

Development of Environmental Education Trainer through PAIC Process

Denpong Charoensilpa

*Department of Environmental Education
Faculty of Environmental and Resource Studies
Mahasarakham University, Mahasarakham 44150, Thailand*

Nongnapas Thiengkamol

*Major Advisor, Department of Environmental Education
Faculty of Environmental and Resource Studies
Mahasarakham University, Mahasarakham 44150, Thailand*

Chatchai Thiengkamol

*Co- Advisor, Director of Research In Motion Co., Ltd. 599/321
Baan Klang Krung, Jatujuk Sub-district, Jatujuk District
Bangkok 10900, Thailand*

Jurairat Kurukodt

*Co- Advisor, Department of Environmental Education
Faculty of Environmental and Resource Studies
Mahasarakham University, Mahasarakham 44150, Thailand*

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Abstract *The objective of this research was to develop a prototype of environmental education trainer for undergraduate students of Mahasarakham University. The sample was selected by purposive sampling technique. Instruments composed of knowledge of trainer characteristics, public mind behavior, inspiration and environmental education trainer 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 SWOT Analysis in the training process. 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 posttest of knowledge of trainer characteristics, public mind behavior, inspiration and environmental education trainer characteristics were higher than pretest with statistical significance ($p < .01$, $p < .01$, $p < .05$, and $p < .05$). The Three Dimensional Evaluation was used to evaluate the participation of participant, the finding revealed that the mean scores of Friend Evaluation and Facilitator Evaluation showed no statistical difference ($p > .05$) but mean scores between Self-Evaluation and Friend-Evaluation, and between Self-Evaluation and Facilitator-Evaluation showed statistically difference ($p < .01$ and $p < .05$). The mean scores of both Friend-Evaluation 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.*

Key words : *Environmental Education Trainer / PAIC Process*

1. Introduction

The United Nations' Intergovernmental Panel on Climate Change (IPCC) at the Paris Conference issued its the Four Assessment Report, strengthening its conclusions about climate change and human behavior, reported that there is a new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities. Presently, it is clearly conclusion that the globe has been warming with the rate approximately 0.2 °C per 10 years or 1 decade and this rate has increased in the future continuously (Environmental Journal, 2007).

Thailand was also accounted at the 23 order of world that released the gas carbon dioxide with 277.51 million ton

per year. It was calculated that Thailand was in the list of countries by carbon dioxide emissions per capita in 2007 with 4.1 ton (Wikipedia, 2010).

Even through in the past, Thailand had promoted, had maintained environmental quality and had tried to solve the environmental problem, but there was only governmental sector that took an important role without the participation of all sectors, particularly, the popular participation. However, the main causes, the people are lacking of knowledge and understanding, consciousness and attitude to practice themselves toward environment with the realization of their importance to take responsibilities for natural resources and environmental conservation (Thiengkamol, 2010a). Therefore, all sectors of Thai society must turn their interesting to collaborate alleviating the global problem such as global warming, which is the hot issue that global population has taken a notice to this problem including Thai people too. The way of living of humans depended on the other living things so all of them are interdependent each other, so it is impossible to live with regarding to only them but they must take the responsibility for society as a whole. Therefore the social development can grow further, it needs to build the public consciousness to act others or society or public being increasingly since at present society is a high competition. The materialism of present society was a push pressures for people to be more selfish and to take more advantage from the others without concerning to the others. Therefore, the serious and continuous changing on behavior and consciousness, the governmental sector had set a measurement of national education management that "one of goals of education management is to make the learner to have the moral and social responsibilities in order to make him to be a good member and trainer for community and society as Thai citizen and global citizen (Office of Secretary of Educational Council, 2005).

For the undergraduate students of Faculty of environment and Resource Studies, Mahasarakham 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 PAIC technique integrating with SWOT Analysis 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 work together in focus group discussion including raising awareness on facing environmental problem (Thiengkamol, 2005b; Thiengkamol, 2008; Thiengkamol, 2010b). 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. Moreover, 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, 2005b). The brain storming principle is introduced widely in the various work of innovation creation.

2. Research Objective

The objective of this research was to develop a prototype of environmental education trainer for undergraduate students of Mahasarakham University.

3. Methodology

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

- 1) Construction of handbook for the participatory training: it contains knowledge of trainer characteristics, public mind behavior, inspiration and environmental education trainer characteristics (CEDPA, 1999; FAO, 2005; UNESCO, 1978; InWent-DSE-ZEL, 2002; Thiengkamol, 2004; Thiengkamol, 2009).

- 2) 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 trainer characteristics.
- 3) The evaluation form of Three Dimensional was constructed to assess the participant practice during PAIC implemented.
- 4) 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).
- 5) The 30 participants were employed for testing of knowledge of trainer characteristics, public mind behavior, inspiration and environmental education trainer characteristics. The systematic operation of 30 participants was trained with Participatory-Appreciate-Influence-Control (PAIC). The focus group discussion included brain storming and SWOT (Strength-Weakness-Opportunity-Threat) analysis (Langly, 1998; Weiss, 1993; Sproull, 1988; Thiengkamol, 2005b).
- 6) The Pretest-Posttest One Group Design was used to test for before and after training process with Participatory-Appreciate-Influence-Control (PAIC). Additionally, the Three Dimensional Evaluation (TDE) was used to determine the congruence of three aspects evaluation; Self-evaluation, Friend-evaluation, and Facilitator-evaluation for training participation (Thiengkamol, 2004; Thiengkamol, 2005b; Thiengkamol, 2008b).
- 7) PAMEI technique was employed for identify the performance, assessment, monitoring, evaluating for participants performance of undergraduate student of Mahasarakham University as the environmental education trainer for alleviating global warming (Thiengkamol, 2004; Thiengkamol, 2005a; Thiengkamol, 2008).

4. Results

4.1 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 76.67%, all of them were third year student of Program Environment and Natural Resources Management with 100%, and they lived at dormitory with 76.67% as shown in table 1.

Table 1 Characteristics of Undergraduate Students

Characteristics		Undergraduate Students	
		Frequency	Percent
Sex	Male	7	23.33
	Female	23	76.67
Class	First Year	-	-
	Second Year	-	-
	Third Year	30	100
	Fourth Year	-	-
Program	Environmental Education	-	-
	Environmental Management	30	100
	Environmental Technology	-	-
Live at	Dormitory	23	76.67
	Rent House	2	6.67
	Home	5	16.66
Total		30	100

4.2 Results of Pretest and Posttest with PAIC technique

PAIC technique was implemented for undergraduate students on the concept development of environmental education trainer for alleviating global warming based on knowledge of trainer characteristics, public mind behavior, inspiration and environmental education trainer characteristics contents.

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 and environmental education trainer characteristics were higher than pretest with statistical significance ($p < .01$, $p < .01$, $p < .05$, and $p < .05$) as presented in table 2.

Training Issues	Pretest		Posttest		t	p
	\bar{x}	S.D.	\bar{x}	S.D.		
Knowledge of Trainer Characteristics	7.50	1.70	8.95	0.60	-3.404	.001*
Public Mind Behavior	7.90	1.37	9.60	0.68	-5.667	.000*
Inspiration of Environmental Conservation	8.90	1.12	9.50	0.51	-2.108	.025*
Environmental Educator Characteristics	10.85	2.18	12.45	0.69	-2.235	.019*
Training Achievement	35.15	5.50	40.50	1.28	-4.127	.000*

* Significant Level at .05; ** Significant Level at .01

4.3 Results of Three Dimensional Evaluations for Participation

Three Dimensional Evaluations were employed for determination the perceptions of 30 undergraduate students in three aspects evaluation; Self-evaluation, Friend-evaluation, and Facilitator-evaluation by using One-way ANOVA in order to investigate the mean scores difference of three group during focus group discussion. 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 ($p < .01$) as illustrated 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 showed in table 3.

Table 3 Three Dimensional Evaluations for Participation

Source of Variation	SS	df	MS	F	p
Between Group			66.717	13.079	.000*
Within Group	133.433	2	5.101		
Total	290.750	87			
	424.183	89			

** Significant Level at .01

The Three Dimensional Evaluation was used to evaluate the participation of participant, the finding revealed that the mean scores of Friend Evaluation and Facilitator Evaluation showed no statistical difference ($p > .05$) but mean scores between Self-Evaluation and Friend-Evaluation, and between Self-Evaluation and Facilitator-Evaluation showed statistical difference ($p < .01$ and $p < .05$) as illustrated in table 4. The mean scores of both Friend-Evaluation and Facilitator-Evaluation were higher than Self-Evaluation as presented in table 4.

Table 4. Each Pair Comparisons among Self-Evaluation, Friend Evaluation and Facilitator Evaluation

Evaluation		Self-Evaluation	Facilitator Evaluation	Friend Evaluation
	\bar{x}	19.85	21.80	23.50
Self-Evaluation	19.85	-	-1.950 (.030*)	-3.650 (.000**)
Facilitator Evaluation	21.80		-	-1.700 (.067)

** Significant Level at .01 and * Significant Level at .05

4. Results of Four Dimensional Evaluations for Trainer Role Play

Four Dimensional Evaluations (FDE) included trainer self-evaluation, trainer friend evaluation, audience evaluation, and expert trainer evaluation. It was used for trainer role play evaluation of 10 selected undergraduates who had top ten scores for posttest scores. They were selected to play a role as trainer. After they played as trainers, they were evaluated by FDE, One Way ANOVA was employed to investigate the mean scores of four groups. The results showed that there were no different mean score on role play as trainer ($p < .05$) as presented in table 5. This can be explained that the opinion of four aspects on trainer role play are congruent, therefore the undergraduate can perform as trainer for environmental education.

Table 5 Four Dimensional Evaluations for Trainer Role Play

Source of Variation	SS	df	MS	F	p
Between Group	2.521	3	.840	1.016	.397
Within Group	29.778	36	.827		
Total	32.299	39			

* Significant Level at .05

During PAIC implemented, the five focus groups discussion were done, the overall results showed that there were at least five projects purposed such as "Transferring Environmental Knowledge to Community", "Teenage of New Generation Concern to Environment" "Green University Project", "Paper Saving Bank" and "Project of Caravan of Global Warming Alleviation" to be implemented according to the action plans on "Empowerment of Environmental Education Trainer. The pilot projects selected for implementing were three from five proposed projects. These were "Transferring Environmental Knowledge to Community", "Teenage of New Generation Concern to Environment" and "Paper Saving Bank". 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. The PAMEI used for participatory assessment, participatory monitoring, participatory evaluation and participatory impact were approval for three project implementations. Moreover, it was revealed that after the undergraduate students had implemented the three pilot projects, then they gain more experiences, increase more awareness raise and take more responsibility for environmental conservation, particularly, they have more skill to make a decision of environmental problem solving properly.

PAMEI technique was used for monitoring, evaluating, and impact from project implementing with 3 projects. Moreover, 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 be express and explain their ideas and thinking fluently. Furthermore, PAIC can be introduced to stimulate students to increase their public mind behavior and inspiration of environmental conservation better than before training with statistically significant ($p < .01$ and $p < .05$) 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.

5. Discussions

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 and environmental education trainer characteristics after participating in the PAIC training. It was congruent to these studies of Thiengkamol, 2004; Thiengkamol, 2005a; Thiengkamol, 2005a; Jansab, 2006 and Thiengkamol, 2010b. 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 stimulate the attitude and behavior changing. Moreover, it is able to stimulate public mind and inspiration for environmental conservation through practice proper behavior in their daily life activities for alleviating global warming. The findings are also pertinent to the results from the study of Jumrearnsan, W., and Thiengkamol, N., (2010: in press) that the attitude is affected to inspiration creation and behaviors change for global warming alleviation.

The results of TDE of 30 Participants was employed for determination of the congruence of three aspects evaluation; Self-evaluation, Friend-evaluation, and Facilitator-evaluation. The mean scores of both Friend-Evaluation and Facilitator-Evaluation were higher than Self-Evaluation ($p < .01$ and $p < .05$) and the finding revealed that the mean scores of Friend Evaluation and Facilitator Evaluation showed no statistical difference ($p > .05$). This indicated that the participants evaluated themselves lower than friend and facilitator because they are humble persons that are general style of Thai students.

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 and community strengthening (Thiengkamol, 2004; Thiengkamol, 2005a; Thiengkamol, 2005b; Jansab, 2006; Thiengkamol, 2010b).

During, the PAIC training implemented, focus groups discussion and SWOT (Strength-Weakness-Opportunity-Threat) analysis were integrated, therefore, it is obviously seen that after 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 environmental education trainer for alleviating global warming, especially they plan to build network of global warming alleviation across the Mahasarakham University and to join with other colleges and universities in the Northeastern region. Additionally, in accordance with different studies of Thiengkamol (2005a), Thiengkamol (2005b) Jumrearnsan and Thiengkamol (2010b); Thiengkamol, (2010:inpress). and Jansab, (2006), the findings revealed that PAIC can initiate and stimulate the participant creative thinking to propose the projects to implement and attitude changing will be able to cause behavior change for environment conservation and participation, and political participation.

6. Recommendations

1. *Recommendation from the Research*

1.1 The recommendations from the findings revealed that the undergraduate students of Mahasarakham University should be educated by using PAIC technique to accelerate their inspiration, public mind behavior, and to increase numbers of environmental education trainer in order to accomplish the goal of sustainable development through the brain storming process of PAIC. Therefore, university should introduce this participatory training technique as PAIC to use in every faculty of the university.

1.2 The students of every faculty of Mahasarakham University should join the project of environmental education trainer for alleviating global warming with public mind and collaborate to develop the network across the university to serve the policy of green university of Mahasarakham University.

1.3 It should be promoted and distributed PAIC technique for learning and teaching process on other topics based on environmental education integration to increase the amount of environmental education trainer for alleviating global warming with public mind to other level of education such primary school, and secondary school including vocational level and for every educational institute and work place.

1.4 PAIC technique can be used for network development of environmental education trainer for alleviating global warming with public mind to every educational institute and work place in order to accelerate the amount of people to practice proper daily life activity for environmental conservation.

2. Recommendations for Policy, Plan and Project Implementation

2.1 The Ministry of Education should issue policy and plan to support every level of education to use PAIC technique to develop the environmental education trainer for alleviating global warming with public mind to aware and take responsibility to participate for environmental and natural resources conservation to meet the sustainable development.

2.2 Every university, college and school should let teacher to receive the PAIC training for utilization and application for every subject since this technique is a participatory learning based on the brain storming and creative process to initiate the student to learn according to the student-centered concept.

2.3 The pilot projects implemented and evaluated after the PAIC training process should be supported to enhance to set other succeeding projects on environmental and natural resources conservation in order to meet the real sustainable development.

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