

Integrating Appropriate Indigenous Knowledge in the Geography Lessons in Secondary Schools of Uganda

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Abstract: Indigenous knowledge in this paper is defined as the totality of local knowledge, tools and methods available to and used by a cultural group in producing items essential to its subsistence and comfort. Although this knowledge is important, little seem to have done to promote and utilize it neither has it been developed and documented for purposes of creating a data base. There has been lack of emphasis upon social and psychological knowledge in schools and teacher training colleges regarding indigenous knowledge, its use of, whether local or foreign. Geography education focusing on people's daily experiences is well suited to integration of indigenous knowledge and technology. Integration has a pedagogical importance in that content and methods proposed promote social responsibility, citizenship, patriotism and social relevance which are among the key objectives of teaching geography.

Key words: Indigenous knowledge and technology, the geography curriculum, social responsibility and relevance

INTRODUCTION

Indigenous knowledge which includes science and technology according to Dean (1999) is the local knowledge that is derived from some form or combination of non-western but historically mainstream traditions or well established and institutionalized traditions. Indigenous technology in this study refers to the totality of tools and methods available to and used by a cultural group in producing items essential to its subsistence and comfort. There are a variety of local knowledge and technology available in each cultural group e.g., the art of spinning and weaving plant and animal fibres, use of potter's wheel to make domestic utensils, brick making, skills of mining, smelting, casting metal long distance trade connected with astronomy, identification modification of plant and animal species, soil management, botanical knowledge, medical knowledge and craft related knowledge and technology, agro-forestry and forest management technologies, hydrology navigational techniques, inter-cropping practices. This traditional knowledge tends to be very old and is rooted in local traditional culture. These technologies are the evolutionary product of long process of natural selection of innovations often stretching over several centuries (Jenkins, 1994; Bhalla and Dilmus, 1991). Although this knowledge is important, little seem to have been done to promote and utilize it neither have it been developed and documented them with the aim of creating a data base. Creation of data on the available indigenous knowledge system would inform policy and influence practice in the development process in a more sustainable and selfreliant manner and how it can be utilized in our formal education. This paper discusses the possibilities of indigenous knowledge in geography for secondary schools with sample lesson plans.

During colonial and post colonial period the world economy favoured knowledge and skills developed in modern laboratories. The knowledge and technology originally developed to meet local needs in a different socio-economic context was promoted and global industrial and agricultural firms are producing for the world market including developing countries like Uganda and this puts indigenous knowledge and techniques at a great disadvantage. These profit making organizations do not care about indigenous knowledge and technology and what it might offer to the local population. In many developing countries to-day, particularly in remote rural areas, local knowledge remains oriented toward non-commercial purposes and this has sustained them in modern society. This may not be valued by the dominant national leaders who are globally oriented in thinking. Indigenous knowledge and technology in many ways like preservation of society life, living in harmony with the dead and living dead co-existence with the environment.

Education is an expression of cultural hegemony i.e. dominant forms of curriculum and pedagogy represent not the imposition of a single class view of these activities but a composite structure of diverse and sometimes conflicting social practices and ideas (Shapiro, 1984). Shapiro (1984) goes on to argue traditional sources of meaning and value of traditional knowledge and technology have been undermined by foreign culture. Education in traditional societies is disconnected from the non-school world of students, thereby ensuring that it is abstract and scholastic in character. Science and mathematics and other forms of knowledge associated with high technology occupy a high status position in education. Students from the lowest socio-economic level of society get few opportunities for self and social empowerment. To them schooling is a place that disconfirms rather than confirms their historic experiences and dreams.

The Geography curriculum was introduced in Uganda during colonial days by the British colonial education. The way geography is defined over time affects the way it is taught in schools and universities. According to Edwards (1996) Geography is a totally artificial construct that is produced in response to varying time and space and specific social, economic and political contexts. A change to a new paradigm in geography can often be correlated with changes in the philosophy and/or methodology of one of the physical, biological and social sciences. The aims of geography as a school subject have always been influenced by the prevailing philosophy of education, the economic climate and the paradigm of geography

GEOGRAPHY EDUCATION IN UGANDA

This research is based on a study done in two universities in Uganda; Makerere University, School of Education and Uganda Christian University Mukono, Department of Education, where the researcher is involved in training geography teachers for secondary schools. A critical analysis of the geography education offered in secondary schools is a continuous process which started in 2000 when the author was able to try out the suggested integration in some selected secondary schools in central and eastern Uganda together with the student teachers.

Geography education in Ugandan schools today is still a combination of environmental determination and scientific quantitative paradigms although other paradigms are slowly surfacing. There is an over emphasis on physical rather than social geography, and neglect of a wide range of human experiences. Political geography has been neglected and a great focus on extractive primary and secondary industry at the expense of other kind of work. Environmental deterministic examinations ignore the constructive (and destructive) role of culture, indigenous knowledge and technology and the way people relate to environments. They view the productive activities of society using natural resources as being the most important, and that productive activities are those where the use of natural resources is most direct (Gilbert, 1986).

The geography syllabus for secondary classes (senior one to six) in Uganda states that two regions should be studied, one developed, the other a developing area. For the paper on East Africa, the students encounter themes on agricultural modernization (e.g., Ranching, mechanization, modern irrigation); resettlement schemes (e.g., in the large multipurpose river development schemes in Egypt, Sudan, Ghana, Tennessee valley Authority) industrial and tourism development, trade, transportation, urbanization, foreign aid and regional cooperation. Themes in the sections on North America, the Rhine and the African region are developed with a strong assumption of "trickle-down" in mind that is benefits from modernization programs and projects will flow down to the poor majorities. The role played by

large-scale investment such as in irrigation, ranching schemes, use of advanced scientific technology in the exploitation and development of resources i.e. machinery, chemicals, urbanization, and tourism are constant themes (Kagoda, 1997).

The section on East Africa and Africa does not mention the value of local food production, subsistence agriculture and ecological sustainability. Traditional agriculture and knowledge are de-emphasized while traditional trade and developments initiatives from within are not mentioned. These topics emphasize scientific and high technology agriculture and industrialization which does not relate to the realities of most Ugandan children (Kagoda, 1997). A paper in high school geography; "Problems of developments" do not again include indigenous knowledge.

When modern technology substitutes for traditional production, it renders obsolete a large part or all work skills, local know how, managerial ability, equipment and supporting infrastructure. Since the value of this human resource and the indigenous knowledge is external to multinationals or firms sponsoring the modern technology it rarely influences the calculations of benefit costs (Bhalla *et al.*, 1991). This partly explains why students of geography can hardly apply what they have learnt in school. It explains why productivity of most traditional activities in developing countries has remained low despite impressive developments (Bhalla, 1991). Similarly Dean (1999) argues that in much of the developing world today the attitudes of people in power is biased dismissing local knowledge as largely irrelevant or useless for modern purposes. The issue of technology blending rarely comes up in these post-colonial countries contexts. One rarely finds a system which attempts to maintain indigenous knowledge or integrate local technologies into agricultural or industrial systems or even into combined medical and other practices. In Uganda, however, traditional medicine practitioners and healers are working hand in hand with modern medical researchers to identify and develop local herbal drugs in modern laboratories.

Justification for integrating indigenous science and technology in the geography curriculum: The main goal of technology blending is to both maintain local knowledge and supplement it; "expanding it and combining it with modern knowledge and technologies" (Dean, 1999). He goes on to argue that it provides self sustaining livelihood for local people. Local knowledge and technology must be amenable to commercial orientation at least to some degree in order to serve as a means to secure a livelihood. It will lead to more equitable sharing of the resulting benefits and increase the standard of living in traditional societies. This will be as a consequence of up-grading traditional production methods, elevating productivity, income and quality of life in the traditional sector.

Dean (1999) argues that: The most important public policy initiative that would help support Indigenous knowledge and technology blending is widespread public Education concerning the potential importance of local knowledge. This would involve analyzing and discussing areas in which knowledge blending may be equally or even more beneficial with the local context than model approaches that rely excessively on more modern technology and ideas as the latter tend to be designed for different (highly industrial) contexts with different historical, social, ecological and other conditions.

There is need to learn more about which technologies under what conditions will encourage cumulative technical change directly through recombination with other technologies and applications to new technologies that create cultural and social conditions more permissive to innovation (Bhalla, 1991). However there has been no research on people and their behavior, relationships and institutions in most developing countries regarding appropriate indigenous knowledge with the possibilities of integrating it in modern technology. There has been lack of emphasis upon social and psychological knowledge in schools and colleges curriculum regarding indigenous knowledge, its use of, whether local or foreign. There is no linkage between consumers of technology and researchers and consequently manufactures of such technology imported in the country.

Pedagogy and indigenous knowledge: Integration of indigenous knowledge and technology also has pedagogical importance in that content and methods proposed in teaching it promote social responsibility, citizenship and social relevance, which are among the key objectives of geography education. Issues of patriotism, good citizenship are conveyed effectively through issue-based student centered learning. Collaborative, team based learning experience can be applied which leads to high achievement and positive relationships between students. Continuous interaction with the community creates interdependence and continuous redefinition of the community needs based upon the interaction of individuals within a large society including both the schools and the community. This will expand the research agenda and enrich geography content.

These methods will involve linking the outside community with school instruction or learning activities. Research projects or group studies can be conducted within a course particularly fieldwork, pragmatism and constructivism. The school gets into partnership or exchanges that engage teachers and students with the community experience. This meets the communities' needs and enhances the students and teachers sense of civil responsibility. That is teachers and students will help local communities improve on their knowledge and skills while they learn through research from local people.

The pragmatic perspective here is based on experience, experiment and evaluation in a continuous process influenced by beliefs that are also being

continuously reconstructed through the process of social interaction (Dorsey, 2001). From a constructivist perspective the teachers use materials with which learners become actively involved through manipulation or social interaction. Activities stress students' observation; collecting data; generally, and testing hypothesis and work collaboratively with others. The class visits sites outside of the classroom and teachers work together in planning this integrating curriculum (Schunk, 1996).

Lastly this approach to geography learning and teaching promotes "Education for Sustainable Development" currently advocated in education systems by UNESCO the world over.

Samples of Topics where indigenous knowledge can be integrated in teaching geography

- Biodiversity conservation
- Soil erosion control strategies
- Irrigation
- Agricultural tools
- Livestock farming
- Hunger and famine
- Food preservation
- Astronomy (climate)
- Water prediction
- Family planning, etc.

The section below illustrates how some of the above topics can be integrated in classroom teaching. This includes a topic, aims objectives, methods, projected content, procedure and conclusion of the lesson.

Sample lessons (Senior 5-6 age 17-19):

Topic: Conservation and Management of Natural Resources.

Time: Three weeks (Nine hours)

Aim: Students will identify biodiversity that exist in their region and how it was traditionally managed and conserved by the local people.

Objectives:

- Students will define the concept biodiversity.
- Students will identify food types, species and varieties of plants and Animals classified by local people.
- Establish methods used by local people to conserve these food varieties.
- Identify these food varieties still available in the local food markets.
- Suggest ways of working with local people to conserve food varieties still available and those nearing extinct.

Suggested Methods:

- Brain storming
- Field work
- Library research.

- Journal writing
- Guest speakers
- Small group discussions

Contents:

- Definition of Biodiversity: Students identify names given to different species of banana family e.g. Musa SIP 4- staple food in Uganda. It has 20 varieties (matoke)
- Different species in the yam family (Gems Dioscorea.)
- Mushroom- some edible and other medicinal
- White ants (orders soptera) – classification was done by local people according to the size and shape of anthills.
- A list of a variety of those foods no longer available, On the basis of this information teachers, students, biologists/scientists can do more research and classify other animals and plants.

Procedure:

- Brainstorm on the varieties of food types.
- Classify the foods identified by students
- Ask students to do library research as preparation for fieldwork
- Fieldwork in the neighbouring villages
- Report writing

N.B. Students in pastoral regions or grain growing regions can also identify the different varieties of grains classified by the local people.

Expected outcomes:

- The teachers will learn with their students the variety of plants and animals in their society.
- Students will learn skills of data collection, recording, interpretation and analysis.
- The communities where the schools do research will realize the relevance of the geography curriculum

Conclusion: Teacher helps the students to write the report by giving them guidelines including; title, objectives, methods, subheadings for report content, conclusion and recommendations

Lesson II:

Soil conservation (senior 3-4 ages: 4-6)

Aim: The students will be able to compare the traditional soil conservation methods with these taught by teachers in geography lessons.

Time: Two weeks (six hours)

Objectives:

- The students will identify methods used by local people to control soil erosion and degradation.
- Students will list and describe methods used in

modern agriculture to control soil erosion and degradation.

- Students will suggest/ demonstrate how both can be integrated in practice.

Suggested Methods:

- Fieldwork
- Debate
- Library
- Group discussions

Content:

- Soil conservation methods like Agro-forestry
- Nitrogen fixing crops-intercropping crop-rotation
- Use of Ashes
- Knowledge of trees that do not harm soils or lower water table.
- Digging ditches
- Farming fish which helps to open up springs
- Fallowing
- Modern chemicals for spraying pests and fertilizing soil
- Indigenous knowledge of soil types, watertable etc.

Procedure:

- Brainstorm-to define soil degradation and conservation
- Library research where students will identify modern methods of soil control.
- Fieldwork and guest speakers to identify traditional methods of soil conservation
- Group work and debate: Focus on the best methods affordable and appropriate for soil conservation in rural areas of Uganda.

Expected outcomes:

- Students will develop positive attitude towards traditional methods of soil conservation
- Fieldwork as a method of reading will help developing in student's skills of team work, collective decision making and co-operative/ collaborative learning.

Conclusion:

- Teachers conclude the lessons by clarifying missing links
- Definition of concepts and facilitating the groups to make reports/note-making process.

Sample lesson III:

Class: Senior one (age 13-15 years)

Topic: Weather; traditional methods of forecasting weather.

Aim: Students will establish the value of the traditional methods of forecasting weather in agricultural regions.

Objectives:

- Students will be able to define weather
- Identify elements of weather

- Establish and describe traditional methods of forecasting weather
- Identify and describe modern weather measuring instruments
- Write a newspaper article on the value of traditional weather forecasting in agriculture in Uganda

Suggested Methods:

- Socratic methods
- Group work discussion
- Library research
- Guest speaker
- Creative writing

Content:

- (a) Modern methods of forecasting weather
 - Define weather, name elements of weather and their measuring
 - Instruments
- (b) Local methods of forecasting weather
 - Winds directions from local perspectives
 - Seasonal birds, croaking of toads and frogs
 - Seasonal caterpillars, grasshoppers, termites, white ants
 - Clouds
 - Moon- appearance and disappearance
 - Flowing of plants like coffee, shading of leaves
 - Misty, foggy mornings
 - Rainmaking
 - Heat in atmosphere
 - Value of forecasting weather; for planting crops, harvesting, predict famine therefore store food, pastoralist plan for their animals pasture i.e. burn the grass if rain is expected, in areas where weather stations are far and modern technology is not available this is the best method of guiding local farmers, guide to long distance travelers etc.

Procedures:

- Students will define weather through brain storming Through guided discussion students will identify elements of weather and the measuring instruments.
- The students will be taken to nearest weather station to see the measuring instruments. They will get information as to how weather is forecasted.
- A guest speaker will inform students the traditional methods of forecasting weather
- Students will write a new paper article on a competitive basis on the topic “The value of traditional methods of forecasting weather for agricultural purposes in rural areas of Uganda”.

Conclusion: The teacher will wrap up the topic by classifying concepts, and guiding the students how to write the article.

Expected outcomes: Development of writing skills, appreciation of local knowledge and teamwork.

NOTE for Uganda Geography Teachers:

- Literature is available in libraries on most of the different species of plants and animals but use of specific names hinders students of this level to associate such names with local names. Local methods of forecasting weather are not yet documented and a lot of research is still needed.
- Local methods of soil management and conservation are documented for some regions of Uganda; but a lot of research and documentation is needed.
- Local food varieties both domestic and in the wild are documented in some regions. This needs more research especially those nearing extinction.
- Some traditional tools are available in the museum based in Kampala but this is not easily accessible to all students of Uganda.
- The English language being a second language, most students at this level fail to comprehend such geographical concepts like “north easterly or south westerly etc. winds; agro-forestry, inter-cropping and crop-rotation”. When these concepts are taught in class, some students do not relate it to what they experience outside the classroom, for example to the winds which they experience seasonally or agricultural practices they do at home or have seen in their local areas. Approaching the teaching of geography by integrating indigenous knowledge will facilitate the comprehension of such concepts in geography curriculum.
- Integration of local knowledge in geography curriculum will be facilitated if research is carried out in all areas of Uganda. There are many ethnic groups (about 40) and each has developed its, skills, knowledge to enable it survive at subsistence level. Unless this knowledge is written down it will become extinct including valuable knowledge of food crops and animals. If this kind of local knowledge is familiar with some Uganda students and it will enable them to accept, understand and practice modern affordable science and technology if introduced at the appropriate time.
- There is need for the designers of modern technology to do research in developing countries, so that they design appropriate and affordable technology based on research. This kind of technology can then be popularized in schools and later practiced by students once they leave school.
- Evidence of local knowledge and technology is revealed by local artisans who made chairs, hoes, shoes, spears, fishing hooks, bells and axes. Smiths also used copper and bronze were to make armlets and bracelets etc. Canoe making was common among societies living near water like Baganda. The art of

making leather by pastoral tribes for clothing and sandals e.g. Bahima. The making of back cloth, baskets is also very important.

Way forward:

- It is clear from the above that any meaningful interventions aimed at revamping the internal efficiency and effectiveness of the current geography curriculum must integrate the positive attributes of indigenous knowledge.
- The geography curriculum in Ugandan secondary schools needs to be revised to include indigenous knowledge and technology where appropriate. This will make the curriculum more relevant to the needs of the local population.
- Modern technology to be integrated should be appropriate and affordable and developed after a thorough research in the developing countries like Uganda.
- Teachers and teacher training institutions should do a lot of research in this area of indigenous knowledge, package it and disseminate it in the school curriculum.
- Integrating indigenous knowledge will help implement some of the “ Education for Sustainable Development” goals of making it possible to preserve the environment which is currently being degraded by modern technology.

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