

Development a Prototype Environmental Education Teacher through PAIC Process

Miss On-anong Ruboon

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

Nongnapas Thiengkamol

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

Tanarat Thiengkamol

*Co-Advisor, School of Management, Assumption University,
Hua Mak Campus, 592/3 Ramkhamhaeng 24,
Hua Mak, Bangkok 10240, Thailand*

Jurairat Kurukodt

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

Doi:10.5901/mjss.2012.v3n11p361

Abstract: The objective of this study was to develop a prototype of environmental education teacher through PAIC process. Sample group was selected by purposive sampling technique based on the defined criteria. The methodology was implemented with Participatory-Appreciation-Influence-Control (PAIC) integrated with brain-storming and focus group discussion for developing trainer (TOT) to be a prototype. The research results illustrated that after PAIC process implemented, the mean scores of posttest of knowledge of Environmental Education (EE), knowledge of global warming, characteristics of Environmental Education Teacher (EET), inspiration of environmental conservation, environmental behavior, and training achievement were higher than pretest with statistical significance ($p < .01$, $p < .01$, $p < .01$, $p < .01$, $p < .01$, and $p < .01$) respectively. Furthermore, FDE was used for trainer role play evaluation, it illustrated that Trainer Self-Evaluation, Audience Evaluation, Trainer Friend-Evaluation and Expert Trainer-Evaluation were no differences among four dimensional aspects of evaluation, then the 10 selected scientific teachers with top ten highest scores to be trainers. One-way ANOVA was used investigate the mean scores difference of four groups. The results of One-way ANOVA showed that there were difference of mean scores on role play as trainer in training process ($p > .05$). The 10 trained scientific teachers would be prototype of EET trainers and the left participants would be facilitators for the second level and they acted as steering committee to organize the second level training with the aid of researcher team.

Key Words: Development / Prototype / Environmental Education / Teacher

1. Introduction

Currently, Thailand, Ministry of Education has realized to the important of develop a prototype of Environmental Education Teacher (EET), it published a book called "Teacher Friend: Environmental Education Process for school development for teacher of the whole country by providing example of activities with the purpose to build habit of student by raising awareness, perceiving the value of environment and developing the environment based on daily life activities

by having appropriate practice (Office of Basic Education Commission, Ministry of Education, 2010). However, the Ministry of Education did not systemically manage.

To meet authentic sustainable development, it needs to develop a prototype of EET, because it should be accepted that teacher is an important and valuable change agents and good role model for their scientific teachers to imitate, therefore preparation of teaching-learning process by using environmental education principle as blueprint for environmental conservation through knowledge and understanding giving, awareness raising, participating, responsibility taking, attitude and behavior changing for scientific teachers in all levels of education and all education systems whether formal, non-formal, informal and lifelong education, is very critical thinking (Thiengkamol, 2011e). Additionally, creating and developing inspiration of environmental conservation are also essential factors to accomplish environmental behavior with integration through environmental education process (Thiengkamol, 2011b, Thiengkamol, 2011c, Thiengkamol, 2011e, Thiengkamol, 2011g, Thiengkamol, 2011h, Thiengkamol, 2011i, Thiengkamol, 2011j, Thiengkamol, 2012a & Thiengkamol, 2012b).

Principally, scientific teachers stayed at school a very long period a day in school, most of scientific teachers and students often consult their teachers more than their parents, therefore, good and visionary teacher can play prominent role in making up a better future to accomplish environmental conservation for their students as well. However, we wish to have teachers who are born to be teacher because they will take roles and functions with spiritual of teachers. This might be a good opportunity to prepare new generations with public consciousness for our future of environment and natural resources conservation by EET through environmental education process in order to meet real sustainable development.

In order to develop prototype of EET, the 14 Environmental Education Characteristics (EECs) and 26 supportive EECs were revealed from the study of Charoensilpa, Thiengkamol, Thiengkamol, & Kurokodt, (2012) are essential characteristic to build EET. These cover as followings: 1) ability to transfer environmental knowledge, 2) to stimulate others to realize the importance of environmental conservation, 3) to have deeply awareness about environment and natural resources, 4) to have public consciousness for environmental conservation, 5) to have positive attitude for environmental conservation, 6) to have value that for environmental conservation be everyone duty, 7) to have a sensitivity of environmental conservation, 8) to wish to take a responsibility for environmental conservation, 9) to participate to environmental conservation activities regularly, 10) consistency of self practice for environmental conservation, 11) ability to make decision correctly for environmental conservation, 12) must practice as a role model of environmental conservation for public perception, 13) to have correct environmental knowledge and 14) understanding to introduce environmental knowledge for others to practice correctly.

The development process of EET is implemented by use 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 an 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 of 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 resource 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. Consequently, training of trainer (TOT), scientific teacher was trained to be a prototype of EET including integration with brain storming and focus group discussion and evaluation of participation with Three Dimensional Evaluation (TDE) and evaluation of role play as a trainer with Four Dimensional Evaluation (FDE). PAMEI will be employed to assess and monitor based on the qualitative and quantitative approaches (Thiengkamol, 2004, Thiengkamol, 2005a, Thiengkamol, 2005b, Thiengkamol, 2010b, Thiengkamol, 2011a, Thiengkamol, 2011b, Thiengkamol, 2011c, Thiengkamol, 2011g, Thiengkamol, 2011h, Thiengkamol, 2011i, Thiengkamol, 2012a & Thiengkamol, 2012b)

Predominantly, Thiengkamol gave mentions that the important characteristics of EET should have knowledge and understanding, and awareness and sensitivity about the environment and environmental challenges on attitude concern for the environmental conservation, skills to monitor and evaluate the environmental problems including knowledge transferring, responsibility taking, skill practicing, 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. Teachers are very valuable change agents and role models for student, if they are able to teach student to practices in their daily life activity until it becomes permanently environmental habit or behavior. This might lead to factual sustainable development through practicing of all global citizen (Thiengkamol, 2008, 2009a, 2009b, 2011e, & 2011f).

2. Objective

The objective of this study was to develop a prototype of environmental education teacher for environmental conservation in order to accomplish sustainable development.

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 Environmental Education (EE), knowledge of global warming, characteristics of Environmental Education Teacher (EET), inspiration of environmental conservation, and environmental behavior (Charoensilpa, Thiengkamol, Thiengkamol, and Kurokdt, 2012, UNESCO, 1978, InWent-DSE-ZEL, 2002, Thiengkamol, N., 2004, Thiengkamol, N., 2011a, Thiengkamol, N., 2011e).
- 2) The research instruments composed of test, questionnaire and evaluation form. The test was used for determining their knowledge of Environmental Education (EE), knowledge of global warming, and questionnaire was used for determining inspiration of environmental conservation, environmental education teacher characteristics, and environmental behavior.
- 3) The evaluation form of TDE and FDE were constructed to assess the participant practice during PAIC implemented.
- 4) 34 scientific teachers were selected with purposive sampling from scientific teachers under the Office of Udonthani Educational Area Zone 3. They would be recruited according to the setting criteria (willingness, time, devotion, commitment, and public mind).
- 5) The 34 participants were employed for testing of knowledge of Environmental Education (EE), knowledge of global warming, and questionnaire was used for determining inspiration of environmental conservation, environmental education teacher characteristics, and environmental behavior. The systematic operation of 34 participants was trained with PAIC. The focus group discussion included brain storming and Training of Trainer (TOT) (Langly, 1998, Weiss, 1993, Sproull, 1988, InWent-DSE-ZEL., 2002, Thiengkamol, 2004, Thiengkamol, 2005b). TDE was used to determination the congruence of three aspects evaluation, Self-evaluation, Friend-evaluation, and Facilitator-evaluation for training participation. Additionally, FDE was used for evaluating EET on role playing as trainer. FDE covered Trainer Self-Evaluation, Audience Evaluation, Trainer Friend-Evaluation and Expert Trainer-Evaluation (Thiengkamol, 2004, Thiengkamol, 2005a, Thiengkamol, 2008, Thiengkamol, 2011a, Thiengkamol, 2011b, Thiengkamol, 2011c and Thiengkamol, 2011e).
- 6) The Pretest-Posttest One Group Design was used to test for before and after training process with PAIC.
- 7) PAMEI technique was employed for identify the performance, assessment, monitoring, evaluating for participants performance of scientific teachers under the Office of Udonthani Educational Area Zone 3 as the EET (Thiengkamol, 2004, Thiengkamol, 2005a, Thiengkamol, 2005b, Thiengkamol, 2011a, Thiengkamol, 2011b, Thiengkamol, 2011c and Thiengkamol, 2011e).

4. Results

4.1 General Characteristics of Sample Group

The sample group was 34 scientific teachers that were selected by purposive sampling technique from scientific teachers under the Office of Udonthani Educational Area Zone 3 in the academic year of 2011. Most of them were female with 67.65%, graduate at bachelor degree with 85.29% and program education were general science. Most of them had marital status of marriage with 82.35%, and lived at Semi-Urban area with 47.06%. Majority of them were with ever activity participation with 91.18% and ever received teaching award with 70.59%. They had average of age with 42.17 years and teaching experience with 5.08 years as shown in table 1.

Table 1 Demographic Characteristics of Sample Group

Characteristics	Undergraduate Scientific teachers	
	Frequency	Percent
Sex		
Male	11	32.35
Female	23	67.65

Education Level		
Bachelor	29	85.29
Master	5	14.71
Program of Education		
General Science	29	85.29
Physics	1	2.94
Chemistry	1	2.94
Biology	2	5.88
Educational Science	1	2.94
Marital Status		
Marriage	28	82.35
Single	1	2.94
Divorce/Separate/widow	5	14.71
Living Area		
Urban	12	35.29
Semi-Urban	16	47.06
Rural	6	17.65
Activity Participation		
Ever	31	91.18
Environmental Conservation	23	67.65
Community Development	8	23.53
Never	3	8.82
Teaching Award		
Ever	24	70.59
Group of School Level	11	32.25
Area Level	10	29.41
Regional Level	2	5.88
National Level	1	2.49
Never	10	29.41
Average of age =42.17 years	34	100
Teaching experience =5.08		
Total	34	100

4.2 Results of Pretest and Posttest with PAIC technique

PAIC technique was implemented for scientific teachers on the concept development of EET for alleviating global warming based on knowledge of Environmental education (EE), knowledge of global warming, knowledge of EET, inspiration of environmental conservation, and environmental behavior. The research results illustrated that after PAIC process implemented, the mean scores of posttest of knowledge of EE, knowledge of global warming, knowledge of EET, inspiration of environmental conservation, environmental behavior, and training achievement were higher than pretest with statistical significance ($p < .01$, $p < .01$, $p < .01$, $p < .01$, $p < .01$, and $p < .01$) respectively, as illustrated in table 2.

Table 2 Pretest and Posttest of Sample Group

Experimental Group	Number	Mean	S.D	t	Sig
Pretest of Knowledge of EE	34	5.94	0.78	22.978	.01**
Posttest of Knowledge of EE	34	8.29	0.76		
Pretest of Knowledge of Global Warming	34	6.00	0.89	18.000	.01**
Posttest of Knowledge of Global Warming	34	8.12	0.59		
Pretest of Knowledge of EET	34	6.41	0.92	14.773	.01**
Posttest of Knowledge of EET	34	8.71	0.63		
Pretest of Inspiration of Environmental Conservation	34	6.82	0.67	10.151	.01*
Posttest of Inspiration of Environmental Conservation	34	8.32	0.73		
Pretest of Environmental Behavior	34	6.97	0.58	12.215	.01**
Posttest of Environmental Behavior	34	8.32	0.68		
Pretest of Training Achievement	34	32.14	2.48	33.223	.01**
Posttest of Training Achievement	34	41.76	2.44		

** Significant Level at .01

4.3 Results of Three Dimensional Evaluations for Participation

TDE was employed for determination the perceptions of 34 scientific teachers in three aspects evaluation, Self-evaluation, Friend-evaluation, and Facilitator-evaluation by using One-way ANOVA to investigate the mean scores difference of three groups. The results of One-way ANOVA showed that there were no differences of mean scores about participation in training process through brain storming process with statistical significance ($p > .05$) as illustrated in table 3. This meant that the perceptions of scientific teachers about themselves, their friends in the same small group and their facilitators were not different for their participation in focus group discussion during training process as presented in table 3.

Table 3 Three Dimension Evaluation of Sample Group Participation

Source of Variation	Sum of squares	Df	Mean Square	F	Sig.
Between Group	17.784	2	8.892	1.563	.215
Within Group	563.206	99	5.689		
Total	580.990	101			

** Significant Level at .01

TDE was used to evaluate the participation of participant, the finding revealed that the mean scores of Self-Evaluation and Friend-Evaluation, Friend Evaluation and Facilitator Evaluation, and Self-Evaluation and Facilitator-Evaluation showed no statistical difference, and between showed statistical difference ($p > .05$, $p > .05$, and $p > .05$) respectively as illustrated in table 4.

Table 4. Scheffe' Analysis of Each Pair Comparisons

Each Pair of Variables	Mean Diff(I-J)	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Self-Eva. and Friend-Eva.	-0.85675	.19862	.852	-1.897	3.8548
Self-Eva. and Facilitator-Eva.	-0.26589	.19862	.997	-1.7931	2.1548
Friend-Eva. and Facilitator-Eva.	.82100	.19862	.885	-1.5321	3.4952

* Significant Level at .05

4.4 Results of Four Dimensional Evaluations of Participation as Trainer Role play

FDE was used for trainer role play evaluation and it illustrated that Trainer Self-Evaluation, Audience Evaluation, Trainer Friend-Evaluation and Expert Trainer-Evaluation of the selected 10 scientific teachers with top ten highest scores to be trainers. One-way ANOVA was used investigate the mean score differences of four groups. The results of One-way ANOVA showed that there were no difference of mean scores on role play as a trainer in training process ($p > .05$) as illustrated in table 5. This implied that the opinions of four aspects of Trainer Self-Evaluation, Audience Evaluation, Trainer Friend-Evaluation and Expert Trainer-Evaluation on the trainer role plays, were not different, therefore trained scientific teacher can perform as a prototype of EET trainer.

Table 5 Four Dimensional Evaluation of EET as Trainer Role Play

Source of Variation	Sum of squares	df	Mean Square	F	Sig.
Between Group	22.698	3	7.566	1.429	.321
Within Group	698.940	132	5.295		
Total	721.638	135			

* Significant Level at .05

During PAIC implemented, the six focus group discussion were done, the overall results illustrated that there were at least 6 projects purposed such as "Love Environment", "Waste Bank", "Youth Camp for Environmental Conservation", "Green School", "One Man One Tree Cultivation" and "Bio-fertilizer Preparation" to be implemented according to the action plans on "Network Development for Environmental Conservation". The pilot projects selected for implementing were four from six proposed projects. These were "Love Environment", "Waste Bank", "Youth Camp for Environmental Conservation", and "One Man One Tree Cultivation". After some part of four of projects were started implementing, the scientific teachers 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.

Additionally, after the PAIC training finished. The finding revealed that before training, the scientific teacher had less to moderate level of knowledge of Environmental (EE), knowledge of global warming, knowledge of EET, inspiration of environmental conservation, environmental behavior contents. At the beginning of training process, most 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 including role play as a trainer, they can express and explain their ideas and thinking more confident when compared with before training. Furthermore, PAIC can be initiated to stimulate scientific teachers to increase their environmental behavior, to inspire their public consciousness and to participate different activities for environmental conservation with more knowledge of EE, knowledge of global warming, knowledge of EET, inspiration of environmental conservation, and environmental behavior as shown in table 2. However, PAIC is able to use for encouraging the participant to be able to make a proper decision on the facing problem by practicing so it is resembling to environmental education process that guide to practice in decision making of self-control of creation of environmental behavior about issues concerning environmental quality and environmental conservation to accomplish quality of life.

The PAMEI used for participatory assessment, participatory monitoring, participatory evaluation and participatory impact were approval for four projects implementations. Additionally, it was revealed that after the scientific teachers had implemented the four 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 correctly.

5. Discussions

The results indicated that the scientific teachers will gain knowledge of Environmental education (EE), knowledge of global warming, knowledge of EET, inspiration of environmental conservation, and environmental behavior after participating in the PAIC training. These were congruent to a variety of studies of Thiengkamol, (2004, 2005a, 2005b, 2010b, 2011b, 2011c, 2011g, 2011h, 2011i & 2012). 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 inspiration of public consciousness 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 Jumrearnsan, and Thiengkamol, 2011, Thiengkamol, 2011i, Thiengkamol, 2011j, Thiengkamol, 2012a & Thiengkamol, 2012b, that the awareness is affected to inspiration creation of public consciousness for environmental conservation and behaviors changing for global warming alleviation and environmental conservation to meet sustainable development through EET competency development with EE principle.

The results of TDE of 34 participants were employed for determination of the congruence of three aspects evaluation, Self-evaluation, Friend-evaluation, and Facilitator-evaluation. The mean scores three aspects were no difference among three aspects ($p > .05$, $p > .05$, and $p > .05$). The mean scores of Self-Evaluation was a little lower than mean scores Friend-Evaluation 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 scientific teachers.

Moreover, FDE was used to evaluate the role plays as trainer of 10 scientific teachers, it was found that there was no statistically significant level ($p > .05$) as illustrated in table 5. It might be concluded that 10 scientific teachers can be trainer of prototype of EET for training other scientific teachers as illustrated in table 5. The result of training of trainer as EET was pertinent to different studies of Thiengkamol, N., and Thiengkamol colleagues (2004, 2005a, 2005b, 2010b, 2011b, 2011c, & 2011a) and researches of Sukwat, Thiengkamol, Navanugraha, & Thiengkamol, and Wattanasaroch, Thiengkamol, Navanugraha, & Thiengkamol 2012. 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, N., 2004, Thiengkamol, N., 2005a, Thiengkamol, N., 2005b, Thiengkamol, N., 2010b, Thiengkamol, N., 2011b, Thiengkamol, N., 2011a, Wattanasaroch, Thiengkamol, Navanugraha, & Thiengkamol 2012, and Sukwat, Thiengkamol, Navanugraha, & Thiengkamol, 2012).

During, the PAIC training implemented, focus group discussion and brain storming concept were integrated, therefore, it is obviously seen that after training they had intended to run 4 pilot projects from 6 projects. They search the way to maintain the four pilot projects with different ideas being suggested during this brain storming process in order to meet their intentions of being EET for alleviating global warming, especially in accordance with the action plans on "Empowerment of EET" across Udonrathani Province and to join with other educational area in the same province, and other provinces in the Northeastern Region or other region of country. Additionally, the result was congruent to plentiful studies of Thiengkamol, N., (2005a, 2005b, 2010b, 2011b, 2011c), and Thiengkamol colleagues Wattanasaroch, Thiengkamol, Navanugraha, & Thiengkamol 2012, Sukwat, Thiengkamol, Navanugraha, & Thiengkamol, C. 2012, Jumrearnsan, & Thiengkamol, 2012, Saenpakdee, & Thiengkamol, 2012, & Sukserm, Thiengkamol, & Thiengkamol, 2012, including study of Jansab, 2006.

References

- Bicknell, J., D. Dodman, et al., Eds. (2009). *Adapting Cities to Climate Change: understanding and addressing the development challenges*. London: Earthscan.
- Charoensilpa, D., Thiengkamol, N., Thiengkamol, C., and Kurokodi, J. (2012). *Development of Environmental Education Characteristics*. *Journal of the Social Sciences*, 7 (3):56-60.
- CEDPA. (1999). *Advocacy Building Skills for NGO Leaders: The CEDPA Training Manual Series Volumes IX*. Published by the center for Development and Population Activities: Washington, D.C.
- InWent-DSE-ZEL. (2002). *Regional Training Course "Advanced Training of Trainer"*. Grand Jomtien Palace. Pattaya City. Thailand.
- Jansab, S. (2006). *Strategies for the Development of Women's Political Participation in Pattaya City*. Thesis of Master of Art Master of Art (Women Studies), Office of Women and Youth Studies of Thammasart University.
- Jumrearnsan, W., & Thiengkamol, N. (2012). *Development of an Environmental Education Model for Global Warming Alleviation*. *The Social Sciences*, 7: 65-70.
- Ketuman, P. (2007). *Adolescent Development*. Retrieved from: http://www.psyclin.co.th/new_page_56.htm on 9 September 2011.
- Langly, A. (1998). "The Roles of Formal Strategic Planning" *Long Range Planning*. Vol. 21, No.1. Office of Basic Education Commission, Ministry of Education. (2010). *Teacher Friend: Environmental Education Process for school development*. Bangkok: Office of National Buddhist Publishing, Office of Secretary of Educational Council. (2005). *Strategic development of children and youth with special abilities*.
- Pimdee, P., Thiengkamol N., Thiengkamol T., (2012) *Psychological Trait and Situation Affecting through Inspiration of Public Mind to Energy Conservation Behavior of Undergraduate Student*, *Mediterranean Journal of Social Sciences* Vol 3 (3)
- Saenpakdee, A. & Thiengkamol, N. (2012). *Formulation of Community Forest Act for Thailand*. *The Social Sciences*, 7: 71-76.
- Sproull, N.L. (1995). *Handbook of Research Method: A Guide for Practitioners and Scientific teachers in the Social Science*. (2nd ed.). Metuchen, NJ: Scarecrow Press.
- Sukwat, S. Thiengkamol, N., Navanugraha, C., and Thiengkamol, C. (2012). *Development of Prototype of Young Buddhist Environmental Education*. *Journal of the Social Sciences*, 7 (1):56-60.
- Sukserm, T., Thiengkamol, N. & Thiengkamol, T (2012). *Development of the Ecotourism Management Model for Forest Park*. *The Social Sciences*, 7: 95-99.
- Thiengkamol, N. (2004). *Development of A Learning Network Model for Energy Conservation*. Doctoral Dissertation of Education (Environmental Education) Faculty of Graduate Studies, Mahidol University, Thailand.
- Thiengkamol, N. (2005a). *Strengthening Community Capability through The Learning Network Model for Energy Conservation*. *Journal of Population and Social Studies*, 14 (1), 27-46.
- Thiengkamol, N. (2005b). *Development of Health Cities Network for Mekong Region*. In *Proceedings of the International Conference "Transborder Issues in the Grate Mekong Sub-Region" Ubon Ratchathani, Thailand, 30 June-2 July 2005* (pp.111-119). Ubon Ratchathani: Nevada Grand Hotel.
- Thiengkamol, N. (2009a). *The Great Philosopher: the Scientist only know but Intuitioner is Lord Buddha*. Bangkok: Prachya Publication.
- Thiengkamol, N. (2009b). *The Happiness and the Genius can be Created before Born*. Bangkok: Prachya Publication.
- Thiengkamol, N. (2010b). *Urban Community Development with Food Security Management: A Case of Bang Sue District in Bangkok*. *Journal of the Association of Researcher*, 15 (2), 109-117.
- Thiengkamol, N. (2011a). *Holistically Integrative Research* (2nd ed.). Bangkok: Chulalongkorn University Press.
- Thiengkamol, N. (2011b). *Development of Energy Security Management Model for Rural Community through Environmental Education Process*. In *Proceedings of the 1st EnvironmentAsia International Conference on "Environmental Supporting in Food and Energy Security: Crisis and Opportunity" Bangkok, Thailand, 22-25 March 2011* (pp.11). Bangkok: Rama Garden Hotel.
- Thiengkamol, N. (2011c). *Development of Food Security Management Model for Undergraduate Student Mahasarakham University through Environmental Education Process*. In *Proceedings of the 1st EnvironmentAsia International Conference on*

- "Environmental Supporting in Food and Energy Security: Crisis and Opportunity" Bangkok, Thailand, 22-25 March 2011 (pp.12). Bangkok: Rama Garden Hotel.
- Thiengkamol, N. (2011e). *Environment and Development Book*. (4th ed.). Bangkok: Chulalongkorn University Press.
- Thiengkamol, N. (2011f). *Nurture Children to be Doctors*. Bangkok: INTELLUALS.
- Thiengkamol, N. (2011g). Development of Energy Security Management for Rural Community. *Canadian Social Science*, 7 (5), October 31, 2011.
- Thiengkamol, N. (2011h). Development of a Food Security Management Model for Agricultural Community. *Canadian Social Science*, 7 (5), October 31, 2011.
- Thiengkamol, N. (2011i). Development of Model of Environmental Education and Inspiration of Public Consciousness Influencing to Global Warming Alleviation. *European Journal of Social Sciences*, 25 (4):506-514.
- Thiengkamol, N. (2011j). Model of Psychological State Affecting to Global Warming Alleviation. *Canadian Social Science*, 7 (6):89-95, December 31, 2011
- Thiengkamol, .N. (2012a). Development of A Prototype of Environmental Education Volunteer. *Journal of the Social Sciences*, 7 (1):77-81.
- Thiengkamol, N. (2012b). Development of Food Security Management for Undergraduate Student Mahasarakham University. *European Journal of Social Sciences*, 27 (2):246-252.
- Wattanasaroach, K. and Thiengkamol, N. Navanugraha, C., & Thiengkamol, T. (2012). Training ISO 14001 to Develop Green Dormitory Standards. *Journal of The Social Sciences*, 7 (2): 98-110.
- Weiss, J. W. (1995). *Organizational Behavior and Change: Managing Diversity, Cross Cultural Dynamics and Ethics*. Anaheim, CA: West Publishers.
- Wikipedia. (2010). List of countries by carbon dioxide emissions per capita. Retrieved from http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita.
- UNESCO. (1978). Intergovernmental Conference on Environmental Education Organized by UNESCO in Cooperation with UNEP Tbilisi (USSR) 14-16 October 1977. Final Reports. Paris: UNESCO.