

## Development of a Prototype of Environmental Education Volunteer

Nongnapas Thiengkamol

Faculty of Environment and Resources Studies, Mahasarakham University, Thailand

**Abstract:** Environmental Education Volunteer (EEV) is an important person to distribute the knowledge and understating on environmental issues, particularly to inspire the people to change their behaviors for natural resources and environment conservation. Additionally, environmental education volunteer should have public mind to serve community and society in terms of awareness and consciousness raising, attitude, belief and behavior changing through knowledge giving activities. Human behavior has been reported with a new and stronger evidence that it is the most essential factor to increase green house gases. The objective of this research was to develop a prototype of environmental education volunteer. The sample was selected by purposive sampling technique. Instruments composed of knowledge of trainer characteristics, public mind behavior, inspiration of environmental conservation and environmental education volunteer characteristics. One way ANOVA and t-test was used for data analysis. The process for Training of the Trainer (TOT) was implemented with Participatory Appreciate Influence Control technique (PAIC) integrating with brain storming during training process and evaluation was done with Three Dimensional Evaluation (TDE) and Four Dimensional Evaluation (FDE). TDE covers self-, friend- and facilitator-evaluation and FDE covers trainer self-, audience-, trainer friend- and expert trainer-evaluation. The action plan formulations and project practices were evaluated with participatory performance, Assessment, Monitoring Evaluation and Impact (PAMEI). The results illustrated that after PAIC process implemented, the mean scores of post-test of knowledge of trainer characteristics, public mind behavior, inspiration of environmental conservation, EEV characteristics and training achievement were higher than pre-test with statistical significance ( $p < 0.01$ ,  $p < 0.01$ ,  $p < 0.01$ ,  $p < 0.01$  and  $p < 0.01$ ), respectively. The three dimensional evaluation was used to evaluate the participation of participant, the finding revealed that the mean scores of friend and facilitator evaluation showed no statistical difference ( $p > 0.05$ ) but mean scores between self- and friend-evaluation and between self- and facilitator-evaluation showed statistically difference ( $p < 0.01$  and  $p < 0.05$ ). The mean scores of both friend- and facilitator-evaluation were higher than self-evaluation. This indicated that the participants evaluated themselves lower than friend and facilitator because they are humble persons that are general style of Thai. However, FDE was revealed that it was no statistical difference ( $p > 0.05$ ). It implied that the opinions of trainer self-, trainer friend- and audience-evaluation and expert trainer were no differences. During PAIC implemented, the 5 focus groups discussion were done, the overall results showed at least five projects purposed such as Environmental knowledge given to friends, Tree cultivation for faculty public mind for environmental conservation inspire student on voluntary mind and Network development of environmental education to be implemented according to the action plans on empowerment of EEV.

**Key words:** Development, prototype, environmental, education volunteer, self-evaluation, expert trainee, empowerment of EEV

### INTRODUCTION

In the past, Thailand had promoted to maintain environmental quality and had paid attention to solve the environmental problem but only the governmental sector had taken an important role to make a decision without the participation of all sectors particularly, the popular participation. Nevertheless, the essential factors, the people did not have enough knowledge and understanding, awareness, consciousness and attitude to practice themselves toward environmental conservation

by realizing on their important duties as global citizen to take responsibilities for natural resources and environmental conservation with public consciousness (Thiengkamol, 2011d).

Consequently, the impacts of environmental pollution during these three decades have driven all sectors of Thai society to turn their interesting to participate and collaborate for alleviating the global problem like as global warming which is the hot issue that global population has taken a notice to this problem. Taking into account on way of daily living, humans need

to depend on the other living things in view of that they are interdependent each other but they are important change agents among living things so, they should take the more responsibility than others for making a balance of diversity of ecological system as a whole. Particularly, Thiengkamol gave mentions that the important characteristics of Environmental Education Volunteer (EEV) should have knowledge and understanding and awareness and sensitivity about the environment and environmental challenges, attitude concern for the environmental conservation, skills to monitor and evaluate the environmental problems including knowledge transferring, responsibility taking, skill public consciousness or public mind performing and inspiration raising for environmental conservation.

Additionally, participation in environmental activities and decision making on environmental problem solving would be emphasized in daily life practice until it becomes an environmental habit or behavior by all global citizen. Generally, these characteristics should be introduced through all educational channels whether through the formal education, informal education, non-formal education and lifelong education in order to achieve an actual sustainable development of the world (Thiengkamol, 2008, 2009, 2011d).

These concepts were congruent to findings that revealed from the research that there are 14 main Environmental Education Characteristics (EECs) covering of composed of:

- Ability to transfer environmental knowledge
- To stimulate others to realize the importance of environmental conservation
- To have deeply awareness about environment and natural resources
- To have public consciousness for environmental conservation
- To have positive attitude for environmental conservation
- To have value that for environmental conservation be everyone duty
- To have a sensitivity of environmental conservation
- To wish to take a responsibility for environmental conservation
- To participate to environmental conservation activities regularly
- Consistency of self practice for environmental conservation
- Ability to make decision correctly for environmental conservation
- Must practice as a role model of environmental conservation for public perception

- To have correct environmental knowledge
- Understanding to introduce environmental knowledge for others to practice correctly (Charoensilpa and Thiengkamol, 2011)

The undergraduate students of Faculty of Environment and Resource Studies, Maharakham University, they must take important roles in the future to be a leader in the aspect of environment and natural resources conservation that are congruent to the roles and functions for taking responsibility for Thai society in order to accomplish the philosophy that of faculty that the intelligent student should be a leader and living with environmental friend.

Therefore, they should have ideal to be congruent to those roles and burdens in the future then it needs to introduce the environmental education process to develop and create the public consciousness with the ideal to devote themselves for society in aspect of environment and natural resources conservation through the Participatory Appreciate Influence Control (PAIC) technique integrating with brain storming and focus group discussion during the training process. This participatory training technique will be able to stimulate their inspiration to have public consciousness to change their awareness, attitude and practice because during the implementation of PAIC training, they have a change to participate by brain storming to create a imagine and creating ideas across the training process through different activities such as presentations of their project proposed in the focus group discussion and role play as trainer for environment and natural resources conservation.

PAIC composes different features that are similar to environmental education process such as PAIC stimulating voluntary mind, public mind and behavior of the participants on environment and natural resources conservation and PAIC stimulating the participants about the sensitivity, skill and responsibility to research together in focus group discussion including raising awareness on facing environmental problem (Thiengkamol, 2004, 2005b, 2008, 2010, 2011b, c). They should take responsibility as environmental education leader in the future, so they should have truly environment knowledge and understanding with solving problem and making decision properly including correctly attitude and sensitivity to perceive environmental problem.

Furthermore, they should practice to gain more skill to regularly perform activities in the daily life until it becomes the permanent behavior in their lives. Nevertheless, they should be able to transfer their

knowledge and understanding for environmental conservation to their families and societies through the practice and behavior in terms of proper model because PAIC training technique is able to adjust the participant to freely create the imagination and thinking from the process of participate in the focus group discussion and brain storming process (Thiengkamol, 2005a, b, 2008, 2010, 2011b, c). The brain storming principle is introduced widely in the various research of innovation creation.

**Research objective:** The research objective was to develop a prototype of environmental education volunteer.

### MATERIALS AND METHODS

The research design was implemented in steps by step as follows:

- Construction of handbook for the participatory training; it contains knowledge of trainer characteristics, public mind behavior, inspiration and environmental education volunteer characteristics (Charoensilpa and Thiengkamol, 2011, UNESCO, 1978, Went-Dse-Zel, 2002; Thiengkamol, 2011a, d)
- The research tools composed of test, questionnaire and evaluation form. The test was used for determining their knowledge of trainer characteristics and questionnaire was used for determining public mind behavior, inspiration and environmental education volunteer characteristics
- The evaluation form of three dimensional was constructed to assess the participant practice during PAIC implemented
- The undergraduate students of Faculty of Environment and Resource Studies were selected with purposive sampling from the undergraduate student, Mahasarakham University. They would be recruited according to the setting criteria (willingness, time, devotion, commitment and public mind)
- The 30 participants were employed for testing of knowledge of trainer characteristics, public mind behavior, inspiration and environmental education volunteer characteristics. The systematic operation of 30 participants was trained with PAIC. The focus group discussion included brain storming and Training of Trainer (TOT) (Langly, 1988; Weiss, 1995; Sproull, 1995; Went-Dse-Zel, 2002, Thiengkamol, 2004, 2005b). The Three Dimensional Evaluation (TDE) was used to determination the

congruence of three aspects evaluation, self-, friend- and facilitator-evaluation for training participation. Additionally, Four Dimensional Evaluation (FDE) was used for evaluating EEV on role playing as trainer. FDE covered trainer self-, audience, trainer friend- and expert trainer-evaluation (Thiengkamol, 2004, 2005a, 2008, 2011a-d)

- The pre- and post-test one group design was used to test for before and after training process with PAIC
- PAMEI technique was employed for identify the performance, assessment, monitoring and evaluating for participants performance of undergraduate student of Mahasarakham University as the environmental education volunteer for alleviating global warming (Thiengkamol, 2004, 2005a, b, 2011a-d)

### RESULTS

**General characteristics of sample group:** The sample group of this study was 30 undergraduate students that were selected by purposive sampling technique from Faculty of Environment and Natural Resources Studies, Mahasarakham University in the academic year of 2010. Most of them were female with 73.33% and 3rd year student of Program Environment and Natural Resources Management with 96.67%. Majority lived at dormitory with 80% as shown in Table 1.

**Pre- and post-test with paic technique:** PAIC technique was implemented for undergraduate students on the concept development of EEV for alleviating global warming based on knowledge of trainer characteristics, public mind behavior, inspiration of environmental conservation and EEV characteristics contents.

Table 1: Demographic characteristics of sample group

Characteristics	Undergraduate students	
	Frequency	Percentage
<b>Sex</b>		
Male	8	26.67
Female	22	73.33
<b>Class</b>		
1st year	-	-
2nd year	1	3.33
3rd year	29	96.67
4th year	-	-
<b>Program</b>		
Environmental education	-	-
Environmental management	30	100.00
Environmental technology	-	-
<b>Live at</b>		
Dormitory	24	80.00
Rent house	1	3.33
Home	5	16.67
<b>Total</b>	30	100.00

Table 2: Pre- and post-test of sample group

Experimental groups	No.	Mean±SD	t	Sig.
Pre-test of knowledge of trainer characteristics	30	7.45±1.650	4.921	0.01
Post-test of knowledge of trainer characteristics	30	9.13±1.030		
Pre-test of public mind behavior	30	7.89±1.370	5.559	0.01
Post-test of public mind behavior	30	9.59±1.030		
Pre-test of inspiration of environmental conservation	30	7.78±1.020	5.738	0.01
Post-test of inspiration of environmental conservation	30	9.87±10.96		
Pre-test of EEV characteristics	30	10.05±2.180	5.235	0.01
Post-test of EEV characteristics	30	13.45±0.690		
Pre-test of training achievement	30	33.95±4.510	5.563	0.01
Post-test of training achievement	30	41.50±1.320		

The research results illustrated that before and after PAIC process implemented, the mean scores of posttest of knowledge of trainer characteristics, public mind behavior, inspiration of environmental conservation, EEV characteristics and training achievement were higher than pre-test with statistical significance ( $p < 0.01$ ), respectively as shown in Table 2.

**Three dimensional evaluations for participation:** Three dimensional evaluations were employed for determination the perceptions of 30 undergraduate students in three aspects evaluation, self-, friend- and facilitator-evaluation by using one way ANOVA in order to investigate the mean scores difference of three group. The results of one way ANOVA showed that there were different of mean scores about participation in training process through brain storming with statistical significance ( $p < 0.01$ ) as shown in Table 3. This meant that the perceptions of student on himself, his friend in the group and his facilitator were highly different for their participation during the focus group discussion during training process as shown in Table 3.

TDE was used to evaluate the participation of participant, the finding revealed that the mean scores of friend- and facilitator-evaluation showed no statistical difference ( $p > 0.05$ ) but mean scores between self- and friend-evaluation and between self- and facilitator-evaluation showed statistical difference ( $p < 0.01$  and  $p < 0.05$ ) as shown in Table 4. The mean scores of both friend- and facilitator-evaluation were higher than self-evaluation as shown in Table 4. FDE was used for trainer role play evaluation it illustrated that trainer self-, audience, trainer friend- and expert trainer-evaluation of the selected 10 students with top ten highest scores to be trainer. One way ANOVA was used investigate the mean scores difference of four groups. The results of one way ANOVA showed that there were different of mean scores on role play as trainer in training process ( $p > 0.05$ ) as shown in Table 5.

Table 3: Three dimension evaluation of sample group participation

Source of variation	Sum of square	df	Mean <sup>2</sup>	F	Sig.
Between group	113.740	2	56.870	5.564	0.01
Within group	889.227	87	10.221		
Total	1002.967	89			

Table 4: Scheffe' analysis of each pair comparisons

Each pair of variables	Mean diff. (I-J)	SE	Sig.	95% CI	
				Lower bound	Upper bound
Self- and friend-evaluation	-2.29000*	0.73372	0.010**	-4.3241	-1.8548
Self- and facilitator-evaluation	-2.10000*	0.73372	0.027*	-3.7931	-0.1548
Friend- and facilitator-evaluation	0.20200	0.73372	0.926	-1.5321	3.4952

\*Significant level at 0.05 and \*\* Significant level at 0.01

Table 5: Four dimensional evaluation of EEV role play as trainer

Source of variation	Sum of square	df	Mean <sup>2</sup>	F	Sig.
Between group	2.634	3	0.878	1.129	0.521
Within group	27.972	36	0.777		
Total	30.606	39			

This implied that the opinions of four aspects of trainer self-, audience-, trainer friend- and expert trainer-evaluation on the trainer role plays were not different therefore student trainer can perform as trainer prototype of EEV.

During PAIC implemented, the five focus groups discussion were done, the overall results illustrated that there were at least five projects purposed such as Environmental knowledge given to friends, Tree cultivation for faculty public mind for environmental conservation inspire student on voluntary mind and Network development of environmental education to be implemented according to the action plans on empowerment of EEV.

The pilot projects selected for implementing were three from five proposed projects. These were Tree cultivation for faculty public mind for environmental conservation inspire student on voluntary mind. After some part of three of projects were started implementing, the students gained more experiences including raising their awareness and responsibility to environmental conservation. Particularly, they got more skill to make decisions on solving environmental problems correctly and practice themselves properly. In addition after the PAIC training finished. The finding revealed that before training, the students had less to moderate level of knowledge of trainer characteristics and public mind behavior at moderate level. At the beginning of training process some of them lacked of self-confidence to

express their ideas and thinking. But after using the integration of environmental education and training of trainer through focus group discussion and brain storming process, they can express and explain their ideas and thinking confidently.

Furthermore, PAIC can be introduced to stimulate students to increase their public mind behavior and to inspire their environmental conservation behavior more than before training with statistically significant ( $p < 0.01$ ) as shown in Table 2. However, PAIC is able to use for encouraging the participant to be able to make a decision on the facing problem by practicing so, it is similar to environmental education process that entails practice in decision making of self-formulation of a code of behavior about issues concerning environmental quality.

The PAMEI used for participatory assessment, participatory monitoring, participatory evaluation and participatory impact were approval for three project implementations.

Additionally, it was revealed that after the undergraduate students had implemented the three pilot projects then they gain more environmental knowledge, experiences, raise more awareness and take more responsibility for environmental conservation, particularly, they have more skill to make a decision of environmental problem solving properly.

## **DISCUSSION**

The results indicated that the undergraduate student, Faculty of Environment and Resource Studies, Mahasarakham University will have knowledge of trainer characteristics and questionnaire was used for determining public mind behavior, inspiration of environmental conservation and EEV characteristics after participating in the PAIC training. These were congruent to a variety of studies of Thiengkamol (2004, 2005a, 2010, 2011b, c). It might be explained that the training with PAIC technique is able to raise knowledge in various issues and for different target groups and it can be used for stimulation the attitude and behavior changing. Moreover, it is also able to stimulate public mind and inspiration for environmental conservation through practicing suitable behavior in their daily life activities for alleviating global warming.

The findings are also pertinent to the results from the study of Jumreansan and Thiengkamol (2011) that the attitude is affected to inspiration creation and behaviors change for global warming alleviation. The results of TDE of 30 participants were employed for determination of the congruence of three aspects

evaluation, self-, friend- and facilitator-evaluation. The mean scores of both friend- and facilitator-evaluation were higher than self-evaluation ( $p < 0.01$  and  $p < 0.05$ ) and the finding revealed that the mean scores of friend- and facilitator-evaluation showed no statistical difference ( $p > 0.05$ ). The mean scores of self-evaluation was lower than mean scores friend- and facilitator-evaluation, so it indicated that the participants evaluated themselves lower than friend and facilitator because they are humble persons that are general style of Thai students.

Additionally, FDE was used to evaluate the role plays as trainer of 10 students, it was found that there was no statistically significant level ( $p > 0.05$ ) as shown in Table 5. It might be concluded that 10 student trainers can be trainer prototype of EEV for training other students as shown in Table 5. The result of training the trainer as EEV was pertinent to different studies of Thiengkamol (2004, 2005a, 2010, 2011b) and researches of Sukwat and Thiengkamol (2011) and Wattanasaroch and Thiengkamol (2011).

Furthermore, it was found that PAIC training is effective for training with integration of brain storming process to develop a shared vision, action plan and projects in different issues of training such as energy conservation, urban community food security management, environment and natural resource conservation, development of health cities network for Mekong region, development of women's political participation in Pattaya city, community strengthening, environmental management in dormitory and soil and water conservation (Thiengkamol, 2004, 2005a, b, 2010, 2011b; Wattanasaroch and Thiengkamol, 2011; Sukwat and Thiengkamol, 2011).

## **CONCLUSION**

During, the PAIC training implemented, focus groups discussion and brain storming were integrated therefore, it is obviously seen that after training they had intended to run 3 pilot projects from 5 projects. They search the way to maintain the three pilot projects with different ideas being suggested during this brain storming process in order to meet their intentions of being EEV for alleviating global warming, especially in accordance with the action plan on action plans on Empowerment of EEV across the Mahasarakham University and to join with other colleges and universities in the Northeastern region. Additionally, the result was congruent to numerous studies of Thiengkamol (2005a, 2010, 2011b), Wattanasaroch and Thiengkamol (2011), Sukwat and Thiengkamol (2011) and study of Jansab (2006).

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