

Development Model of School Landscape Management for Environmental Conservation การพัฒนารูปแบบการจัดภูมิทัศน์โรงเรียนเพื่อการอนุรักษ์สิ่งแวดล้อม

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บทคัดย่อ

การวิจัยนี้มีวัตถุประสงค์ เพื่อศึกษาเปรียบเทียบคะแนนเฉลี่ยของความรู้เรื่องการจัดภูมิทัศน์เพื่อการอนุรักษ์สิ่งแวดล้อม หลักการสิ่งแวดล้อมศึกษา แรงบันดาลใจในการมีจิตสาธารณะ และพฤติกรรมการจัดภูมิทัศน์เพื่อการอนุรักษ์สิ่งแวดล้อม ระหว่าง ก่อนและหลังอบรม และพัฒนาักษรเรียนให้สามารถเป็นวิทยากรที่จะนำความรู้ที่ได้รับจากการอบรมไปถ่ายทอดแก่ผู้อื่นและชุมชน การวิจัยครั้งนี้เป็นการวิจัยกึ่งทดลองโดยใช้ การประชุมเชิงปฏิบัติการอย่างมีส่วนร่วมแบบพาอิค ที่บูรณาการด้วยการวิจัยเชิง คุณภาพการอภิปรายกลุ่มย่อย การประเมิน 3 ด้าน และการประเมิน 4 ด้าน เพื่อประเมินการแสดงบทบาทสมมุติการเป็นวิทยากร เครื่องมือเป็นแบบสอบถาม กลุ่มตัวอย่างเป็นนักเรียนมัธยมศึกษาตอนปลาย โรงเรียนเชียงยืนพิทยาคม จำนวน 26 คน ได้จากการ สุ่มตัวอย่างแบบเฉพาะเจาะจงตามเกณฑ์ที่กำหนดคือการมีจิตสาธารณะและให้คำมั่นว่าจะมีส่วนร่วมตลอดกระบวนการวิจัย สถิติ ที่ใช้ในการวิเคราะห์ข้อมูลคือ Paired Sample t-test เพื่อเปรียบเทียบความรู้ก่อนและหลังการอบรม และ One Way ANOVA เพื่อเปรียบเทียบผลการประเมิน 3 ด้านและผลการประเมิน 4 ด้าน

ผลการวิจัยพบว่า คะแนนเฉลี่ยของความรู้เรื่องการจัดภูมิทัศน์เพื่อการอนุรักษ์สิ่งแวดล้อม หลักการสิ่งแวดล้อมศึกษา แรง บันดาลใจในการมีจิตสาธารณะ และพฤติกรรมการจัดภูมิทัศน์เพื่อการอนุรักษ์สิ่งแวดล้อมมีผลสัมฤทธิ์ของการอบรม หลังการอบรม มี คะแนนเฉลี่ยสูงกว่าก่อนการอบรม ซึ่งแตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.01, 0.01, 0.01, และ 0.01 ตามลำดับ รวมทั้งได้วิทยากรการจัดภูมิทัศน์เพื่อการอนุรักษ์สิ่งแวดล้อมที่สามารถถ่ายทอดความรู้เพื่อการอนุรักษ์สิ่งแวดล้อมให้แก่บุคคลอื่น ได้ นอกจากนี้ระหว่างการอบรมมีการประเมิน 3 ด้านเพื่อประเมินการมีส่วนร่วมของผู้รับการฝึกอบรม พบว่า คะแนนเฉลี่ยการ ประเมินตนเอง การประเมินโดยเพื่อนและประเมินโดยผู้อ่านวิเคราะห์ความต่าง ในสถานการณ์ปัจจุบันและอนาคต แตกต่างอย่าง ไม่มีนัยสำคัญทางสถิติที่ระดับ 0.05 และ 0.05 นอกจากนี้การประเมินคุณลักษณะของการแสดงบทบาทสมมุติการเป็นวิทยากร ด้วยการประเมิน 4 ด้าน พบว่า คะแนนเฉลี่ย การประเมินตนเอง การประเมินโดยเพื่อนวิทยากร การประเมินโดยผู้ฟัง และการ ประเมินโดยวิทยากรผู้เชี่ยวชาญ แตกต่างอย่างไม่มีนัยสำคัญทางสถิติที่ระดับ 0.05

คำสำคัญ: ภูมิทัศน์โรงเรียน การจัดการ การพัฒนา รูปแบบ การอนุรักษ์สิ่งแวดล้อม

Abstract

The objective was to compare the mean scores between pretest and posttest of school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior and to develop trainers who are able to transfer knowledge of school landscape management for environmental conservation for others. Participation-Appreciation-Influence-Control (PAIC) was conducted and it was integrated with Three Dimensional Evaluations that were employed for exterminating the participation and Four Dimensional Evaluations were used for trainer role play evaluation. The quasi-experimental research was conducted with 26 high school students of Chiang Yuen

School, Chiang Yuen District, Maha Sarakham Province. They were collected by purposive sampling technique anchored in criteria of public mind and commitment to participate via the whole research process. Three Dimensional Evaluations were employed for exploring the participation and Four Dimensional Evaluations were employed for trainer role play evaluation. One-way ANOVA was used to determine the mean scores difference of three and four groups.

After PAIC implemented, the results revealed that the mean scores of posttest of school landscape management knowledge, environmental education, inspiration of environmental conservation, environmental conservation behavior and training achievement were higher than pretest with statistical significance ($p < 0.01$ for all aspects). Moreover, it also obtained the trainers who are able to transfer knowledge of school landscape management for environmental conservation for others. In present and future situations, mean scores were different with no statistical significance ($p < 0.05$ and $p < 0.05$). Additionally, the mean scores of Four Dimensional Evaluation were different with no statistical significance ($p < 0.05$).

Keywords : School landscape, Management, Development, Model, Environmental conservation

1. INTRODUCTION

Landscape is the relationship dimension of phenomena and geographical change under the consideration on landscape from scene characteristics and plant structure. It is a scene of that area by comparing with other areas according to natural land features and environmental components as ecosystem consideration. Green school landscape management is referred to the concept that covers designs, builds, and maintains beautiful outdoor and indoor environments of school based on the principle of environmental conservation including maintain environmental quality by arranging, creating, and managing for clean, pleasant and beautiful landscapes. Landscape management referred to essential skills of arranger to make appropriate decisions in terms of plant selection, plant maintenance, and land use planning and considering landscape of the larger environment as a system. It needs to understand how to manage the landscape by practicing and enhancing the enjoyment of outdoor spaces while simultaneously conserving natural resources and environment for instance soil and water [1].

Chiang Yuen School is situated in Chiang Yuen District, Sarakham Province. Its environment has enrichment of biodiversity and is surrounded with large forest area, therefore it can be used as

unspoken teacher of natural resources and environmental conservation for students because it provides the large shade from big tree and beautiful environment. If students participate in school landscape management intentionally, it will make students more appreciative of school environment. The educational institute administrator should pay attention to create the school environment to challenge students to assist for arranging school area to be green landscape for relaxation, being cool and pleasant because students stay at school longer time than their home. It is second home for students. However for better relaxation, the different academic peoples believe that school with clean, cool, brilliant and pleasant and good atmosphere and environment will influence the students to be gentle, tender and soft. It is relevant to the highest aim of educational reform of Thailand that required to raise educational level to ideal school to produce the student to meet standards for all level of education by starting from kinder garden up high school. The ideal school refers to school with clean and green environment including providing the good teaching-learning condition. This brings to meet the main aim of development in the Eighth and Tenth of National Economic and Social Development Plan that emphasized on development for increasing Thai

people's potential of all ages and sex to decrease problems and obstacles of living [2] [3].

Environmental education principles are similar to the sustainable development notion as original idea that of sustainable development was referred at conference of environment and development of United Nation since 1992 that defined in Agenda 21 of global action plan mentioned that "Sustainable development is development which meets the needs of the presented without compromising the ability of future generations to meet their own needs" [3]. It elucidates fundamentally that people of present generation should have knowledge, understanding the important of environmental problems and realize that their activities for living, it must devour the natural resources, therefore their activities affect to the environmental quality directly with or without intention, then they must take responsibility for any activities that they conduct with public mind to sincerely conserve the environment and natural resources. Simultaneously, they must have appropriate behavior for pro-environment based on right awareness and positive attitude to participate in environmental projects and activities including having sensitivity to realize the essential of environmental quality and must practice to protect environment until it becomes a stable behavior by paying attention to sustain the environmental quality without requirement of rewards, money or admiration [4] [5] [6] [7].

Thiengkamol declared on public consciousness or public mind founded on inspiration that it is happening from insight. However, inspiration is dissimilar from motivation since inspiration requires no rewards, admirations, money, and complements. Particularly, inspiration of public consciousness or public mind, when someone has best practices for natural resources and environment conservation, someone needs no rewards, admirations, money or any complements since someone means to act from one's spirit and mind. Consequently inspiration might take place from appreciation or get impression from person as role model or idle,

or impress on events, situations, environment, and media reception for instance movies, book, magazine, and internet. [5] [6] [8] [7] [9] [10].

Nevertheless, the school landscape management knowledge is a new topic, therefore if the high school students have an opportunity to practice from real practice through direct experience by learning in the school. It is a mean to conserve environment in Chiang Yuen School. Therefore, school is a very important learning site for school landscape management. Moreover, Chiang Yuen School also provides the raw materials to use for landscape arrangement such as plenty of plants and flowers for decoration. Once school has good landscape management, then it will be a beautiful place with good aesthetic view so it assists the students in the school on peaceful and happy learning. Moreover, the beautiful landscape of school can be used as a place for learning on environmental conservation for students during they learn at school with feeling of relaxation for studying. Concurrently, environmental education principles covering environmental knowledge, awareness, attitude and sensitivity were integrated in the training process of Participation-Appreciation-Influence-Control (PAIC) process. PAIC process would be able to inspire student behavioral change from their direct experience of participation for school landscape management. It will be able to change students to have pro-environmental behavior. However, Chiang Yuen School is high school in Maha Sarakham Province locates in the Northeastern region of Thailand and it covers the area of enriched forest with high biodiversity. Therefore, it is excellent opportunity to train high school students to be trainers and educators for knowledge transferring on landscape management knowledge to other students in this school and for other schools which have similar environment in the same districts and other districts in this province. PAIC process is able to inspire students to have public mind to be trainers and educators on

landscape management knowledge [5] [6] [7] [11] [12] [13].

2. OBJECTIVE

The objective was to compare the mean scores between pretest and posttest of school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior.

3. METHODOLOGY

The research method was implemented in steps by step as the followings:

3.1 The handbook of school landscape management knowledge for environmental conservation behavior was constructed for high school students of Chiang Yuen School, Chiang Yuen District, Maha Sarakham Province in the Northeastern region of Thailand. Its content included school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior [13] [14] [15] [16] [17] [18] [19].

3.2 The research tools comprised of a questionnaire and evaluation forms. The questionnaire was used for determining participants about school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior.

3.3 The evaluation forms of Three Dimensions and Four Dimensions were constructed to evaluate the participant practice during PAIC implemented.

3.4 Participant of 26 high school students from Chiang Yuen School. They would be recruited according to the setting criteria (willingness, time, devotion, commitment, and public mind).

3.5 Participants of 26 high school students from Chiang Yuen School were used to explore the training achievement of school landscape management knowledge, environmental education,

inspiration of environmental conservation, environmental conservation behavior and training achievement. The PAIC was used to train participants to be trainers. The focus group discussion integrated with brainstorming and Training of Trainer (TOT) were implemented [20] [21] [22] [23]. The Three Dimensional Evaluation (TDE) was used to determine the congruence of three aspects evaluation regarding Self-evaluation, Friend-evaluation, and Facilitator-evaluation for training participation. The Four Dimensional Evaluation (FDE) was used for trainer role play evaluation [13].

4. RESULTS

The results of the research were as the followings. 4.1 General Characteristics of Sample Group The sample group of the research was 26 high school students of Chiang Yuen School, Chiang Yuen District, Maha Sarakham Province in the Northeastern region of Thailand in the year of 2013. The sample was high school students who were selected to be trained for trainer on school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior. Most of them were female with 19 (73.08%), had age between 15-16 years old with mean of 15.88 years old, learnt at secondary school level 4 with 26 (100.00%), had family characteristics with extended family of 14 (53.85%), traveled to school by bus with 17 (65.38%), and had Grade Point Average (GPA) between 2.30-3.21, mean with 2.88.

4.2. Results of Pretest and Posttest with PAIC technique

PAIC technique was trained for 26 high school students on school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior. The research results revealed that before and after PAIC training process implemented, the mean scores of posttest of

training results of school landscape management knowledge, environmental education, inspiration of environmental conservation, environmental conservation behavior and training achievement were higher than pretest with statistical significance ($p < 0.01$, $p < 0.01$, $p < 0.01$, $p < 0.01$, and $p < 0.01$), as showed in table 1.

Table 1 Pretest and Posttest of Sample Group of High School Students

Training Issues	Posttest		Pretest		t	p
	\bar{X}	S.D.	\bar{X}	S.D.		
Landscape Management Knowledge	8.65	0.80	6.95	1.04	8.89	0.00**
Environmental Education	9.27	0.92	7.85	1.00	8.03	0.00**
Inspiration of Environmental Conservation	8.92	1.16	7.19	0.98	5.31	0.00**
Environmental Conservation Behavior	8.04	1.56	6.88	1.07	5.62	0.00**
Training Achievement	34.88	2.98	24.88	2.07	8.66	0.00**

** Significant Level at 0.01

In table 1, it showed that after training with PAIC, the posttest scores were higher than pretest with statistical significance at 0.01 level in all aspects

4.3 Results of Three Dimensional Evaluations for Participation in Present Situation

Three Dimensional Evaluation was employed for determining the participation of 26 high school students in three aspects evaluation in present situation, Self-evaluation, Friend-evaluation, and Facilitator-evaluation by using One-way ANOVA Analysis in order to explore the mean score differences of three groups. The results of One-way ANOVA showed that there were different mean scores among Self-evaluation, Friend evaluation and Facilitator evaluation about participation in training process with no statistical significance ($p > 0.05$) as showed in table 2.

Table 2 Three Dimension Evaluation of Sample Group for Participation in Present Situation

Source of Variation	Sum of squares	df	Mean Square	F	Sig.
Between Groups	0.14	2	0.07	1.08	0.344
Within Groups	4.93	75	0.06		
Total	5.07	77			

*Significant Level at 0.05

In table 2, it showed that after brain storming, the mean scores of three groups were no statistical significance at 0.05 level.

4.4 Results of Three Dimensional Evaluations for Participation in Future Situation

Three Dimensional Evaluations were employed for determining the perceptions of 26 high school students in three aspects evaluation in future situation, Self-evaluation, Friend-evaluation, and Facilitator-evaluation by using One-way ANOVA Analysis in order to explore the mean score differences of three groups. The results of One-way ANOVA showed that there were different mean scores about participation in training process with no statistical significance ($p > 0.05$) as showed in table 3.

Table 3 Three Dimension Evaluation of Sample Group for Participation in Future Situation

Source of Variation	Sum of squares	df	Mean Square	F	Sig.
Between Groups	0.17	2	0.08	1.50	0.23
Within Groups	4.18	75	0.06		
Total	4.35	77			

* Significant Level at 0.05

In table 3, it showed that after brain storming, the mean scores of three groups were no statistical significance at 0.05 level.

4.5 Results of Four Dimensional Evaluations for Trainer Role Play

Four Dimensional Evaluations were employed for determining the trainer role play in four aspects evaluation of Trainer self-evaluation, Trainer friend evaluation, Audience evaluation and Expert trainer evaluation by using One-way ANOVA Analysis in order to explore the mean score differences of four

groups. The results of One-way ANOVA showed that there were different mean scores about trainer role play during PAIC with no statistical significance ($p>0.05$) as showed in table 4.

Table 4 Results of Four Dimensional Evaluations for Trainer Role Play

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.04	3	0.01	0.39	0.76
Within Groups	5.35	158	0.03		
Total	5.39	161			

*Significant Level at 0.05

In table 4, it showed that after brainstorming, the mean scores of four groups were no statistical significance at 0.05 level.

Training period of the PAIC training implementation, focus groups discussion and brainstorming were integrated together, consequently, it is obviously seen that they had a very good participation and they were able to convey their idea and clarify their idea and thinking to their friends in the small group. Furthermore, they were able to play role as trainers effectively. Principally, in small group discussion they joyfully participated and were able to use their own imagination to draw their own idea and express their thinking to propose project to implement after PAIC training finished. Additionally, they planned to share their knowledge and understanding getting from PAIC process to other students in the same school and plan to act as trainers for other students in this school, other schools' students in the same district and the same province with public mind on school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior to reach better environmental quality in school.

5. DISCUSSIONS

The results clarified that the high school student participants had of school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior after participating in the PAIC training process. These were matching to various studies of Thiengkamol, [33] [34] [35] [36]. The high school students of Chiang Yuen School after being trained with PAIC training technique are capable to gain more school landscape management knowledge, environmental education principle, have inspiration of environmental conservation, and change environmental conservation behavior after participating in the PAIC training through real performance of environmental behavior in their daily living in their school circumstance with beautiful aesthetic scenes. The results are also relevant to the results of different researches of Thiengkamol, and Thiengkamol [5] [6] [12] [18] that the PAIC process influenced to carry out environmental conservation with public mind together with environmental education principle application in training process.

The results of TDE of 26 participants were utilized for exploring the equivalence of three aspects evaluation including Self-evaluation, Friend-evaluation, and Facilitator-evaluation. The mean scores three aspects were no difference among three aspects in present and future situations ($p>0.05$ and $p>0.05$). It is obviously seen that high school student participants realize the importance of school landscape management for creation the attractive scene, therefore, they realize the importance of school landscape management since they stay and learn for at least 8 hours per day and five day a week, and they stay in school longer than at homes. These students happily participate during small group discussion so their mean score both in self-evaluation and friend-evaluation are similar to facilitators. Concurrently, FDE was used to

evaluate the trainer role play of high school student participants; it was revealed that the mean scores of Trainer-self evaluation, Trainer-friend evaluation, Audience evaluation, and Expert trainer evaluation were no statistically significant at level of 0.05, therefore it demonstrated that mean scores of Trainer-self evaluation, Trainer-friend evaluation, Audience evaluation and Expert trainer evaluation are equally then it implies that their opinion about trainer role play of participants all agree to each other. However, the training achievement was pertinent to several studies of [5] [6] [12] [18].

PAIC training is successful for training techniques because it introduces the brainstorming process and focus discussion together, therefore it is able to synchronize to train the participant to be appreciated. At the end of the training, they are able to develop a shared vision, action plan and projects in different issues of training whether urban community food security management, environment and natural resource conservation, elderly health care, dust self-prevention, and environmental conservation of food stand entrepreneur. The results of training achievement was harmonious to plentiful studies of Thiengkamol, [5] [6] [12] [18]. It can be applied to use in other contexts with different target groups by replicating its implementation to build the biodiversity conservation model through trainer development for environmental knowledge transferring for schools and communities in other provinces in this region.

6. CONCLUSION

PAIC technique can be used to increase school landscape management knowledge, environmental education, inspiration of environmental conservation, and environmental conservation behavior and to develop trainers who are able to transfer knowledge of school landscape management for environmental conservation for others.

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