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A model of environmental education for developing healthy urban community: Case study Salaya district, Nakhon Pathom, Thailand

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Abstract

Environmental Education (EE) is a powerful educational tool necessary for a sustainable environment because it can change the attitude and behavior of humans toward supporting ecological integrity of a healthy city. This study was undertaken to find out how EE can assist in creating a healthy urban community (HUC). The study used Methodological triangulation: (1) Quantitative research approach by questionnaires about dimensions of EE and dimensions of HUC from 403 samples. It was found people realized that EE is environmental consciousness and HUC is quality of life, and that both have a positive relationship; (2) Qualitative research approach by 10 Salaya community leaders' small focus group for opinion of leaders' view. The result showed that regarding the environment, what people in a community were concerned about most was health followed by the effect on the scenery.; and (3) Action research approach from 30 samples by first, educating using the monitor and whiteboard. Second, giving the samples the questionnaires of the opinions. It was found that the difference was significant at 0.01 in attitude and knowledge. The results of the study revealed that with "A model of environmental education for developing healthy urban community", EE and HUC were correlated. In conclusion, people would be interested to learn EE for sustainable environmental HUC when they were: (1) aware of "environmental pollution in their own living area"; (2) concerned about their "health and quality of life in relation to the environment where they lived"; and (3) curious to learn "the understandable academic environmental knowledge", which helped create good environment.

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Introduction

Nowadays, communities in Thailand are increasingly changing to urban communities. Urbanization is driven mainly by the expansion of cities and urban migration (Angkurawaranon, 2015). A consequence of an urban community is environmental deterioration from urban pollution. This results in the community encountering varying environmental pollution such as hazardous fumes from vehicles in densely populated urban areas, that threaten public health and safety (Maohui, Yuerong, Xuezhi, & Pengfeng, 2011) While, noise can have a detrimental

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effect on human safety and health, it is the second most harmful environmental problem for human health after the quality of atmospheric air. (Mavrin, Makarova, & Magdin, 2018). At the same time, there is intensive use of plastic packaging, the quantity of municipal solid waste in urban areas continues to increase. Waste generation per capita per day in Thailand is estimated to be 1.14 kg, which is higher than the average figure of other middle-income countries, that is, 0.79 kg (Vassanadumrongdee & Kittipongvises, 2018). These are just some examples of environmental pollution which destroys people's quality of life.

The solution to these problems is to use EE to change the attitude and behavior of people in order to deal with environmental situations. A current concept is to to apply EE to be HUC. Salaya district Municipality was chosen as the study area because of the following points: (1) Salaya community has rapid population growth from migration. (2) Salaya sub-district municipality was upgraded from Salaya Sanitation about 20 years ago by the Announcement of The Ministry of Interior 25 May 1999, so it can be a prototype for other new urban communities in Thailand in applying EE. (3) Bigger area such as Province or District was not suitable for this study due to the objective of the study needing a community. This research was cross section dealing with 443 people of all ages, including village headmen and Salaya district Municipality officers, and the period of research was about 1 year between October 2017 and September 2018. Finding a solution for EE on how to educate the people in Urban Community was done by using 3 research tools, namely, (1) Questionnaires of dimensions of EE and dimensions of HUC with 426 samples from which 403 samples responded to indicate the extent to which they agreed with the scale items. (2) Comments of small focus group from 10 community leaders using the environmental topic (3) Workshop with 30 samples by using t-test. The combination of the 3 results indicated the way to teach EE to the people to become HUC, and people who construct HUC will learn EE.

Methodology

This research used 3 methods as following.

1. Quantitative approach using questionnaires in content of EE 37 questions and content of Healthy City Dimension 31 questions, providing the questionnaires to 4 village leaders in village no. 3, 4, 5, 6 and collected from people of all ages, and using Descriptive Statistics and Multiple Regression analysis.

2. Qualitative approach using small discussion group of 10 Salaya community leaders in Faculty of Social Sciences and Humanities, Mahidol University, and analyzed by the Content Analysis of the opinions.

3. Action Research approach using 20 Pre-questions for 30 Salaya village people, then educating with understandable academic environmental knowledge for 1:30 hours and asking 20 Post-questions (adjusting and switching the same questions from Pre-questions). This was analyzed by *t*-test to find the statistical change to see the differences in environmental knowledge and attitude after educating with understandable academic environmental knowledge.

Research Design

The plan was carried out as following: (1) Requesting the letter from the Faculty of Social Sciences and Humanities, Mahidol University, Salaya, to allow collecting data from Salaya district municipality; (2) Contacting the local administrative organization to ask for the name lists and phone numbers of 4 village headmen; (3) Collecting questionnaires in 4 villages; (4) Preparing the Focus group from 10 village officers to understand opinions about EE and Healthy City in Salaya district; (5) Innovating the form of "Model of environmental education for developing the healthy urban community" from quantitative and qualitative study; and (6) Testing the model from workshop (pre-posttest) to find the significant differences after educating with environmental knowledge.

Population and Sample

In this study 3 groups were used as the population as follows.

Group 1 for quantitative study; the population of 11,200 persons in 4 villages from the calculation formula of Taro Yamane to calculate the number of samples as shown in Equation (1):

$$n = \frac{N}{1+Ne^2} = \frac{11{,}200}{1+(11{,}200\times 0.0025)} = 386.2 \quad (1)$$

This study had to use not less than 387 persons as the samples. Then (Ratio at 1,331/420/7,064/2,385 of population in each village) the study used 426 samples from Ratio at 51, 17, 268, 90 by data of Civil Registration statistics on 22 April 2015. Group 2 for qualitative study; the population was 10 governing officers from 4 villages. Group 3 for action research; the samples were 30 people from random sampling from 4 villages.

Research Instrument

(1) Questionnaires; (2) Focus Group; and (3) Pre-posttest with educating knowledge.

Statistical Analysis

(1) Descriptive statistics (frequencies, mean, *SD.*, and *t*-test); (2) Multiple Linear Regression; and (3) Content Analysis

Results

Quantitative Approach

Environmental opinion

1. Environmental opinion with 6 EE objectives

It can be seen from Table 1 that people in Salaya district appreciated EE at high level, but were lowest level in environmental skills. This means to gain more EE, people must increase environmental knowledge and skills.

2. Environmental opinion with 5 HUC's dimensions

It can be seen from Table 2 that people in Salaya district appreciated HUC at high level and emphasized the quality of life at the first level, followed by culture, cleanness, and safety.

EE equation vs. HUC equation

By using Multiple Regression analysis, EE can be equation by HUC dimensions as shown in Equation (2)-(5). That people in salaya appreciated EE and HUC at high level.

1. EE Learning Equation

Equation (2) shows EE learning of people mostly comes from the interest of Quality of life They will learn EE for their good health and good environment.

$$EE = 0.50 + 0.317DLQ + 0.236DC + 0.181DG + 0.10\ \text{DS}\ (R^2 = 0.593) \quad (2)$$

EE = EE level of People in Community
DLQ = Dimension of Life Quality
DC = Dimension of Culture
DG = Dimension of Good Governance
DS = Dimension of Safety

In detail of Quality of Life found as this equation.

1) Quality of Life Equation

Equation (3) shows the Quality of Life dimension relates to Quality of environment, followed by good health. This can express that good health concerns with good environment.

Table 1 The Appreciation of EE Objectives from the opinion of people in Salaya district

6 EE's objectives	Mean	*SD*	Interpretation	Rank
Attitude of Environment	3.98	0.70	High	1
Awareness of Environment	3.94	0.62	High	2
Evaluation of Environment	3.85	0.63	High	3
Participation of Environment	3.79	0.69	High	4
Knowledge of Environment	3.45	0.81	High	5
Skills of Environment	3.30	0.94	Medium	6
Total EE's Importance's opinion	3.71	0.58	High	

Note: EE = Environmental Education.

Table 2 Appreciation of Healthy City Dimensions from the opinion of people in Salaya district.

5 HUC's dimensions	Mean	*SD*	Interpretation	Rank
Quality of Life in Healthy City	4.03	0.60	High	1
Culture in Healthy City	3.84	0.67	High	2
Cleanness in Healthy City	3.79	0.68	High	3
Safety in Healthy City	3.73	0.69	High	4
Good Governance in Healthy City	3.67	0.84	High	5
Total Healthy City Dimensions' Importance's opinion	3.87	0.52	High	

$$DLQ = 1.338 + 0.161X_{12} + 0.119X_4 + 0.089X_1 + 0.083X_7 + 0.079X_2 + 0.062X_6 \quad (R^2\ 0.454) \quad (3)$$

DLQ = the interest in Quality of Life Dimension

X_{12} = the relationship between quality of environment and quality of life

X_4 = need community nature to be close as rural area.

X_1 = Good health

X_7 = Restaurant quality is important

X_2 = Calm Mind

X_6 = Need trees in the community

By using Multiple Regression analysis, It showed HUC's dimensions go along with EE's objectives.

2. HUC Equation

Equation (4) shows the Healthy Urban Community related the main function of EE by Awareness of the environment and followed by Evaluation of environmental impact, Attitude of environment, Knowledge of environment, and Environmental Participation, respectively.

$$HUC = 0.827 + 0.317Aw + 0.202Ev + 0.117At + 0.076K + 0.076P\ (R^2 = 0.633) \quad (4)$$

which

HUC = Healthy Urban Community

Aw = Awareness of environment

Ev = Evaluation of environmental impact

At = Attitude of environment

K = Knowledge of environment

P = Environmental Participation

In detail of Awareness found as this equation.

1) Result analysis of Aw "Awareness of environment"

The equation (5) shows the people are aware that Healthy Community should be close to rural area as well as in urban area, people follow and see the importance of environment problems in Salaya district. People realize and appreciate a natural environment.

$$Aw = 1.506 + 0.092X_2 + 0.085X_5 + 0.085X_{10} + 0.070X_8 + 0.068X_9 + 0.057X_3 + 0.056X_7 \quad (R^2 = 0.495) \quad (5)$$

Aw = Environmental Awareness in Healthy community

X_2 = Healthy community should be close to nature

X_5 = Follow the environmental problems in Salaya district

X_{10} = Realize that surrounding environment is necessary

X_8 = Natural environment has good effect

X_9 = Urban environment (hasten) has good effect

X_3 = People in community are interested in environmental problems in Salaya district

X_7 = Cohabitation problem has an effect on ourselves

Qualitative Approach

Small group discussion

The opinion of community leaders showed that people in Salaya district love nature because of beautiful scenery such as trees in house area or in public area. This has an effect on a human's health by reducing air pollution as a tree can make oxygen or absorb toxins in the air. Also, waste problem must be appropriately managed. Finally, community leaders agree that people in Salaya district must increase skills and knowledge of environment.

The Small Focus Group expressed the opinion that lower environmental pollution would give better health to people in the community by being close to nature and with appropriate waste management.

Model innovation

The quantitative study explained that the objectives of EE will make the HUC by people's Awareness of the environment, followed by the ability to evaluate environmental quality, Attitude about environment, Knowledge and Skill of environment, and environmental Participation respectively. At the same time, HUC will make EE because of people's concern about Life quality Dimension**,** Consider the Cultural Dimension**,** Respect the Governance Dimension, Care about the Safety Dimension, respectively.

It can be said, EE turns to HUC by Aw, Ev, At, K, P.
HUC turns to EE by DLQ, DC, DG, and DS.

From the results of the qualitative study section, it was found from the opinions people had to have awareness about EE, how necessary it was and whether there were other choices, how to construct awareness, including all the rest of EE objectives. Most people needed the community to be Healthy City, because people believed that law enforcement could not create environmental sustainability, it must originate from self-thinking and self-doing. The leaders must be the persons who provide environmental knowledge to the people. People who have environmental skill and knowledge will have self-environmental conscience finally. When the results were synthesized together with the equations results from this study, the result was a draft model of Environmental Education for developing Healthy Urban Community. After that, the results of the workshop were used to

improve the model. The final results of this study are shown as the model in Figure 1.

Action Research Approach

A Workshop was designed to test the accuracy of the model by using EE objectives (Knowledge, Awareness, Attitude, and Participation) in 20 Likert scale questions with 30 samples. First, giving the Pre-test of 6 EE. Second, teaching understandable academic environmental knowledge in Salaya district area to the samples, for 1:30 hour. Third, giving the Post-test of 6 EE. The results from Table 3 and 4 show that there was significant increasing of Knowledge/Awareness/Attitude/Participation after giving understandable academic environmental lecture. This means a sub-conscious mind about the environment can be taught anywhere, such as in suitable buildings (it is not necessary to use natural, outdoor, beautiful places) because the workshop explained that people will change their attitude about the environment if they receive specific academic environmental knowledge.

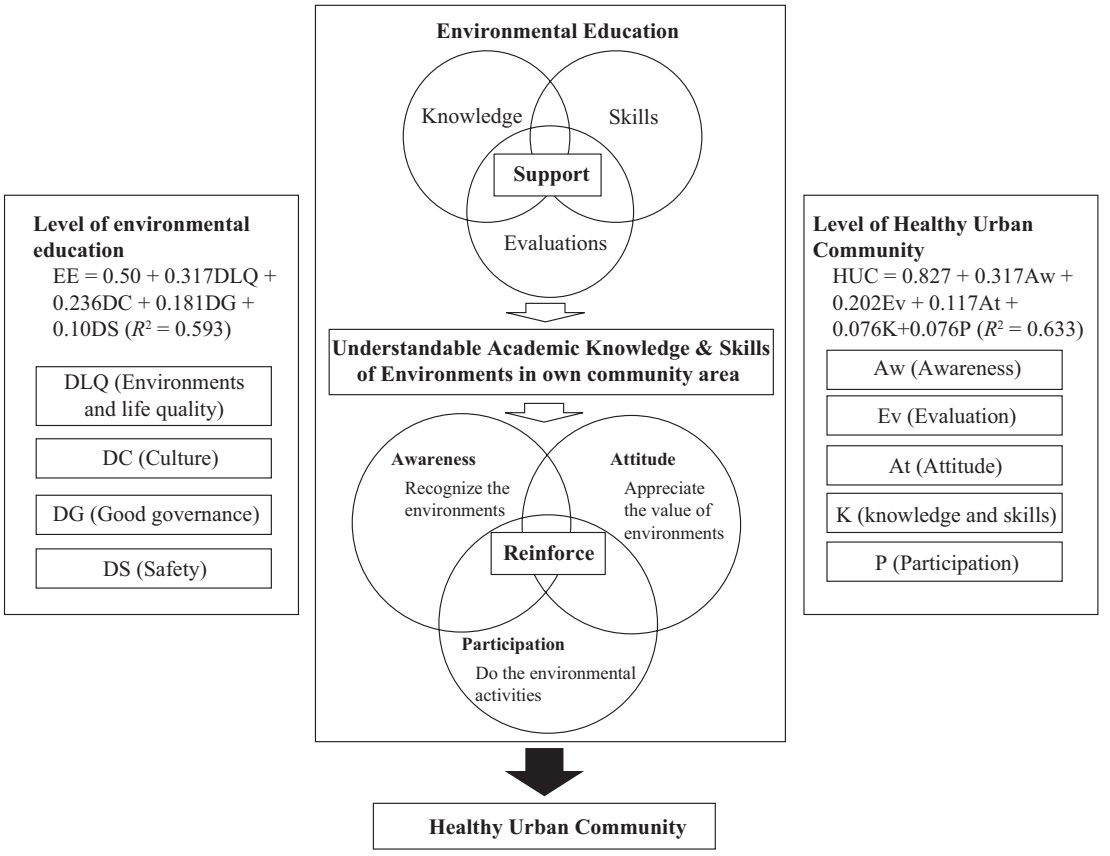


Figure 1 A model of Environmental Education for developing Healthy Urban Community

Table 3 Statistical Significance Changes of Knowledge after Environmental Lecture

Knowledge about the environment	Before Lecture		After Lecture		*p*
	Mean	*SD*	Mean	*SD*	
Knowledge in water management	3.47	0.68	3.97	0.67	.001
Knowledge in air management	2.93	0.83	3.90	0.71	.000
Knowledge in soil management	3.07	0.64	3.83	0.87	.000
Knowledge in garbage management	3.37	0.67	4.00	0.74	.002

Note: $p < .05$.

Table 4 Statistical Significance Changes of Awareness, Attitude, and Participation after Environmental Lecture

Awareness/ Attitude/ Participation	Before Lecture		After Lecture		*p*
	Mean	*SD*	Mean	*SD*	
Total awareness of the sample group	3.90	0.42	4.29	0.52	.000
Total attitudes of the sample group	3.89	0.39	4.31	0.53	.000
Participation of the sample group	3.87	0.46	4.27	0.59	.001

Note: $p < .05$.

Discussion

This study aimed to develop an environmental education model to learn basic environments to construct awareness, attitudes, and participation (Berryman & Sauve, 2016). Past study gave the meaning of participatory learning as having the learners as the center, while the skills and knowledge would lead to participation. (Van Der Putten, Vichit Vadakan, Alisar, & Edgar, 2006). Systematic learning would create awareness to folk tradition. "Local power" was systematic knowledge (Simarak, 2006). Perceiving information of environments would lead to environmental attitudes which became environmental behaviors (Kalantari & Asadi, 2010). Educational strategies could stimulate children and youths to begin the learning of living with nature appropriately and cause a consciousness toward environments, and studying the model and content of instructions would help the children and youths take part in preserving natural resources (Tangtham, 2009). Developing methods and efficiency measures for experimental design of the learning activity management model with community learning conservation will enhance people's activities, environmental education, and attitudes of their environmental conservation toward their behaviors (Sata, Wongpho, & Chankong, 2015). The model from this study can manage the environment in urban community.

In the quantitative approach, when considering only EE, people in Salaya district mostly focused on attitude of environments, that show appreciation of the natural surroundings, followed by the Awareness that they acknowledge the environmental situation in Salaya district area, and Evaluation, Participation, Knowledge and Skills, respectively. However, when combining EE learning with HUC liking, it was found that to become HUC, the most important factors were switched to Awareness, Evaluation, Attitude, Knowledge and Skills, and Participation, respectively. When considering only HUC, the liking of HUC dimensions were ranked as following: Quality of life, Culture, Safety, and Good governance, respectively. It was found that to become EE, the most important factors were Life quality, Culture, Governance, and Safety respectively.

It can be explained that people can learn or understand EE differently. When they were alone, they had good attitude to the environment, but when they were together in society, people will create awareness of the pollution's causes. However, HUC always remains as the Quality of Life whether the objective is EE or HUC.

In the qualitative approach, most of the community leaders viewed that people did not have enough knowledge and skills in environmental management, thus it made them feel isolated, and they seriously ignored the environmental issues. Only related agencies will respond regarding the environment. Knowledge and skills of environments should be given to people directly.

The results of Quantitative and Qualitative studies can be written as the "model" to apply for EE utility. To confirm the validity and reliability of the model, it had to prove that increasing people's knowledge of environments would increase awareness, attitudes, and participation about the environment significantly. The workshop was used and analyzed by *t*-test.

The workshop evaluated "A model of environmental education for developing healthy urban community". The workshop showed the higher significant difference of Awareness, Attitude, and Participation after educating using understandable academic environmental knowledge.

In the model, increasing the Knowledge about the environment will increase Awareness, Attitude, and Participation of environments while life quality of people and Awareness of the environments are most important, which can be the main issues of EE and HUC.

EE must have the models or patterns, then people can understand how to treat the environment around them. Simarak (2006) did the research of mechanism development of knowledge management to develop the locality at the sub-district and district level by using the seeking process of local histories, learning system of community relating to the resource base, society, culture, and economy, emphasizing the data collection for

systematic learning, and constructing the awareness to the folk to let the people in the community do the duty as process lecturer in order that the people in the community would want to do more than the external persons.

Conclusion

Using Multiple Analysis: (1) Use EE as the dependent variable and HUC dimensions as the independent variables. This indicated that the learning level of environmental education of people in the community depended on the significance of the dimensions of healthy urban community in various aspects as follows: dimension of life quality dimension, culture dimension, governance dimension, and safety dimension respectively; and (2) Use HUC as the dependent variable and EE as the independent variables. This suggested that HUC depended on the significance of the objectives of environmental education in various terms as follows: Awareness, Evaluation, Attitude, Knowledge and Skills, and Participation respectively. People can use EE to make HUC, and at the same time, people can use HUC dimensions' liking to learn EE.

The focus group explained that most people in Salaya district had no knowledge or skills of environmental management. They felt really separated from environments and relied only on the Salaya district municipality, which is under staffed, to manage environmental pollutions. It is necessary to give environmental education to the people to change their awareness and behavior.

The workshop confirmed the reliability of the model from this study, which could be applied authentically for constructing the awareness, attitudes, and participation of environments, by giving practical knowledge of basic environments to people in the community.

The result of quality and efficiency evaluation of innovative environmental education, which had been constructed as a model of environmental education for developing the healthy urban community, means "knowledge, skills, and ability to evaluate the environments" have to be increased from basic environmental knowledge to people in the community to cause the construction of "awareness, attitudes, and participation" in terms of environments.

Recommendation

The findings show that EE can make HUC, while HUC can also make EE. Awareness, attitude, participation, knowledge, skills, ability to evaluate about surrounding environments can make quality of life, culture, cleanness, safety, good governance of the city. Likewise, HUC can make EE.

These study results can be applied to any urban community.

1. The community should organize the evaluation set of environmental effects in an easy format appropriate to the community, monthly or quarterly, which will increase the awareness, attitudes, participation of environments to people in the community with environmental instructors from a university, such as, organizing exhibitions of environments, provide knowledge on the problems of environments with people in local festival, etc.

2. The community should have a measurement of life quality through environments to the community, in monthly or quarterly, such as by giving information on pollution from cars, used for examining the water and air quality, warning and advising on waste management to let people get the utmost benefits from waste usage. This information can be made known to the public in urban areas by billboards in the streets, buildings, etc

Conflict of Interest

There is no conflict of interest.

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