Re – Engineering Appropriate Village Technology for Sustainable Rural Educational Development in Africa

Christopher O. Omoregie, PhD
Department of Adult Education,
University of Ibadan.

Jonathan E. Oghenekhowo, PhD
Department of Educational Foundations,
Niger Delta University, Wilberforce Island,
Bayelsa State, Nigeria.

ABSTRACT

Accelerated sustainable development built on Rostow's take-off theory of economic development sets the stage in grassroots development in any community. This, in our stance, was significantly supported by the use of appropriate village technology. This paper, therefore argues that, although the overriding objective of the millennium development goals is reduction of poverty in all its forms, as well as the attainment of social –well-being, much attention has not been paid to the development of indigenous knowledge in this drive. Consequently, this discourse, examined the re–engineering of appropriate village technology as advanced by indigenous knowledge base on rural education for sustainable community development in Africa. Lessons, challenges and options were advanced for policy decision and implementation.

INTRODUCTION

In recent years, there has been considerable upsurge of interest in the use of appropriate village technology in the series of debates on rural education and development. For instance, article 8 of the United Nations Biodiversity Convention held in Rio in 1992 mandates that parties, that is, countries, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles and promote their wider application with the approval and involvement of holders of such knowledge, innovations and practices and encourage the equitable sharing of benefits arising from them. Similarly, one of the 8 - point goals of the millennium development agenda is the attainment of sustainable development which is locally driven within economic, cultural, technological and political contexts through partnership.

The unfortunate interest on development that is built on local realities in Africa is indeed surprising in this era of globalization where technology - driven western models of development are being projected. This perhaps arises from the failure of western technology-based models to adequately tackle the development problems faced by developing nations such as, redistribution of wealth and satisfaction of basic human needs. The modern sector high technology industry thus appears, inappropriate in meeting developing nations' expectations with their conditions of high unemployment, capital shortage and predominantly rural populations.

Conceptualizing Appropriate Village Technology

Appropriate village technology may be understood as those materials, equipments and tools which are designed and aimed at providing solutions, through rural education

that correspond to the individual and material problems of the local community, and which can employ local processes and products to promote the economic and social progress of the local community.

Thus, after a process of selection, modification, or adaptation to the prevailing conditions in the community, such technology should match those development conditions (Ikejiani, 1964). Most essential in the contextualization of appropriate technology is that, such technology should have human dimensions. This informs Toma (1979) submission that, because village technology serve man, they should be controlled by humans, and should not compromise the basis of human life nor their environment. In this wise, appropriate technology is essentially tool designed to serve community development goals through the utilization of local resources. The focus of village technology is on the use of local resources which implies materials, energy, manpower and "technical-know-how" which are adaptive to any community setting.

Put differently, village technology refers to indigenous knowledge used to meeting basic and immediate needs of the people such as economic, health, social and governance. It can be seen as:

i)   techniques which make an optimum use of local resources and maximize social welfare (Morawete, 1974);

ii)   traditional techniques which are labour intensive, low cost, small scale and decentralized productive system (Browne,1981);

iii)   appropriate to the particular situation faced by a given group of people, with consideration given not only to economic circumstances (Long, 1980), and available resources, but to value priorities;

iv)   technology employed by the native inhabitants of a country and which constitutes an important part of its cultural heritage and therefore, be protected

against exploitation by industrialized countries;

v)   a flexible and participative approach to developing a viable, regionally applicable and sustainable development; and

vi)   an alternative technology which is designed to utilize resources sparingly with minimum damage to the environment at affordable cost and with a possible degree of control over the process.

Rationale for Appropriate Village Technology in the 21st Century

Despite the advancement in technologies that made it possible for humans to go to space, attempt in living in other planets apart from the earth, and communicate to each other no matter the distance, village technology remains relevant to development in the following ways:

a.   easily used by the skilled and unskilled alike;

b.   It has a high rate of accessibility;

c.   it can easily be maintained. there is no difficulty getting the parts for repairs;

d. it uses locally available resources;
e. it is culturally acceptable; and
f. it is affordable, effective and sustainable (Ikejiani, 1964: Newman,2012)

These benefits of village technology have made it sustainable in African countries where there is high rate of poverty, disease and illiteracy. To combat these three human development problems, adaptation to local technology through rural education provides affordable food and shelter, medicine and the spiritual direction for knowledge about the future. For the transformation of any society, Newman (2012) opined that human beings in an environment should learn as much as they can so that the environment whether material or social, be subjected to cause and "predictable" effect of possibility transformative learning.

Appropriate Technology and Community Development - The Mix
While most communities want to preserve and develop their village technology, and continue to share it among community members, many have seen their knowledge begin to disappear. Lifestyle changes, in particular, have hampered transmitting indigenous knowledge from the older to the younger generations.   Preserving community's Indigenous Knowledge (IK) is different from protecting it from misuse by others. Communities preserve to their knowledge through rural education for a number of reasons. Some communities have identified a range of economic benefits to be gained from sharing their IK with others. They do not want to have these economic benefits stripped from them. For example, some aspects of village technology can contribute to industries such as eco-tourism, culture, clothing, art, cosmetics, agriculture, health, infrastructure, among other (Olawole, 2004).

Specific products and services, which have existing or potential markets outside the community, may be related to a community's knowledge. The identification, preservation and use of a community's 1K can, therefore, help the community achieve its own economic development goals (Okeke, 1992). Other reasons to re-engineer and preserve 1K are artistic in nature. For example, some community members create artistic and literary works that draw on traditional knowledge. They do not want, as any artist, writer or musician would not, to have their works used without their permission.

However, they may want to have access to a complete store of community knowledge as possible to stimulate their creativity. Preserving appropriate village technology will also contribute to the cultural and political goals of self-identity, self-reliance (especially the ability to support traditional lifestyles), and self-government by creating a strong, ongoing, appreciation within the community of its history and its roots. For many communities, these reasons will be the most important for preserving and protecting their village technology in the 21st century (Browne, 1981).

Re-engineering Appropriate Village Technology for community Development
Good as the benefits of indigenous knowledge may serve the local community, there is a growing challenge of its continuing adaptation to the immediate environment, (Brascoupe and Mann, 2001).

This challenge calls for re-engineering the indigenous knowledge for sustainable development. Re-engineering the village technology in this context depicts a holistic approach to re-inventing the process. Hammer and Champy (1993) define re-engineering as the fundamental rethinking and radical redesign of business (activity) process, to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service and speed.

The characteristics of re-engineering process from the above conceptualization are evident in:

I   fundamental rethink and radical redesign of an enterprise process (including village technology); and

ii.   achieving a dramatic improvements, (say in the design, development and utilization of village technology), in critical contemporary measure of performance in terms of cost, quality, service and speed.

These two characterizations of re-engineering process are highlighted as the key aspects of re-engineering (appropriate village technology) which Hammer and Champy (1993) identified as fundamental rethinking on what constitute appropriate village technology in terms of sustainability, efficiency and necessity. Secondly, is the aspect of radical redesign, not in terms of modification, but, a reinvention through learning which the writers consider as the most important aspect of this process. Thirdly, the key term calls for dramatic results that promotes improvements and the fourth key word in the re-engineering is processes. Hence, re-inventing village technology is a call for strategic application of the fundamentals of re-thinking on cost, quality, service and speed which must be relevant to community development expectation within the context of indigenous knowledge. In environments where such processes have taken place, evidences abound about the level which such communities have achieved in agriculture, medicine, craft, vocation, among others.

Examples of Village Technology in Africa
There are technologies such as cultural artifacts, mode of dressing, types of food and agricultural systems in Africa before the invasion of western civilization. Other examples of village technology include weaving technology, the zai technology, pottery making and chewing stick.

Weaving Technology
Weaving technology is very popular among Africans and this is evident in the popular demands of Africans wears across the globe. Sakorawono is one of the weaving villages lying to the North-east of Kumasi in Ashanti Region of Ghana, Ipetu-Ijesa in Nigeria is popular for mat weaving since the early 1990s. Mat from Ijesa made its debut to the international markets where it was used in making fanciful hand bags for conferences and domestic utilities. The materials used can also be adopted in making special shoes for those in the temperate region of the world.

Zai Technology

The Zai technique is one of the most appreciated techniques by farmers in Northern Burkina Faso. It is the plant-pit system (demi-lunes) or Zai" in the local language. The technique originated in Mali in the Dogon area and was adopted and improved on Northern Burkina Faso by farmers after the drought of the 1980's. (Yunus,1998).

Farmers apply the Zai technique to recover crusted land called 'Zippelle'. Zai is a planting pit with a diameter of 20 - 40 cm and a depth of 10-20cm. The dimensions vary according to the type of soil. Pits are dug during the dry season from November until May and organic matter is added at an average recommended rate of 0.6kg per pit and after the first rainfall, the matter is covered with a thin layer of soil and the seeds placed in the middle of the pit.

The excavated earth is ridged around the semi-circle to improve the water retention capacity of the pit. Zai fulfills certain functions of soil and water conservation and erosion control for encrusted soils.

The advantages of Zai are that it:
i.   captures rain and surface/run-off water;
ii.   protects seeds and organic matter against being washed away;
iii.   concentrates nutrient and water availability at the beginning of the rainy season;
iv.   increases yield; and
v.   reactivates biological activities in the soil and eventually leads to an improvement in soil structure.

The application of the Zai technique technology has reportedly increase production by about 50% if properly executed.

Pottery Making

In Apiadu, Ghana, pottery making is a year round occupation and all the potters regard this as their main work activity and farming as a secondary pursuit. A survey by Browne (1981) reveals that pottery is mostly done by older women of over thirty-five years old. For them, pottery has been a way of life as well as a means of earning a living over a period of years. Pottery manufacturing entails little direct financial cost to the women potters. The raw materials are free and the day - pits are within the Apiadu stool-land.

Chewing Sticks

Olawole (2004) compared chewing stick with toothpaste and noted the following advantages of chewing sticks. It does not have negative effect on mouth gum; there is a better grip and control in navigating the curvature of the mouth; contains fibre that cannot penetrate and injure the lining of the teeth; chewing is good exercise for the jaw and could solidify the tooth and it has medicinal properties against mouth infections.

Problems of Village Technology

African societies succumbed to western civilization in the 18th and 19th centuries.

Foreign products such as mirrors, alcoholic drinks and other accessories attracted Africans' forefathers. Some of them sold their people into slavery for the privilege of foreign articles. Although, there were some rulers like Jaja of Opobo and Kosoko of Lagos who resisted the colonialists, their lands were later captured. What were the weaknesses of local technologies that made them gave way for others?

I   Local technologies were not popularized among the people. Some forms of knowledge were restricted to groups or class.

ii)   Lack of documentation. It is popularly believed that the death of an elderly man in Africa is an extinction of a whole library. The magnitude of knowledge that Africa has lost to lack of documentation can be imagined if despite the loss we observe the present physical and human endowment of the continent.

iii)   Problem of mass production. While mass production is much more possible with western technologies, it could be hard to come by in Africa due to failed infrastructural facilities that could aid their mass production and conservation.

Challenges of Re-engineering Appropriate Village Technology in Community Development.

Village technology has a wide range of commercial and scientific uses, it is becoming increasingly valued by people. In recent years, interest in this knowledge has greatly increased, and stimulated by the search for knowledge of medicines, sustainable use of the environment and their cultural practices and arts. This has led to situations where indigenous knowledge (IK) has been gathered and used without contacting the source of the knowledge, for example, the use of traditional medicines as a basis for developing western pharmaceutical product and herbal remedies.

Abuses of IK include among others:

a)   Unlicensed and unauthorized commercialization of IK.

b)   Taking images, such as photographs, film and video of local people and their ways of life.

c)   Use and misuse of technological symbols without permission.

d)   Disclosing secret knowledge and cultural property.

e)   Publishing research associated with village technology without recognition or reward for the knowledge holders.

f)   Entering into community research without fully explaining how the research will be used or who owns the results in terms of technological attainments.

Because of these challenges, protecting IK from unauthorized use by others is a growing concern for local communities in respect of re-inventing their local technology.

Prospects of Appropriate Village Technology for Sustainable Community Development

An informed community can meet any challenge to its IK whether it

is preventing encroachment, negotiating equitable sharing arrangements, or creating processes to communicate traditional knowledge to sustain future generations. New aspects of a community's IK may be discovered in a forgotten archive, leading to new options (re-engineering) to be explored for their social or economic values. New opportunities can mean new benefits for the community. However, to take advantage of these new opportunities, a community must not only have flexible action plans, but must also be kept informed of new development in terms of re-engineering its appropriate village technology.

A community that remains informed through education is more likely to continue to support the allocation of resources to preserve and protect its village technology. Because of this, ensuring that the community does stay informed and involved should be seen as an important component of the overall action plan for community development as mediated by rural education.

Keeping a community up-to-date is an ongoing task, which means that some basic processes should be followed. The checklist below presents some recommendations on how to maintain interest in the IK efforts, and in doing so, create an informed community for creation and adoption of appropriate local technology for community development objectives through re-engineering, refocusing and re-thinking in community development.

Checklists on recommendations are the following:

1. There is need to ensure one group does not dominate the process of decision making on the village technology.
2. Africans should ascertain all voices have a chance to be heard during meetings, discussions and brainstorming sessions that are relevant to local resources which can be applied to village technology.
3. Community members have to identify particular problems experienced by less vocal community members on their creative instinct.
4. There should be a wide range of community representation on the 1K committee and at major meetings: such as women, men, elders, youth and specific groups(knowledge keepers, artists, hunters/fishers, and other native professionals).
5. Maintain the group's interest through workshops, invitation of guest speakers and training on the process of re-engineering the village technology.
6. Keep the community informed about issues of developments, successes and benefits achieved through the local technology for overall community development.
7. Sustain participatory and consensus-building approaches to maintain support for

community's IK goal and direction. Always ensure community involvement by searching for and using best practices for developing and maintaining community

involvement and sharing information with other similar organizations as well as establishing a network that can benefit from sharing experience and best practices.

CONCLUSION

The Asian civilization gives an impetus to developing an appropriate village technology in African countries. There is need to go back to the roots by a reorientation of attitudes, skills and capacities in line with identifiable technologies that are culturally based in development expectations. As long as Africans continue to consume foreign goods without looking inwards into owning its technologies, Africa is bound to be lost in the globalization trend. Given the enormous natural and human endowment of Africa, it will be a great loss to humanity that the African identity is not found in human collective consciousness. All government and civil societies' efforts need to be geared towards developing appropriate local technologies. This is because, local technologies are capable of addressing some of the problems that have persisted in Africa since colonialisation.

REFERENCES

Brascoupe, S. & Mann, H. (2001). A community guide to Protecting Indigenous Knowledge. E.V. Baeyer (ed), *Research and analysis directorate, Department of Indian Affairs and Northern Development. pg. 6-7; 44 - 45.*

Browne, A. (1981). *Appropriate technology and the dynamics of village Industry: A case study of pottery in Ghana. Transactions of the Institute of British Geographers, New Series, Vol. 6(3),3 13-323*

Ikejiani, O. (1964). *Nigerian education;* Lagos. Longman.

Long, F. (1980). Appropriate technology and social values: A critical appraisal. *Bulletin of the American Academy of Arts & Sciences 33(4), 4-14*

Morawite, D (1974). *"Empowerment implications of industrialization in developing countries", A survey in the Economic Journal, 84.*

Newman, M (2012). *Calling transformative learning into question: Some mutinous thoughts. Adult education quarterly 62 (1): 36-55*

Okeke, C. (1992). Science, *technology and the law. The impact of science and technology on law. 9th Inaugural Lecture of Enugu State University of Science and Technology.*

Olawole, D. (2004). *Indigenous African technology creative common attribution license development.*

www.food.info.net/uk/productivity/yam.html *Retrieved on the 6th July 2006.*

Toma, Y.S. (1979). *Appropriate technology more than a fashionable term'. Development and Cooperation p. 19 www.isearchafrica.com*

Yunus, M. (1998). *"Alleviating poverty through pechnology & science",* New Series Vol. 282

No. 5388 pp. 409-410. 282(5388),409-410.