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The development of ethnobotany curriculum for students in rural schools: An approach that incorporates the needs and insights of local communities

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In this paper, an ethnobotany curriculum is used as a case example of one approach to incorporating the insights and needs of the local community into the curriculum development process. This curriculum development was carried out in the "Kiriwong Community" in Nakornsrithammarat Province, Southern Thailand. The ethnobotany curriculum was developed after conducting ethnographic research to better understand how villagers might learn to gain the benefits from plants and what knowledge and skills were required to prepare their student to live well in their community. Data were collected through participant observation and in-depth interview. Developing the ethnobotany curriculum, I incorporated the basic information gained from studying the Kiriwong villagers' needs and (a) their usage of plants into the study of ethnobotany, (b) sustainable natural resource management principles, (c) rural philosophy for education, and (d) constructivist theory to obtain an ethnobotany curriculum. It is my belief that by creating science curricula the take advantage of these local resources it will be possible to assist students to both develop understandings about content and about the nature of science that are in the government's science standards and to learn sciences in their own context. They can apply such knowledge and skills in their current and future situations and lifestyles.

Ethnobotany curriculum, rural schools, the needs of the local community, science curriculum development, Thailand

INTRODUCTION

Changes in society, brought about by scientific and technological progress, have heightened the interest of governments worldwide in science and in science education—this interest has been central to governmental reforms in Thailand. National policies adopted in many countries recognize the vital importance of science and technology to socio-economic development, the maintenance of national competitiveness and to the well-being of their citizens (Gallagher, 2000). In many countries that have undergone the transformation from an agricultural to an industrial society, scientific and technological progress has directly influenced the lifestyles of citizens in both urban and rural areas.

The principal differences between rural and urban areas, such as population density and the presence or absence of natural-resource-based industries, may result in underestimating of the

problems of uneven development of rural communities. This problem has raised issues of economic and political equity that directly affect education (Collins, & Flaxman, 2001). In some countries with large rural populations, in which the livelihood of rural communities depends on the sustainable use of natural resources, it may be desirable to obtain input from local community members as a part of the process of planning science curricula. The reasons for this are that many rural students may continue to live in their birth communities once graduated from school and therefore are likely to continue to be a part of the local natural-resource based economy. Science education reform needs to build on the strengths and knowledge of local people and provide students with the scientific skill to make decisions that have an effect at the local level.

It may seem that taking the knowledge and needs of local communities into account when designing science curricula would create tensions with reform efforts designed to provide students with understanding of the most current science as well as well as with the diverse methods by which scientists produce that knowledge. Yet, it has been noted (Shymansky & Kyle, 1992) that developing countries were now revisiting their science curricula so that they both emphasized the "nature of science" and the relevancy of science to the daily lives of students. I agree that It is important and possible to incorporate the "nature of science" with local knowledge of natural resources, and natural history, particularly in rural areas where science laboratories are just beyond the schools' fences and where local wisdom reflecting the long established civilization abounds (Brian, 1999; Snively & Corsiglia, 2000).

In considering what science content should be featured in reform science curricula to be used with students in rural Thailand there are obvious tensions between what is in the government endorsed curricular guidelines and the science-relevant experiences of rural students. This tension is evident in what I perceive as a mismatch between the competencies required to work, learn, and live well in the students' own communities and as citizens of the global community. Historically, rural education reform has been difficult due to rural-urban antagonisms, the concentration of wealth and political power in urban areas, conflicting values, and social inequality. Generally, rural citizens have not liked the results of consolidation and urban education models, which many see as "one size fits all." Reformers seeking consolidation as an answer to perceived problems with rural education have, for many years, been telling rural residents that reforms would increase academic achievement and therefore the success of their children (Collins, 2001). Curriculum reform that purports to provide the impetus for the rural schools of Thailand to develop science curricula which will be both tailored to the needs of rural students while meeting the expectations of the national curriculum is clearly needed.

In this study, an ethnobotany curriculum for use in the rural south of Thailand, is used as a case example of one approach to incorporating the insights and needs of the local community into the curriculum development process. The study was carried out in the "Kiriwong Community" in Nakornsrithammarat Province in the southern part of Thailand. The Ethonobotany curriculum was developed after conducting qualitative research to better understand how villagers learn to gain the benefits from plants and what knowledge and skills are required to prepare their student to live well in Kiriwong community in the rural south of Thailand. The curriculum was designed incorporating the community-related information, the sustainable natural resources management with the intent on creating a curriculum for Grades 7 to 9 students in the Kiriwong community, Nakornsrithammarat, Thailand. I think that this case example may be of use to others who are interested in developing curricula that take the needs and knowledge of community members in rural areas into account.

RESEARCH OBJECTIVES

The research objectives of this study were stated as follows:

1. to study the ethnobotany knowledge and local needs at Ban Kiriwong Community, Lan Saka District, Nakornsrithammarat Province.
2. to develop an ethnobotany curriculum through collaboration of villagers, researcher and teachers.

RESEARCH PROCEDURES

Participant observation and in-depth interview techniques as the main tools in studying Kiriwong villagers' knowledge of the plants. I gained access to the setting by asking the school's director to introduce me to a member of the community council. I also identified my objectives of study to the council, the gatekeeper, so they allow me to conduct research study and cooperate with me in supplying information as well as refer me to 24 key informants, who were considered by the villagers to be experts in utilizing benefits from plants and divide such utilization into four groups by the core professions of the residents, as identified by my preliminary study in the setting, as follows:

a) six farmers drawn from the mixed orchard group;

b) six villagers drawn from the natural tie-dyed materials group;

c) six villagers drawn from the herbal product group; and

d) six villagers drawn from the weaver group.

The criteria for informants were: (a) residing for over 10 years in Kiriwong; (b) earning their living as mixed orchard farmers, natural tie-dyed materials, herbal products and woven products on a long term basis; (c) being capable and willing to supply information regarding mixed orchard farming, natural tie-dyed materials, herbal products and woven products; and (d) knowing the names of people residing in the community who could supply additional information regarding the varieties of plants in the community.

The referral from the community authority allowed (a) unlimited access to the residents in the Kiriwong community; (b) the creation of a rapport with them and (c) participation in their activities in order to better understand how villagers learnt to gain the benefits from plants and (d) obtaining information on what knowledge and skills are required to prepare students to live well in their community.

RESULTS

During the six months of gathering the necessary information, the core data were divided into two issues to answer the research objectives. Therefore, the aim of this section is to present and discuss the results.

The Ethnobotany Knowledge and Local Needs

The Kiriwong community is in a fertile tropical rain forest valley where the villagers largely depend on the natural resources, particularly plants, for their livelihood, including food, housing and herbal medicines. The mixed orchards, called *Suan Som Rom*, by the villagers are the main sources of their income. These orchards grow a variety of plant species: the main fruit trees include durian (*Durio zibethinus*), stink beans (*Parkia speciosa*), mangosteen (*Garcinia mangostana*), domestic jackfruits (*Arthocarpus integer*), longon (*Lasium domesticum).* In addition, many rare wild plants grow among their fruit trees. These include, wild vines (*Caryota mitis Lour.*), tree fern (*Cyathea Comtaminas*) and wild orchids only found here, "Singto Ajarn Tem"(*Bulbophyllum smitinandii Seidenf & Thorut*), "Euang sai Sert"(*Coelogyne rochussenii*) and "Euang Kiriwong" (*Didymoplexxiopsis krhiriwongensis Seidenf*).

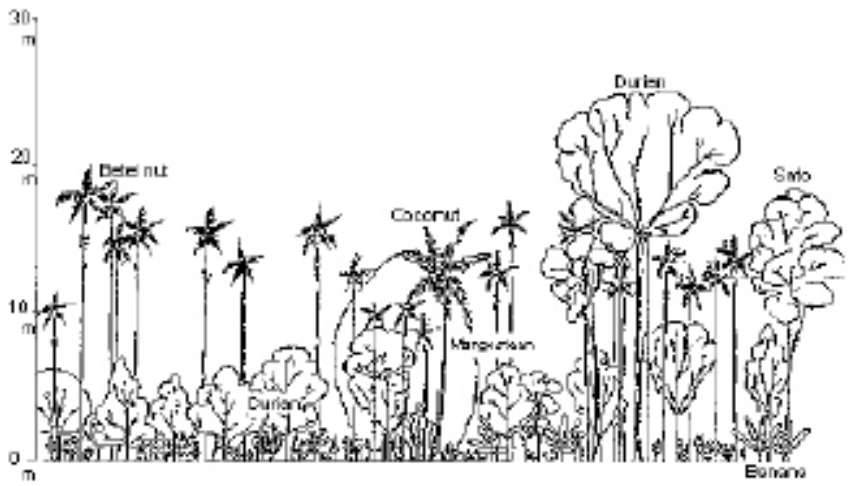

Figure 1. The example of Traditional Agro-forests "Suan Som Rom" in the Kiriwong Community (Source: Kitsada Tungchawal, 2001)

The villagers used the natural resources, mainly the plants grown in the community. They learn to benefit from the plants, with some adjustment for more benefits, from trying to survive in the natural environment. Gathering the information regarding the benefits obtained from the local plants and collecting the plants' samples from the *Suan Som Rom* to categorize them based on the plant taxonomy, we found there were 26 species, 43 families and 50 types of plants regular used by the villagers. When, however, categorized based on the ethnobotanic principles and the benefits obtained from them, there were 4 main types; namely plants used as natural dyes, herbs, woven-wares and food and merchandise.

The villagers obtain their knowledge in three different methods: (a) inheriting the knowledge from their ancestors, (b) learning by doing, and (c) learning by seeking knowledge on their own. The latter was the one that the villagers consider important because they learnt from trying to solve their professional related problems. Such learning is an adult learning method claimed by Knowles (1989) to be one in which adults tend to concentrate on the problems in order to learn and apply such knowledge promptly, not store it for future reference.

With regard to seeking knowledge on their own to solve professional related problems, the villagers look through related books, documents distributed at agricultural product stores, bookstores' botanical books, i.e. books on herbs, common plants, orchids, encyclopedia, sold at bookstores, college students' thesis on Kiriwong community and textbooks handed down by their ancestors. In addition, they also obtain knowledge from their own tests by trial and errors and accumulate their experiences all the time. Such methods are similar to those carried out in academia. The only difference is the academic's knowledge of statistics and the sciences helps to make sense of their findings. The activities occurring while the villagers conduct their research to obtain knowledge are identify the problem, concepts, reasons and act on those things to test the hypothesis and results obtained from the processes. Although the results are unexpected, the villagers obtain the skills in posing questions, solving problems, testing, making computations and drawing conclusions, all of which reflect their curiosity regarding their natural environment. A key informant told me about her own experience of performing her own tests as parts of a quest for knowledge:

> I majored in science so it helps. Whenever we noticed anything, we set a hypothesis and look for ways to work on it. When I get results, I summarize and seek solutions. We cannot assume that plants do not provide any colors … if we can say all plants provide colors, we cannot say which colors they provide. There are ways to get the answer to

that. I test almost all of them, depending on when I work on which plant. All plants can provide colors. (the tie-dyed natural materials producing expert)

The Ethnobotany Curriculum Development

The ethonobotany curriculum was developed after conducting qualitative research to better understand how villagers learn to gain the benefits from plants and what knowledge and skills are required to prepare their student to live well in their community. These are globally valuable biological resources and can be found in close proximity to the students' villages. It is our belief that by creating science curricula the take advantage of these local resources it should be possible to assist students both to develop understanding about content and about the nature of science that are in the government's science standards, as well as to learn science in their own environment. They can apply such knowledge and skills in their current and future situations and lifestyles. They also become aware of how to sustain benefits from the local botanical resources without depleting or destroying those resources.

In developing this curriculum, a meeting was arranged with the school's administrator to inform him of the details and methodology of the curriculum preparation and to ask for his cooperation in informing the school teachers. In addition it was necessary to ask for their cooperation and permission from the administrator to allow these teachers to participate in the curriculum development. The director had the authority to permit the investigator to conduct this research in his school and cooperate with me in the curriculum's development

Designing the ethnobotanic curriculum, I and science teachers incorporated the basic information gained from studying the Kiriwong villagers' needs and their usage of plants into the study of ethnobotany, the sustainable natural resources management principles, the rural philosophy for education and the constructivist theory to obtain an ethnobotany curriculum. This particular curriculum was directed towards the development of scientific minds, centering on the students' self-study and their awareness of maintaining the community's botanic representatives for sustainable usage. Such frame of creating scientific mind concept by incorporating universal knowledge with the local wisdom is shown in Figure 2.

The Development of the Ethnobotany Curriculum Includes 9 Core Steps:

Step 1*: *Identify the vision
The researcher and school personnel, namely the education institute council, the school director, science teachers and head of academic department for the secondary school who meet to identify the vision for the ethnobotany curriculum.

Step 2: Identify the mission
The researcher and school personnel, namely the education institute council, the school director, science teachers and head of academic department for the secondary school who meet to identify commitment for the ethnobotany curriculum.

Step 3: Identify qualifications of the students
The researcher and school personnel, namely the education institute council, the school director, science teachers and head of academic department for the first section secondary school who meet to identify the prerequisite qualification of students learning for the ethnobotany curriculum.

Step 4: Identify the contents
The researcher and the teachers meet to identify the contents for the purpose of developing the ethnobotany curriculum. The researcher present the contents obtained from the preliminary study of the plants during stage 1 to the school's personnel, namely the school director, science teachers and head of academic department to identify the contents in the ethnobotany curriculum.

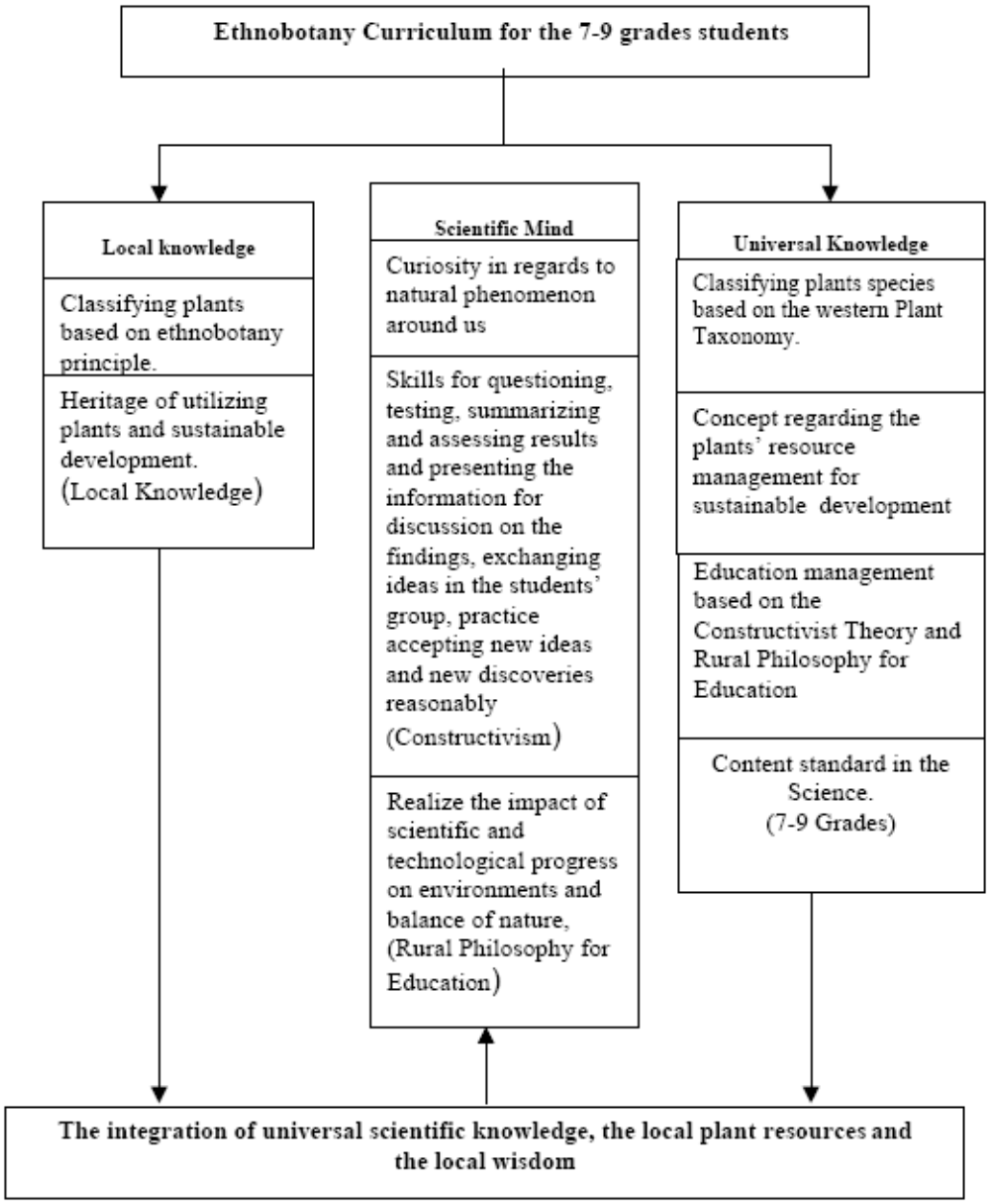

Figure 2. The frame of reference for creating a scientific mind set by incorporating universal knowledge with the local knowledge in the ethnobotany curriculum

Step 5: Identify the directions for learning management and for assessment and evaluation
The researcher and the teachers collaborate in identifying such directions with the researcher presenting the constructivist theory concept, the local education theory and the quality of the tertiary sector students of the Science Subject pursuant to the Ministry of Education's stipulations regarding the guideline of directions for learning management and assessment and evaluation.

Step 6: Identify the learning schedule and learning period structure
The teachers and the researcher collaborate in stipulating the learning time table and its structure for studying pursuant to the ethnobotany curriculum.

Step 7: Preparing the curriculum documents
The teachers and the researcher collaborate in creating such documents to serve as the model curriculum for education management for the students in the first section of secondary school.

Such documents include major documents, namely, visions, commitments, prerequisite students' qualification, contexts, learning management direction, structure, schedule, learning resources and students' learning assessment and evaluation directions.

Step 8: Curriculum criticism

The researcher submits the ethnobotany curriculum to a Botanist and scientist and science educator to check and assess it for accuracy and relevancy of its elements.

Step 9: Curriculum improvement

The researcher modifies and improves the curriculum based on the expert evidence to derive at the curriculum with accurate content and relevant elements.

CONCLUSIONS

This case example is one beneficial outcome of meaningfully linking ethnography research with local community educational need. The curriculum development that incorporates local knowledge and meets the needs can be an inherent responsibility of small rural schools. This ethnobotany curriculum can be of use to others who are interested in developing curricula that take the needs and knowledge of community members in rural areas into account. It is our belief that by creating science curricula the take advantage of these local resources it is possible to assist students to both develop understanding about content and about the nature of science that are in the government's science standards as well as to learn the sciences in their own context. They can apply such knowledge and skills in their current and future situations and lifestyles.

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