



Innovating local-related learning content of environmental education for Klong Roi Sai communities in Bandon Bay area

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Abstract

This research was purposed to create an innovative local-related learning content of environmental education for Klong Roi Sai Communities in Bandon Bay, based on holistic community cultures, natural resources and local environment. There are four steps of this participatory action research: analysis of community problems, consideration of possible innovation, planning and practices, and follow-up and evaluation. The quantitative data were analyzed by descriptive statistics of frequency, percentage, mean. The qualitative data were analyzed by content analysis to manage natural resources and community environment in Klong Roi Sai Communities. The research results revealed that local people in Klong Roi Sai Communities do fishing and farming for their living. Their natural resources are diverse and highly abundant. However, the communities handled the resources separately, resulting in environmental problems on the communities. There were five indicators to innovate this learning content: awareness, knowledge, attitudes, skills, and participation. The content was divided into academic content and practices. There were 54 people co-developing these five innovative contents. This innovation can be used to effectively reduce problems on natural resources and community environment.

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Introduction

Economic development has greatly resulted in full urbanization in Surat Thani province. In the meantime, pollution from communities has appeared along with this development. Surat Thani city is located at the mouth of

the Ta Pi river, the main river running through the center of the city and separating the city into two parts: downtown and Klong Roi Sai Communities. Consequently, Klong Roi Sai Communities have high biodiversity, and they are original and natural resource habitats, considered as the heart of the central south. The natural capital in these local communities has intensively been used by people in the communities, and nearby communities have also been developed even if the river runs through the middle.

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Klong Roi Sai Communities are located on a wetland river delta in Bandon Bay, Mueang District, Surat Thani Province, covering original communities of Bang Bai Mai, Klong Noi, Bang Pho, Bang Sai, Bang Chana, and Klong Chanak subdistricts. These communities are islands surrounded by the Ta Pi River and Phunphin Canal. Interestingly, there are 152 small and big canals call “Bang” linking like a net inside the area; therefore, these communities are called Klong Roi Sai. Along two sides of the river are wetlands containing high biodiversity of plants such as nipa palms, coconuts, cork trees, sago palms, cajeput trees, etc. throughout the area. The people’s way of life in these communities is related to the river as they do fishing for a living together with extra jobs of coconut farms and fruit orchards. However, a lot of problems have emerged during urbanization, for example, latent population has become a big problem as people from other areas immigrate to be laborers or residents. This has affected physical health - manners, mental health and well-being of local communities. (ChamnanMueang, personal communication, November 22, 2018)

Although the people’s simple way of life is mainly dependent on their natural resources and environment in the communities, urbanization is unavoidable for the communities. A lot of resource problems have emerged during urbanization, for example, latent population coming with the development, the expansion of transportation ways, pollution seriously impacting physical and mental health and well-being of local communities as well as state and private sectors. These problems have become more severe.

Therefore, innovating local-related learning content of environmental education for Klong Roi Sai Communities in Bandon Bay is a research work to create a learning content through the participation of local communities, government organizations and local entrepreneurs to find ways to solve problems of impact on natural resources and environment. In addition, this learning content could be useful to promote integration for participation in solving problems by the local communities and urge awareness to have positive attitudes towards the development and community participation in solving local environmental problems. Environmental education process was integrated into this research to drive the innovation of sustainable community strength to be “the innovation of local-related learning content of environmental education with sustainable local development and local people.” This

content can also be utilized and used to solve real problems in communities. Moreover, it can be linked to both schools and universities in the communities

The Research Objectives are to study the natural resources and environment incidences of Klong Roi Sai Communities in Bandon Bay, to develop and apply the local-related learning content through community participation, and to urge young leaders to care for Klong Roi Sai environment.

Literature Review

This research was based on the following three main concepts.

Community Natural Environment

Humans are surrounded by environment. When environment types are considered, some academics divide them into two types: natural and cultural environments, or they can be called by different terms but with a similar idea. For example, Chankaew (1993) categorized the environment into two types: natural things and creatures and man-made things including physical and social environment. These data are consistent with Promotion and Conservation of National Environmental Quality Act, B.E. 2535 Section 4 stating that ‘environment means physical and biological things surrounding humans, which are both natural and man-made’. In addition, Pongsapich (1995) stated that the environment included physical and social environment, and both were relatively different. In terms of one-way relationships, it was believed that nature caused culture. For two-way relationships, it was believed that nature and culture created each other. However, culture can also create other culture. According to the mentioned relationships, both natural and cultural environments are similarly important. Importantly, culture is considered an essential tool to manage nature for the most benefits for humans.

Environmental Education

When learner development is operated by knowledge process for positive attitudes towards environment, this positivity lead to good value and proper behavior. The instruction process for this development is to give learners the most useful and direct experiences and direct practices

with natural resources and local environment (Piampongsarn, 2005). The movement of environmental education for sustainable development is in accordance with the abovementioned concept. It is educationally targeted at achievements in (1) awareness of environment, (2) knowledge for learners' various environmental experiences and understanding, (3) attitudes for learners to have environmental value and concerns, (4) skills of learning to prove and understand the environment including improvement to protect the environment, and (5) learner's participation to protect and improve environment in various levels.

Educational Innovation and Local-related Learning Content

Generally, learning means changes of individual behavior resulted from interaction with environment or practices (Khowtrakul, 2013). The extent of learning covers a serial learning process to help learners to have knowledge including learning outcomes such as understanding of contents, ability in actions, and process skills and attitudes (Khaemane, 2015).

Educational innovation is like a tool that an instructor uses for learner-centered learning. The purpose of this innovation is to help learners have learning process. Adulyahasem (2010) claimed that there are three levels of learning process. First, a perception level means to perceive news and information through five senses—hearing, seeing, smelling, tasting, and touching -of ears, eyes, nose, tongue, and body. Second, a comprehension level is important because it is a level for learners to learn new knowledge. This level results in the final level, a transformation level, which is a level for learners to change their attitudes, value system, manners and behavior. If the learners change their attitudes and behavior, it will be clear that learning has happened.

Local-related learning content was defined by several people. For instance, Thammawithikul (2012) defined it as a collection of learning experiences given to learners targeted by their problems and local needs. The main purpose is to have learners develop their life quality. This is consistent with the Department of Non-formal Education Development (2003) specifying the principles of the local-related learning content. Development leads target learners to have intellect or learning for knowledge, development of their practice ability, co-existence and potential.

Methodology

This is a participatory action research conducted by having local people work as co-researchers to practice the local-related learning content for Klong Roi Sai Communities. Therefore, knowledge, awareness, skills and behavior resulted from these practices in order for the learners and the communities to sustainably live their lives with natural environment. There were four steps: understanding the problems, determination of problem-solving, practices, and follow-up and evaluation.

The instrument was a questionnaire for the samples. Reliability was checked and suggestions were given by three experts to conform to research questions and objectives (IOC). The community members distributed and collected the questionnaire from household leaders. Moreover, interview, focus group, a knowledge return meeting, and practices were conducted. The community contexts were also analyzed, criteria were specified, and the learning content was created including after action review (AAR) of the target group. The quantitative data were analyzed by descriptive statistics, frequency, percentage, mean, and standard deviation. The qualitative data were analyzed by content analysis.

Research Process

The research was processed from the current incidences and environmental problems of Klong Roi Sai Communities. In addition, the research was cooperated with the communities to innovate the local-related learning content of environmental education. The evaluation of this community-participatory innovation was also included. The details of each step are as follows:

Phase 1 The participatory study of current incidences and problems of Klong Roi Sai Communities

The questionnaire was conducted as an instrument to collect the data. The experts had given suggestions to improve the instrument before the community representatives collected the data in each community as *planned*. Besides, in-depth structured interview was used to collect the data with experts including (1) experts on natural resources and local environment, community cultures and community basic information, and (2) community and educational institute leaders as participants for local development. The data were then

analyzed, interpreted, returned to the communities and synthesized for local environment and natural resources situation analysis.

Phase 2 The study and evaluation of knowledge creation process and the local-related learning content for Klong Roi Sai Communities

An opinions meeting was held and participated in by community leaders, cultural leaders, and governmental leaders to co-analyze for summary of the concrete learning content linked to social capital, natural resources and local environment capital, and the problems of local environmental management. For example, nipa palms and the community's way of life in Bang and mangrove conservation were used to create giant mud crab habitats, and pollution and environment problems in the communities were solved. In addition, measurements for participants in local innovation and criteria for learners of the learning content were determined. A lesson learned guideline was also conducted to solve natural resources and local environment problems.

Phase 3 Practices

The community leaders, cultural leaders, and governmental leaders operated as planned. The measurements and five programs under the learning content regarding five indicators were proposed by related sectors as well as summarized in writing and assessed by the academics. The innovation was then tested to develop the young leaders caring for Klong Roi Sai Communities. In the research, 30 young leaders were selected from six subdistricts as the samples according to the determined criteria. In addition, the lesson learned step after practices was completed to improve measurements to revise the content of environmental education.

Phase 4 Evaluation

The community leaders, cultural leaders, and governmental leaders evaluated all the previous practices. It was found that the information of some programs under the content was insufficient due to some problems of informants. The measurements and some other programs under the content were completed to develop innovative users. Furthermore, the measurements and the program of interpreter development were improved after the steps of the lessons learned and reviews by the academics.

Participants

Population for this research was people in Klong Roi Sai Communities, government officials, community leaders, and cultural leaders. The community leaders were selected by purposive sampling from six subdistricts. The samples were detailed as follows:

1. 12 administrators in local government organizations, selected by purposive sampling from governmental leaders in six subdistricts (2 samples from each subdistrict).

2. 12 community leaders and cultural leaders, selected by purposive sampling in six subdistricts (2 samples from each subdistrict).

3. Household leaders living in Klong Roi Sai Communities. The sample size was calculated according to Darwin Hendel's random sampling table at 95% of reliability (Suwan, 2006). Stratified random sampling was used to select the samples of 216 households.

4. 3 Thirty young leaders for natural resources and environment of Klong Roi Sai Communities were selected from interested people in six subdistricts.

Research Instruments

1. The structured interview with the community leaders, cultural leaders, and governmental leaders about local environment incidences in Klong Roi Sai Communities, Mueang, Surat Thani covered six parts of open-ended questions: personal information, community contexts, previous management of natural resources and local environment, previous environmental problems and obstacles, and a resources conservation guideline for the communities in the future.

2. A survey form of natural environment in Klong Roi Sai Communities included five parts: names of natural environment, benefits, problems, and current natural environment incidences.

3. An analysis form of relationships between culture and natural environment in Klong Roi Sai Communities contained three parts: characteristics of relationships, current relationship incidences, and practice ways to promote the relationships.

4. An observation form of natural resources management process in order for people's sustainable living with natural resources in Klong Roi Sai Communities was used.

Data Analysis

Coding analysis was employed in this research for the results of community environment incidences, and content analysis was used for the survey results of community natural resources and natural environment. In addition, the relationships between culture and natural environment were analyzed, and social capital management for people's sustainable living with natural resources in Klong Roi Sai Communities, Mueang, Surat Thani was synthesized.

Data Check

The data collection and analysis for this study were collaborated with four sectors: a researcher, community leaders, cultural leaders, and governmental leaders. Therefore, the data process had to be checked by triangulation method. That is, the data from each sector had to be checked for correctness of other three sectors.

Results

The Natural Resources and Environment Incidences of Klong Roi Sai Communities in Bandon Bay

Klong Roi Sai Communities are islands situated on the river delta with a lot of small canals linked to and separated from the big rivers - Ta Pi River, Chanak Canal, and Phunphin Canal—running towards the Gulf of Thailand through the mouth of Bandon Bay. These wetland areas are naturally abundant and cover six original subdistricts: Bang Bai Mai, Bang Chana, Klong Chanak, Bang Pho, Bang Sai and Klong Noi subdistricts. When an urban area is developed, the environment in these original Klong Roi Sai Communities is damaged; pollution has resulted, and natural resources have been negatively impacted, resulting in a change of local people's way of life. This has also been reflected in the moderate satisfaction of local people in the communities in terms of natural resources and local environment management. That is, the satisfaction of the local people in Klong Chanak ($\bar{x} = 2.15$, $SD = 0.13$), Bang Bai Mai ($\bar{x} = 2.19$, $SD = 0.20$), and Klong Noi ($\bar{x} = 2.56$, $SD = 0.21$) was at a low level. The satisfaction of the local people in Bang Chana ($\bar{x} = 2.98$, $SD = 0.78$), Bang Sai ($\bar{x} = 2.99$, $SD = 0.95$), and Bang Pho ($\bar{x} = 3.05$, $SD = 0.74$) was at a moderate level. In terms of the management of natural resources and local environment by government

organizations, the satisfaction of the local people in Klong Chanak ($\bar{x} = 2.35$, $SD = 0.22$) and Bang Sai ($\bar{x} = 2.25$, $SD = 0.18$) was at a low level. The satisfaction of the local people in Bang Bai Mai ($\bar{x} = 2.89$, $SD = 0.63$), Klong Noi ($\bar{x} = 2.78$, $SD = 0.56$), Bang Pho ($\bar{x} = 2.77$, $SD = 0.59$), and Bang Chana ($\bar{x} = 2.81$, $SD = 0.61$) was at a moderate level. This overall satisfaction of the local people indicated that local people and government organizations in Klong Roi Sai Communities still lacked knowledge and understanding of natural resources and local environment.

The Development of the Local-related Learning Content of Environmental Education by the Community Participation

In this research, the local people were given the opportunity to propose and innovate to manage their natural resources and local environment. The learning content was driven by the community leaders, cultural leaders, and local governmental leaders. The social, environmental, and cultural capitals were synthesized, based on real problems and local people's goals, to develop their communities and maximally manage their natural resources and local environment. The details were summarized in writing; the meeting was held for the communities to check the correction, and then the data were returned to the communities. Therefore, the learning content was finally co-innovated to gain more knowledge, have awareness, attitudes, and skills, as well as participation in environment conservation. The young leaders were surely the ones who propelled other five participation contents of environmental education with the communities as shown in Table 1.

The Development of Young Leaders Caring for Klong Roi Sai Communities in Bandon Bay

Results of the innovation of the learning content, knowledge, understanding, awareness, positive attitudes, skills, and participation in solving environmental problems were found. The innovation was brought to employ young community representatives caring for Klong Roi Sai Communities. In addition, the members in the communities mutually determined criteria of selection—ages, educational levels, status in the communities, duration of living, roles in local resources conservation, knowledge and understanding of the communities, willingness to attend the activities - for the selected 30 participants (five from

Table 1 Structure of the learning content of environmental education of Klong Roi Sai with community participations

Learning Content	Local Wisdom Learning Units
1. Understanding the Environment(Knowledge)	1. Changes in Klong Roi Sai Communities 2. Benefits of Nipa Palm Trees and Coconut Trees 3. Waste Management with Participations from Nai Bang Communities
2. Being Aware of Environmental Issues	1. Making “Ma Tak Nam” from Nipa palm leaves 2. Water pollution management in Klong Roi Sai Communities 3. Nipa Palm trees and Nai Bang locals’ way of life
3. Having Good Attitudes towards the Environment	1. Good attitudes towards conserving local fish 2. Good attitudes towards reforestation and seeing value of local natural resources. 3. Handling waste issues to conserve the natural resources
4. Environmental Skills	1. Handling pollution and environmental issues 2. Environmental changes in Klong Roi Sai 3. Analyzing urban and rural areas
5. Participation in the Communities	1. Mangrove forest conservation: save the habitat for black crabs. 2. Participation in the conservation of mangrove forests at schools and communities 3. Solving the water pollution problems in Bandon Bay 4. Conservation of local resources of Klong Roi Sai: Mangrove reforestation 5. Tackling waste problems of Bandon Bay estuary

each of six subdistricts) for this development. The lecturers were also invited in this training. The lessons learned after the training were handled and brought to improve the content again. The characteristics of young leaders were also determined.

There were 22 hours of learning content, divided into two sections: six hours of five academic content and 16 hours of practice.

- Six hours of academic content included environmental knowledge and understanding, environment awareness, positive attitudes toward the environment, environmental skills, and participation in the communities.

- 16 hours of practice for the participants included trainings of community wisdom.

The development of young leaders contained both practical and lectured trainings in order for them to have five desired characteristics: environmental knowledge and understanding, positive attitudes toward the environment, enhancement of environmental skills, and participatory working.

Discussion

Klong Roi Sai Communities are physiographical wetlands located on the river delta to the Gulf of Thailand. The communities are highly abundant in natural resources and environment with 81 percent of local people engaged in local fishing, coconut farming, fruit orchards, and so on for their living. Therefore, the local people depend on their

natural resources and culture as their social capital, resulting in economic, social, cultural phenomena and the identity of the communities.

The research results revealed that the urbanization of Surat Thani has damaged the original environment in Klong Roi Sai communities and caused waste problems. The development of transportation routes has impacted bringing more air pollution. The growth of industry from building Bandon Bay Deep Sea Port has also affected water pollution and changes of ecosystem in the communities. These have resulted in changes of the local people’s living, destruction of the original environment, pollution, and degradation of natural resources. The satisfaction of the local people in the communities and government organizations was only from low to moderate levels.

There are six subdistricts in Klong Roi Sai Communities. High awareness to conserve the natural resources, environment, and local cultures was found from the community leaders, cultural leaders, and local governmental leaders. Since the local people mainly depend on social capital, the content was developed to be a tool for gaining knowledge, awareness, attitudes, skills, and participation in local resources and environment conservation. There were five main contents covering 17 learning subjects of community wisdom.

In addition, the development of 30 young leaders was done through two sections of the contents: five academic contents and two days of practice. It was found that

1. All dimensions of in-depth knowledge of natural resources and local environment were developed.

2. The awareness of natural resources and local environment management was higher.

3. The attitudes toward overall and local environment were positive due to more knowledge and understanding of natural resources and local environment. The skills to manage natural resources and local environment were widely developed.

4. Participatory working in household and community levels was realized to manage natural resources and local environment.

Therefore, according to the learning content through the young leaders, the community leaders, the cultural leaders, and the local governmental leaders, ‘Klong Roi Sai Local Young Tour Guide Club’ was established to be representative for concrete conservation of natural resources and local environment. Furthermore, “Waste Bank for Klong Chanak Community” connected to industry area and Bandon Bay Deep Sea Port was founded. It was indicated that the concrete content has effectively influenced natural resources and local environment.

Conclusion

The local-related learning content of environmental education for Klong Roi Sai Communities in Bandon Bay, Surat Thani was innovative, holistically based on community cultures, natural resources and local environment. This research was completed by collaborating with community leaders, cultural leaders, and the local governmental leaders. Hence, the management of natural resources and local environment was revealed, and there was a lack of integration including knowledge and understanding of systematic resources management as social cultural capital. Five learning contents were implemented to gain knowledge and understanding, awareness, positive attitudes toward environment, and participatory working with the communities. This learning content was also employed to build young leaders, together with the community leaders until the management of natural resources and local environment was systematically handled. The environmental groups and activities in Klong Roi Sai Communities were clearly developed, as shown in Figure 1.

Recommendations

1. The communities can determine their own measurements for the learning content to manage their own contexts of natural resources and local environment.

2. The communities should bring this learning content to maximally support local wisdom learning in all six sub districts.

3. The government sector and educational institutes in the communities should bring this innovation to further apply to communities with diversity of resources, environment, and cultures.

4. Klong Roi Sai Communities should be supported to bring this knowledge from the innovation to apply to an economic dimension, ecotourism, and cultural tourism to enhance the economic security and distribute knowledge of natural resources and community environment management.

Conflict of Interest

There is no conflict of interest.

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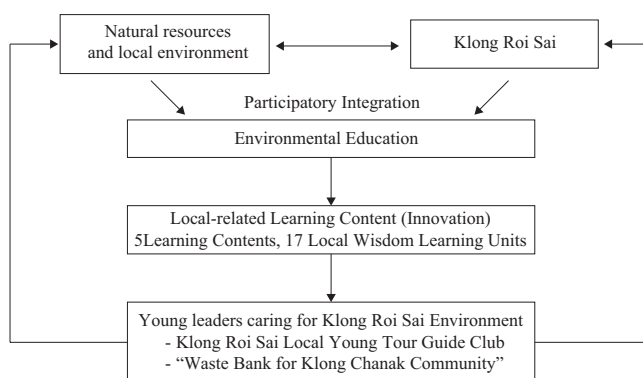


Figure 1 The innovation of local-related learning content of environmental education for Klong Roi Sai Communities

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