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The Effect of Environmental Education Activities for the Developing Environment and Occupational Health in School

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ABSTRACT

Environmental development and occupational health are important to be nurtured among Thai School aged students. Therefore, activities to improve these concepts should be studied. There were two main purposes of this research:1) to examine the effect of the developed environmental education activities program which will improve occupational health and school safety on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers and 2) to compare these averagescores between different genders and educational levels. This quasi experiment: one group pretest-posttest design was used for this study. 45 environmental leader students of Phuwiangwittayakhom school, Thailand and in academic year, 2018 were recruited to this study using purposive sampling. The instruments included:1) the developed environmental education activities program which will improve occupational health and school safety,2) tests on knowledge of Environmental development and occupational health, and3) questionnaires about environmental related ethics and environmental volunteers. Percentage, mean, standard deviation, and One–Way MANOVA, One–Way MANCOVA) and Univariate tests were used for data analyzing.

Results of the research showed that 1) average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers at posttest were significantly improved when compared to those at pretest ($p<0.05$); 2) Comparing between genders, there was statistically significant difference only the average score of environmental volunteers ($p<0.05$),whereas, there was no significant difference between the average scores of knowledge about environmental development and occupational health in the school andenvironmental ethics ($p>0.05$); 3) comparing between educational levels or different grades, there was no significant difference between the average scores of knowledge on environmental development and occupational health in the school, Also, environmental ethics and environmental volunteers of different students' grade level ($p>0.05$).

In conclusion, the developed activities program can improve knowledge of environmental development, occupational health, environmental ethics and environmental volunteers for the whole group; however, it may be considered to apply this program for the different genders, and educational levels. Therefore, three recommendations were proposed: 1) schools should apply this of the developed environmental education activities program which will improve occupational health and school safety as extracurricular activities for leader students or environmental related student clubs because this program has specific contents and different periods, 2) teachers should consider and assign appropriate activities for female or male students, 3) comparing between grades point averages and students' roles in school and these outcome variables should be studied for the future research.

Keywords
Environment and occupational health improvement; School; Knowledge of Environmental development; Environmental ethics; Environmental volunteers

Introduction

At present, environmental education is important for humans being worldwide and especially in Thailand for two reasons: 1) changes related to globalization and social or economic growing in Thailand2) impacts of environmental changes are affected widely. First, changes due to the globalization and economic and social development of Thailand. Thailand has faced to economic and social changes continuously for decades. These changes also affected at the society and community and life styles, especially in rural areas which changed noticeable [1]. Second, the impacts that occur at the social and community levels, it cannot be denied that the resulting impact will direct to negatively affecting an environment around to the human body. An environment is everything that surrounds humans which have interrelationships by the impacts of one factor will be inevitably reinforce or destroy another [2].

Solving environmental problems is not an easy task, but the most important thing as all sectors must have the intention and work together to make environmental protection successful and sustainable [3]. Furthermore, managing the environment effectively, one must focus on human resources development, an effective environmental management must focus on the development of human resources, from the development of thoughts, beliefs, feelings, and behaviors, especially the behavior of willing support and cooperation [4].

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Environmental education is a learning process that aims to educate human about the environment, awareness of problems, attitudes and values that are good for the environment, problem solving skills, participation in problem solving, and evaluation of environmental problem solving, by relying on environmental elements to studied of 4 issues, namely to environmental knowledge, process of transferring knowledge to the target group, and achievement of the objectives [3]. The development of good human knowledge, attitudes, and behavior are the results of human perception that occurs throughout life.

Therefore, providing environmental education to humans of all genders, ages, and all levels of education can improve their awareness on environment. However, raising awareness for the whole society may require a longer time and resources. Therefore, prioritizing or focusing for specific groups can be possible for Thailand, where limit resources. As a result, school aged students who can learn things easily and have a good development in physical, mental, thinking and problem solving skills. If the students receive a good knowledge of the environment, and there are various and interesting ways to transfer knowledge will be an effecting a more efficient and perceived learning.

Additionally, school is a society that is a source of knowledge, this must be a place with occupational health and safety management to meet standards for reduce the harm that occurs in school, and to be suitable as a learning center for students [5]. However, some schools are in poor environment and pose a risk of harm to school personnel, not suitable as a learning centers. There is a need for work to address the issue, through the occupational health and safety work in that school. Besides the importance of administrators, including the human resources in the school, students must have a good awareness for establishing good attitude, self-sacrifice, and volunteers [6]. In this research, the importance of developing environment and occupational health in school is recognized asbeneficial to the development of the environment and health occupational in a good school. It creates safety for students and personnel in the school which results in appropriate society in the school. Additionally, good and safety environment can improve students' learning process, effective teaching and learning process, and congruent with all aspects of changes occurred during globalization era. However, no previous study which related to developed activities program aiming to improve environmental education, occupational health on students' knowledge, environment ethics and volunteers has been found.

From these above reasons, the researchers has done research to examine environmental education activities program for improving occupational health and school safety on knowledge of environmental development, occupational Health, environmental Ethics and environmental volunteers among Thai School-aged Students. Phuwiangwittayakhom School, Khon Kaen province, Thailand, The developed environmental education activities program for improving occupational health and schoolsafety which provide a good and systematic knowledge transferring system on environmental education and occupational health was tested.

There were two main purposes of this research: 1) to examine the effect of the developed environmental education activities program which will improve occupational health and school safety on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers and 2) to compare these average scores between different genders and grade levels. This quasi experiment one group pretest-posttest design was used for this study.

Materials and Methods

Conceptual Framework

The effect of environmental education activities for the developing environment and occupational health in school that consists of 6 learning activities which are to activity 1: surrounding environment, activity 2: basic occupational health and safety, activity 3: livable school, activity 4: finding risk in school, activity 5: safety school and activity 6: sustainable safety school. The instruments included: 1) the developed environmental education activities program which will improve occupational health and school safety, 2) tests on knowledge of environmental development and occupational health, and 3) questionnaires about environmental related ethics and environmental volunteers.

The conduction as training course of developing environment and occupational health in school that consists of 6 learning activities. Each activity have to be 4-steps knowledge transfer process of the stages including introductory stage, original knowledge review stage, the cognitive modification and the knowledge-building stage, and the review and evaluation stage. Details as presented in figure 1.

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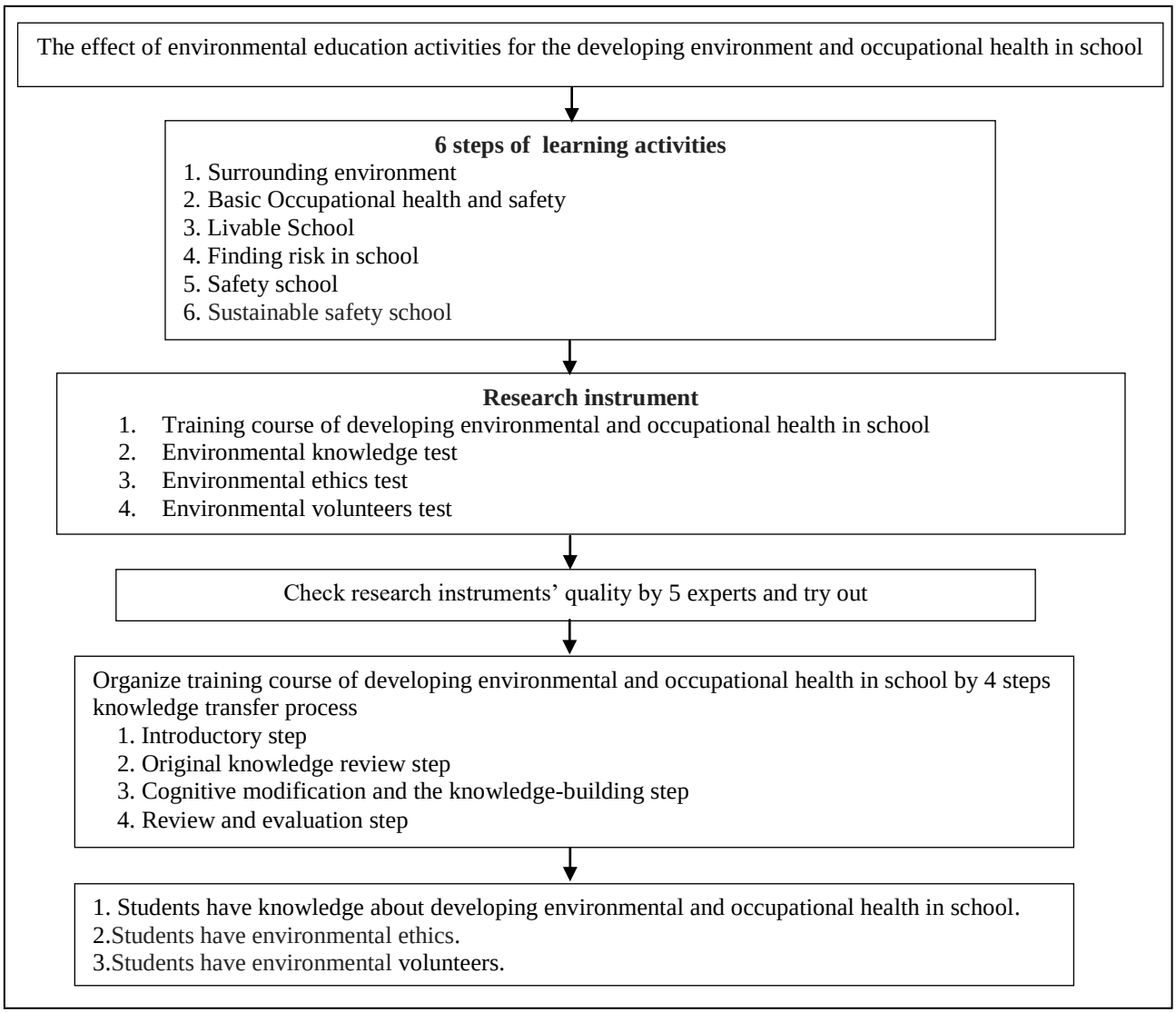

Figure1. Conceptual Framework

Population and samples

The population were2700 secondary students ofPhuwiangwittayakhom school in Khon Kaen province, Thailand, the sample were 45 students, they are voluntary environmental vocal students in grade levels 9-11. The gender of sample can be divided into 2 groups as follows 20 male and 25 female students, they are between age of 13 – 15 and they all were selected to this study by using purposive sampling.

Variables

- Independent Variable were the developed environmental education activities program, students' gender and students' grade levels.
- Dependent Variables were knowledge of environmental development, occupational health, environmental ethics and environmental volunteers.

Research Instrument and Quality Testing

- Transmission instrument was the developed environmental education activities program which will improve occupational health and school safety, prepared by the principal researcher who has experienced in studying on knowledge about the environment, occupational health in school. This program was conducted based on theories

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and the research it consisted of 6 activities and submitted to the thesis supervisors for reviewing and then the principal researcher improve the program upon suggestions. Later, five experts assessed the content validity and appropriateness of the developed program. All experts have commented on the developed program at the most appropriate level. Mean of appropriateness)$\bar{x}$) is 4.80, standard deviation (S.D.) is 0.03 and index of congruency (IOC) is 0.87. Therefore, this developed activities program can be used in this research.

- Measurement instruments were tests consisting of 3 sets about environmental knowledge test, questionnaires of environmental ethics and environmental volunteers. All three measurement tools were prepared by the principal researcher by reviewing theory and the research.

Set1. Tests on knowledge of Environmental development and occupational health

Environmental knowledge test was used to study and compare the knowledge about environmental development and occupational health in the school. The test was composed 60 items, and each item composed 4 multiple choices. The correct answer is 1 point and wrong answer is 0 point. Interpretation criteria $\bar{x}$ = 0.00-12.00 is least level of knowledge, $\bar{x}$ = 12.01-24.00 is low level of knowledge, $\bar{x}$ = 24.01-36.00 is moderate level of knowledge, $\bar{x}$ = 36.01-48.00 is high level of knowledge and $\bar{x}$ = 48.01-60.00 is most level of knowledge [7].

Set2. Environmental ethics questionnaire

Environmental ethics test was used to study and compare student's environmental ethics. The test was composed 30 items and it was 4 multiple choice, interpretation criteria of environmental ethical level scores about $\bar{x}$ = 1.00-1.75 is ethics for self, $\bar{x}$ = 1.76-2.50 is ethics for family and friends, $\bar{x}$ = 2.51-3.25 is ethics for society and $\bar{x}$ = 3.26-4.0 is ethics for goodness [8].

Set3. Environmental volunteers questionnaire

Environmental volunteers questionnairewas used to study and compare student's environmental volunteers. The test was composed 30 items and it was 5 multiple choices, interpretation criteria of environmental volunteers level scores about $\bar{x}$=1.00-1.80 is least level of environmental volunteers, $\bar{x}$ =1.81-2.60 is low level of environmental volunteers, $\bar{x}$ = 2.61-3.40 is moderate level of environmental volunteers, $\bar{x}$ = 3.41-4.20 is high level of environmental volunteers and $\bar{x}$ = 4.21-5.00 is highest level of environmental volunteers [9]. This questionnaire was submitted to thesis supervisor for reviewing and then the principal researcher improve upon suggestions. Later, five experts assessed the content validity and appropriateness of the questionnaire. All experts have commented on the developed program at the most appropriate level

Furthermore, index of congruency (IOC) of test on knowledge of environmental development and occupational health was 0.87, questionnaire of environmental ethics was 0.89 and questionnaire of environmental volunteers was 0.91. Consequently, all instrumental tools of this research can be used in this study.

Additionally, difficulty, discrimination and reliability index of these tools were conducted by trying out with students who were studying at Phuwiangwittayakhom school in academic year, 2018 but were not recruited as the sample.

Results showed that all instrumental tools were acceptable to use in this study. 1) environmental knowledge test had the difficulty index between 0.26-0.73 which was at appropriate level, the discrimination index between 0.43-0.75, which can be used in this research and the Cronbach alpha reliability index as 0.97, which is also acceptable. 2) the environmental ethics questionnaire had the discrimination index between 0.42-0.74, which can be used in this research, and the Cronbach alpha reliability index as 0.97 which was acceptable.3) The environmental volunteers questionnaire had the discrimination index between 0.35-0.73, which could be used in this research, and the Cronbach alpha reliability index as 0.95, which was acceptable. The researcher used these indexes to improve the measurement instrument and used to samples students [10].

Data collection

The research design was quasi experimental research, by using one group pretest and posttest design [11], to showed as in table 1.

Table 1. Research design of the development of environmental education activities program for the environmental development and occupational health in school.

Experimental group	Pretest	Experiment	Posttest
E	T_1	X	T_2

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E = The sample in experimental group (Students).
T_1 = Knowledge testing, environmental ethics, environmental volunteers, before training
X = Training course of developing environmental and occupational health in school
T_2 = Knowledge testing, environmental ethics, environmental volunteers, after training

Preparation before learning activities to carry out site preparation, materials and equipment and documents for activities including the developed environmental education activities program which will improve occupational health and school safety, knowledge test, environmental ethics and volunteers questionnaire.

Take a test before the event using knowledge test of environmental development and occupational health in the school, environmental ethics questionnaire and environmental volunteers questionnaire to record as scores before training or at pretest.

Conduction as learning activities of studies environmental for developing environment and occupational health that consists of 6 learning activities to spent 6 activities of 6 hours each. And do a test before and after each activity for 1 hour, totaling 38 hours, to showed as in table 2.

Table 2. Details of the developed environmental education activities program which will improve occupational health and school safety

No.	Activities	time
1	Pretest	1 Hour
	Activities 1 : Surrounding environment	6 Hour
2	Activities 2 : Basic Occupational health and safety	6 Hour
3	Activities 3 : Livable School	6 Hour
4	Activities 4 : Finding Risk in school	6 Hour
5	Activities 5 : Safety school	6 Hour
6	Activities 6 : Sustainable safety school	6 Hour
	Posttest	1 Hour
	Total	**38 Hour**

The developed environmental education activities program which will improve occupational health and school safety was divided into 4 steps, including introductory stage, original knowledge review stage, the cognitive modification and the knowledge-building stage, and the review and evaluation stage.

Step 1. Introductory, this step was introduced about content for getting students interested in the activity. In this stage, the teacher was persuades students to get interested in the learning topic by giving examples, illustrations, videos, examples from the teacher's experience, so that students can imagine and think accordingly.

Step 2. Original knowledge review, this step was bring students to participate in activity by child centered learning. Focus on students to express their opinions, and take part in presenting the experience and the original knowledge by students. In which the organization of this activity aside from the students has already participated, the teacher can observed students behavior in cooperating the activity, to improve the teaching approach according to the situation for all students to participate thoroughly.

Step 3. Cognitive modification and the knowledge-building, this step was important of process to transfer the knowledge, it consists lectured, demonstration knowledge discussion, generating ideas from discussions and learning by doing.

Step 4. Review and evaluation, this was the last step in which the students review their knowledge, ideas, and understanding by comparing their original ideas, and new ideas that have been received and conveyed to students who participate in activity, such as a representative to explain and conclusion the results of learning in the activity, and take a test by knowledge test of developing environment and occupational health in the school, environmental ethics test and environmental volunteerism test to record as scores after training.

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The environmental education activities of developing environmental and occupational health in school was to efficiency of 91.07 / 90.19, which is higher than the specified efficiency threshold of 80/80. And effectiveness index of the activity set was 0.6389, showed that the students had to 63.89% increase in learning progress.

Result

The effect of the developed environmental education activities program which will improve occupational health and school safetywere presented as followed:

1. Results of comparison of average scores for knowledge of environmental development, occupational health, environmental ethics and environmental volunteersof the students at pretest and posttest were:

1.1 Average score of environmental knowledge at posttest is higher than pretest. Considering details, average scores at posttest was at the most level ($\bar{x}$=54.11) and at pretest was at the high level ($\bar{x}$= 43.68). Comparing the average scores of environmental knowledge at pretest and posttest, it was found that there was statistically significant difference in the knowledge average scores of environmental knowledge ($p < 0.05$).

1.2 Average score of environmental ethics at posttest is better than pretest. Considering details, average scores at posttest was the level of goodness)$\bar{x}$=3.58(and at pretest was at the level for society)$\bar{x}$=2.83(. Comparing the average scores of environmental ethics at pretest and posttest, it was found that there was statistically significant difference in the average scores of environment ethics ($p < 0.05$).

1.3 Average score of environmental volunteers at posttest is higher than pretest. Considering details, average scores at posttest was at the most level)$\bar{x}$=4.58(and at pretest was at the high level)$\bar{x}$=3.81(. Comparing the average scores of environmental ethics at pretest and posttest, it was found that there was statistically significant difference in the average scores of environmental volunteers ($p < 0.05$). Details were showed in table 3.

Table 3. Comparison of average scores, SD. And levels of knowledge of environmental development, occupational health, environmental ethics and environmental volunteersat pretest and posttest using t-test.

Topic	Pretest			Posttest			t	df	p
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level			
Environmentalknowledge (N = 60)	43.68	4.73	High	54.11	2.75	Most	-15.879	44	.000*
Environmental Ethics (N = 4)	2.83	0.21	Ethics for society	3.58	0.12	Ethics for goodness	-23.054	44	.000*
environmental volunteers (N = 5)	3.81	0.21	High	4.58	0.12	Most	-38.010	44	.000*

* Statistically significant level of .05.

2. Results of comparison of average scores for knowledge of environmental development, occupational health, environmental ethics and environmental volunteersamong the students with different genders using One–Way MANOVA and One–Way MANCOVA were found that students with different genders had a statistically significant difference in average scores on environmental volunteers ($p < 0.05$), but there was not significantly different on the average scores knowledge of environmental development, occupational health, environmental ethics, as shown in table 4-5.

Table 4. Results of comparison of average scores for knowledge of environmental development, occupational health, environmental ethics and environmental volunteersamong the students with different genders using One–Way MANOVA.

Test statistics	Value	Hypothesis df	Error df	F	p
Pillai's Trace	0.309	3.000	41.00	6.110 [b]	0.002 [*]
Wilks' Lambda	0.691	3.000	41.00	6.110 [b]	0.002 [*]
Hotelling's Trace	0.447	3.000	41.00	6.110 [b]	0.002 [*]
Roy's Largest Root	0.447	3.000	41.00	6.110 [b]	0.002 [*]

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* Statistically significant level of .05.

Table 5. Results of comparison of average scores for knowledge of environmental development, occupational health, environmental ethics and environmental volunteersamong the students with different genders using using One–Way MANCOVA using pre-test scores as covariates.

Early variant	Dependent variable	SS	df	MS	F	p
Gender	Environmental Knowledge	8.604	1	8.604	1.135	.293
	Environmental Ethics	.000	1	.000	0.006	.937
	Environmental Volunteers	.176	1	.176	13.544	.001*

* Statistically significant level of .05.

3. Results of comparison average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteersof the students among the students with different grade levels using One–Way MANOVA were found that among students with different grade levels (grade 9-11), there was not significantly different on average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers. Therefore, the one-way MANCOVA were conducted using average scores at pretest as a common variables. It also confirmed the same results that for those students, who had different grade levels, the average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers at posttest were not significantly different, as shown in table 6-7.

Table 6. Results of comparison average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteersof the students among the students with different grade levels using One–Way MANOVA

Test statistics	Value	Hypothesis df	Error df	F	p
Pillai's Trace	0.138	6.000	82.00	1.009	.425
Wilks' Lambda	0.867	6.000	80.00	.985[b]	.441
Hotelling's Trace	0.148	6.000	78.00	.961	.457
Roy's Largest Root	0.084	3.000	41.00	1.147[c]	.342

* Statistically significant level of .05.

Table 7. Results of average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteersof the students among the students with different grade levels using One–Way MANCOVA using pre-test scores as covariates.

Early variant	Dependent variable	SS	df	MS	F	p
Grade level	Environmental Knowledge	13.911	2	6.956	.911	.410
	Environmental Ethics	.025	2	.013	.804	.454
	Environmental Volunteers	.048	2	.024	1.469	.242

* Statistically significant level of .05.

Discussion

Based on results, there were three major findings which will be discussed as follow:

1. The Results of the comparison of knowledge average score in developing environment and occupational health in the school, environmental ethics and environmental volunteers before and after training by the training course of developing environment and occupational health in school, it was found that

1.1 Average score of environmental knowledge at posttest is higher than pretest. This result is congruent with previous studies. For example, Papichaya Praparn and Prayoon Wongchantra's study [12] also mentioned that undergraduate students have significantly improved their average scores on knowledge after applying handbook of environmental management in community than at pretest. Furthermore, many previous studies which apply training course with multimedia or resources and various teaching methods can improve students' knowledge on each specific environmental related topics or contents [2, 3, 13, 14]. It may be assumed that the developed activities program provided appropriate and clear contents as well as methods of transferring knowledge such as giving examples, using

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multimedia to attract students' attention. Therefore, students can learn from these activities and gain their own knowledge on environment education. This finding is congruent with concepts of Chaiyong Promwong [15] who suggested that the training courses which include content, subjects and objective related activities or multi resources and materials will help students to be knowledgeable, and be effective behavioral changes.

1.2 Average scores of environmental ethics at posttest are higher than pretest significantly. It dues to, the developed activities program which focused on students' sensible perception using various techniques such as giving examples, comparing negative impacts which resulted in environmental problems. Also, applying group activity process and discussing about environmental problems as the transferring methods. All these above components were included in the developed activities program of this study. Therefore, samples or students were nurtured for the environmental ethics via raising their awareness, reflecting, and discussing on environmental development topics. This result was congruent with previous studies. For example, Prayoon Wongchantra [16] mentioned that building or developing environmental ethics required systematic learning process, contents integration and strong students or learners' participation in terms of raising awareness, attitudes and values about environment. Furthermore, Atthadech Sornsuchat [17] indicated that ethics are good behaviors or manners which are expected from social or society to practice. Additionally, the result was also congruent with results of previous studies. For instance, Thakorn Sittichok and Orapin Sirisamphan [18] advised that undergraduate students who were taught using learning management system model to nurture environmental ethics had a higher score at posttest than those at pretest significantly at p value less than 0.05. It also found the same trends from previous studies. For example a study of Prachumporn Laoprasert [19] which claimed that undergraduate students who were taught using ethical integration teaching methods could have a higher average score on environmental ethics at posttest when compared to scores at pretest. In addition to, Areeya Nangmontha et al., [20] found that the undergraduate students who were taught using the training manual for rainforest ecology had higher average score on environmental ethics at posttest than those at pretest. As well, Pisarn Khrualit and Chaiwat Sutthirat [21] found that grade 7 students who participated in environmental camp as extracurricular activities, had environmental ethics average score at posttest higher than those at pretest. Along with Prayoon Wongchantra and colleaques's study [8] found that students who were taught using the environmental education process with ethical integration could develop environmental ethics scores better than those who were not taught using this process.

Therefore, the implementation of the developed activities program which included environmental ethics and various teaching methods as mentioned above could increase environmental ethics scores and practice among students.

1.3 Average scores of environmental volunteers at posttest were higher than those at pretest because the developed activities program for environmental development and school occupational health included various activities such as 1) practicing in real life situation to participate in cooperating or working with others to improve their own school environment, 2) sharing experiences and opinions with others widely to develop conceptualization, ideas, awareness, and school resources cherishing until dedication and scarification for environmental management occurred without any outside forces or compensations. These learning methods could transfer and nurture environmental volunteers minds for students. It was congruent with concept of Jongrak Suppakitcharoen and colleaqes [22] on process of building volunteers came from helping students to develop their own physical personality and cognition which will affect to reasonable thinking and decision. Previous studies also supported this result. For instance, Surasuk Kaewngam and Prayoon Wongchantra [23] mentioned that students who attended the environmental volunteers leader training course will have volunteers leader skills at posttest higher than those at pretest and also higher than those without training. Along with KanNakapong's study [24] found that after training course with PAIC process, health volunteers presented their service minds regards environmental conservation and waste management better than pretest and Bussaraporn Tiyao and Colleaques [25] suggested that volunteers mind development model for youth required their own inspiration which nurtured from family and theirneeds for taking part of social problem solving roles.

2. Comparing between genders, there was statistically significant difference only the average score of environmental volunteers, whereas there was no significant difference between the average scores of knowledge about environmental development and occupational health in the school andenvironmental ethics. The results demonstrated that different gender was significant difference on the average score on environmental volunteers. It may due to expected roles and expression opportunity between male or female from society norms or expectation are different. Therefore, female and male students could express or perform the environmental volunteers role differently. This research result was congruent with the previous studies. For instance, Chanikan Pattum's study [26] demonstrated that undergraduate students with different gender expressed and performed volunteers behaviors differently. Also, Jittiya Vagee [27] found the same trends among secondary school students with different gender, performed public mind differently. As well, Supaporn Thosparin and colleagues [28] mentioned that female or male older people could differently perform environmental volunteers role. Whereas, there was a study was not found different between genders.

However, there was no significant difference between gender and average score on knowledge about environmental development and occupational health in the school andenvironmental ethics. Average score on knowledge may not be different between male or female students because both gender can seek information or learn without any limitation and

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knowledge score may relate to the training courses rather than other factors. This result is congruent with previous studies of Suksri Suebsing and colleagues [29] which found that knowledge of forest reservation were not different between male and female. The same results were supported by Kiiti Yongsangaunchai and colleagues'study [30] that claimed that among the Bangpoo reserved youth volunteers group with different genders, there was not different on knowledge. Sukunya Mooyen's study [31] also confirmed that knowledge scores on choosing the green product were not different between male and female. Furthermore, different genders did not relate to the environmental ethics. It may due to ethical behaviors depended on students' experience and way of family fostering rather than a short course training and both female or male performed ethical behaviors equally. It is congruent with previous studies of Salukjit Pookcharoon and Polkrit Khumklum [32] which illustrated that there was no difference between genders on an awareness on environmental ethics related to waste management. Also Sarun Wongkhumchan [33] found that different genders did not present different levels of ethical behaviors. This results confirmed that the developed activities program can improve environmental knowledge, ethics and volunteers for students; however, some concerns about different gender should be considered in developing environmental volunteers mind.

3. Comparing between different students' grade level, there was no significant difference between the average scores of knowledge on environmental development and occupational health in the school, environmental ethics and environmental volunteers. This result demonstrated that students' grade level were not different on knowledge, environmental ethics and volunteers scores. It may due to the developed activities program could provide enough information or appropriate methods to enhance the students' learning and then increase environmental knowledge, ethics and volunteers without any educational levels or different grades effect. It was supported by previous studies such as Kongporn Nimcharoenchaiyakul and colleagues [34] mentioned that among high school students with different educational levels, there was no difference on knowledge of waste management related environmental law. Vilunthorn Chooto and Chitsanupong Prathum' study [13] which found that among high school students with different educational levels or grades, there was no difference on scores of awareness, environmental issue recognition and environmental management. Also, Prapasri Buasri and chotima kaewkong [35] found that undergraduate students in the different years, there was no difference on family resource management for reducing global warming. Furthermore, study of Sirisuk nakaseni and colleagues [36] mentioned that undergraduate students with different years performed overall public minds similarly. Moreover, Natdao Kachapalayook [37] also claimed that undergraduate students with different years performed volunteers behaviors for social helping indifferently.

Conclusion

The effect of environmental education activities for the developing environment and occupational health in schoolas follows:

First, the developed activities program can improve knowledge of environmental development, occupational health, environmental ethics and environmental volunteers for the whole group. This conclusion referred from the study's results which found that average scores on knowledge of environmental development, occupational health, environmental ethics and environmental volunteers at posttest were significantly improved when compared to those at pretest ($p<0.05$)

Second, comparing between genders, there was statistically significant difference only the average score of environmental volunteers ($p<0.05$),whereas, there was no significant difference between the average scores of knowledge about environmental development and occupational health in the school andenvironmental ethics ($p>0.05$)

Third, comparing between educational levels or different grades, there was no significant difference between the average scores of knowledge on environmental development and occupational health in the school, Also, environmental ethics and environmental volunteers of different students' grade level ($p>0.05$).

Therefore, the developed environmental education activities program which will improve occupational health and school safety can be used to improve knowledge of environmental development and occupational health, environmental ethics and volunteers. However, it may be considered to apply this program for the different genders.

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