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The Effect of Environmental Education Learning for Enhancing Rivers Management in the Northeast of Thailand Using Community-Based Learning

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Abstract

Community-based learning is a strategy or model of learning management that integrates curricular content into the community using work based learning to encourage learners to learn from real-life situations in the community under the participation of teachers, learners and people in the community. The purposes of this research were to develop environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning as effective and effective, to study and compare knowledge, attitude and environmental ethics for enhancing rivers management in the northeast before and after study and to compare knowledge, attitude and environmental ethics for enhancing rivers management in the Northeast of students with different gender. The sample used in the study were 50 the third year undergraduate students in Environmental Education program, Faculty of Environment and Resource Studies, Mahasarakham University, which was derived by purposive sampling. The research tools were the environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning, knowledge test, attitude test and environmental ethics test. The statistics used for data analysis were frequency, percentage, mean, standard deviation and hypothesis testing using Paired t-test and One-Way ANOVA. The results of the research showed that: 1) The environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning were the efficiency of 81.08/85.43, the efficiency index was a value of 0.7709, it showed that the students have increased knowledge and resulted in the students progressing from their studies accounted 77.09%; 2) The students had average score of the knowledge, attitude and environmental ethics in the posttest higher than the pretest statistical significance ($p < .05$); 3) There was statistically significant different of score of knowledge, attitude and environmental ethics of students with different gender ($p < .05$).

Keywords: Rivers management, Northeast of Thailand, Community-based learning, Enhancing, Knowledge, Attitude, Environmental ethics

1. Introduction

1.1 Introduce the Problem

Education and learning should have an important goal of developing people as citizens to be physically and mentally complete, intellectually, knowledgeable and moral, ethics and culture to live in balance, have the necessary skills and be able to live happily with others, lifelong continuous self-learning leadership by focusing on learning to inspire and live a meaningful life to learning to nurture creativity the ability to create new things, learning to cultivate a public mind, hold on to common interests and learning for implementation and focus on building work to achieve results be a qualified citizen, self-reliant and lead a happy life. In this regard, the curriculum and methods of education and learning in the 21st century should enable learners to continually learn and develop themselves, not memorizing the subject matter. Emphasis is placed on learning that arises from the real needs of the learners and takes action in order to gain direct experience and build on that knowledge on their own. Teachers must be able to create and design a learning environment that is supportive and

conducive to objective learning. There is linking knowledge or exchanging knowledge with the community and society as a whole manage learning through real-world contexts and creating opportunities for students to have access to quality media, technology, tools and learning resources (Jarungkiatkul, 2018).

Setting the primary objectives function, which is the net effect of a system or destination that education must develop and empower citizens and society to live with pride, to set the primary objective of education alone, unable to develop human beings and society. But there is a mechanism to drive policies and strategies that are practical. The action must understand the changing context of the world in the 21st century, fundamentals of educational philosophy as well as elements of the student's lifestyle environment. By understanding these should be basic knowledge that is short, concise, easy to understand, can be done together and has clear guidelines and in addition, it makes it possible to think of problems in steps. The present condition of teaching and learning management is quite limited. But in conclusion, it is an educational management that is not suitable for the students' conditions, students lack cooperation in various tasks. Therefore, education management should be integrated (Wankaew, 2008).

There are various problems in the present education situation, that occur in Thai society and the rapidly changing context of the country's development at present. While all sectors continue to focus on economic and material competition until it becomes materialism. As morality and ethics, it has been neglected as a result, making people in Thai society far from religion. As a result, the way of life and traditional values that are good in the structure of Thai society fade away. This makes the immunity of children, youth, students, and students to be resistant to environmental problems that cause various problems of society, such as the problem of causing quarrels among students, the problem of drug epidemic among students, student problems students behaving inappropriately during class time, problems with sex in school age and crime problems. In such a situation, it was found that the root of the real problem was not being mentally refined neglected from the family institution, an educational institution that will cultivate morality and ethics until it causes a lack of sense of duty and lack of conscience and manifested as inappropriate external behavior. The reform of the bureaucratic system has separated religious work from the Ministry of Education, making the good things that used to support each other, such as houses, temples, and schools, could not be connected in bringing the principles of dharma into the people's way of life thoroughly. Lack of psychological development of the people in the nation, the teaching of educational institutions does not see the importance of religion enabling youth in school age to have knowledge but do not see the importance of morality and ethics. It is a clear signal that the development of Thai society from now on must be proactively developed in all aspects especially the implementation of religious dimensions in the people's way of life urgently and clearly. The Office of the National Economic and Social Development Board has assessed social capital in order to draw conclusions about driving Thailand towards sustainable progress. It must rely on quality social capital, establishing a basic conceptual framework for development, especially religious institutions, must speed up the reform of the management of religious circles by encouraging religious institutions to play an important role

dissemination of morals, virtues and ethics so that people in the society can coexist peacefully (Phuangsomjit, 2017).

Community-based learning is a model of experiential learning designed to promote learning and develop learners by allowing learners to participate in activities related to individual and community needs. It is a strategy or learning model that integrates curriculum content to connect with the community by using practice as a base allowing learners to learn from real-life situations in the community under the participation between teachers and learners and groups of people in the community, such as studying history, culture, livelihood, handicrafts, education of traditional nursing from individuals and community organizations in addition to learning in the classroom. The critical process of learning uses critical reflection. This will help to gain knowledge of the content according to the curriculum and better understand the community. The aim is to promote learning and develop learners in knowledge and a wide range of skills such as analytical thinking, synthesis, critical thinking (Rithikupt, 2018).

Therefore, the researcher has adopted a method of teaching and learning by using community -based learning to be applied in the teaching and learning activities of environmental education which contains a total of 7 learning plans, including: river management in the Northeast of Thailand, Chi river management, Mun river management, Songkram river management, Phra Ploeng river management, water use and water resources management, water resource management to provide students with more knowledge, attitudes and environmental ethics in teaching and learning activities.

1.2 Research Objectives

(1) To develop an environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning as an effective and effective.

(2) To study and compare knowledge, attitude and environmental ethics for enhancing rivers management in the Northeast of Thailand before and after study.

(3) To compare knowledge, attitude and environmental ethics for enhancing rivers management in the Northeast of Thailand using community-based learning of students with different gender.

2. Method

2.1 Population and Sample

The population used in this research were 329 undergraduate students in years 1-4 in Environmental Education program, Faculty of Environment and Resource Studies, Mahasarakham University, the beginning of the academic year 2020.

The sample used in the study were 50 the third year undergraduate students in Environmental Education program, Faculty of Environment and Resource Studies, Mahasarakham University, which were derived from purposive sampling.

2.2 Tools Used in Research

(1) The environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning.

(2) Knowledge test.

(3) Attitude test.

(4) Environmental ethics test.

2.3 The Research Tools and Quality of Tools

(1) Study information, concepts, theories, research papers related to river management in the Northeast.

(2) Use the data to create tools used in research, including:

(a) Plan for enhancing rivers management in the Northeast of Thailand using community-based learning of 7 learning plans.

(b) Knowledge test about rivers management in the northeast by answering as a choice of 4 options, i.e. A, B, C and D, 35 questions, correct answer received 1 point, wrong answer 0 point.

(c) Attitude test river management in the northeast it's a closed-ended question. It is an estimation scale. There is an answer form that is divided into 5 levels, i.e. strongly agree, agree, not sure, disagree, strongly disagree, 35 items.

(d) Environmental ethics test is a multiple choice model with 4 options, which defines the level of environmental ethics in 4 levels: for myself, for relatives and friends, for society and for correctness and goodness, amounting to 35 items.

(3) Bring the tools used in the research to send 3 experts to consider the consistency along with finding the appropriateness, accuracy and checking the accuracy of the content, found that:

(a) Environmental education learning plans for enhancing rivers management in the northeast of Thailand using community-based learning, it was found that the consistency value (IOC) of the learning plan was 1.00, with an average of 0.50 and above. And the suitability value was 4.44, indicating that the suitability of the environmental education learning plan for enhancing rivers management in the Northeast of Thailand using community-based learning at a very appropriate level can be used to collect information.

(b) Knowledge test about rivers management in the northeast found that the consistency value (IOC) was 0.97. Attitude test river management in the Northeast found that the consistency value (IOC) was 1.00. Environmental ethics test found that the Compliance (IOC) was equal to 1.00. It was considered consistent with the specified criteria, can be used to collect data.

(4) Bring the tools used in the research to try out with the fourth year 107 undergraduate students in Environmental Education program, Faculty of Environment and Resource Studies, Mahasarakham University, that were not a sample to analyze the difficulty index, discrimination and reliability found that:

(a) The knowledge test about rivers management in the Northeast had an available difficulty index level; 0.56-0.66. The reliability of the attitude test using the α-Cronbach Coefficient method was found that there is a confidence factor of 0.948, which can be used to collect data.

(b) The attitude test river management in the Northeast had available discrimination at a valid level; 0.32–0.77. The reliability of the attitude test using the α-Cronbach Coefficient method was found that there is a confidence factor of 0.929, which can be used to collect data.

(c) The environmental ethics tests had available discrimination at a valid level; 0.45-0.62. The reliability of the environmental ethics test using the α-Cronbach Coefficient method was found that there is a confidence factor of 0.932, which can be used to collect data.

(5) Bring the tools used in the research to improve and make a complete version to collect data with the sample group.

2.4 Data Collection

(1) Prepare environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning, knowledge test, attitude test and environmental ethics test.

(2) The students took a quiz on their knowledge test, attitude test and environmental ethics test before study (pre-test).

(3) Enter teaching activities implement an environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning, there are 7 weeks of teaching and learning, 1 plan (3 hours) per a week, a total of 21 hours. There are steps as follows:

Step 1: Survey the community by having students explore the community area to collect information using community-based learning.

Step 2: Analyze learning resources in community areas using community-based learning.

Step 3: Design learning using community-based learning by setting goals for learning activities, plan the implementation of learning activities and organize learning activities for students.

Step 4: Organize learning using community-based learning as follows:

(1) Set goals of learning activities to provide students with knowledge, attitudes and environmental ethics.

(2) Plan the implementation of learning activities and organize learning activities for students as follows:

(a) Meeting to assign duties in the operation divided into equal subgroups.

(b) Prepare equipment for activities, distribute knowledge sheets and teach according to the content prepared.

(3) Visit the area to study water resources in the community.

Step 5: Remove the lessons learned by having students in each group jointly analyze the data and discuss to create knowledge, attitudes and environmental ethics.

Step 6: Evaluation by asking each group of students to present the results of data analysis and guidelines and do exercises at the end of the chapter as well as a summary.

(4) The students took a quiz on their knowledge test, attitude test and environmental ethics test after study (post-test).

2.5 Statistics Used in Research

The statistics used for data analysis in this research, the details are as follows:

(1) Basic Statistics were Frequency, Percentage, Mean and Standard Deviation

(2) Test the Efficiency of the Engine, Including the Appropriateness of environmental education learning plan, Conformity Index Value, Difficulty Index of the Knowledge Test, Discrimination, Reliability, Process Efficiency Factor (E_1), Result Efficiency Value (E_2) and the Effectiveness Index (E.I.).

(3) Statistics Test Results and Hypotheses the .05 Levels of Statistical Significance were Paired t-test and One-Way ANOVA.

2.6 Conceptual Framework for Research

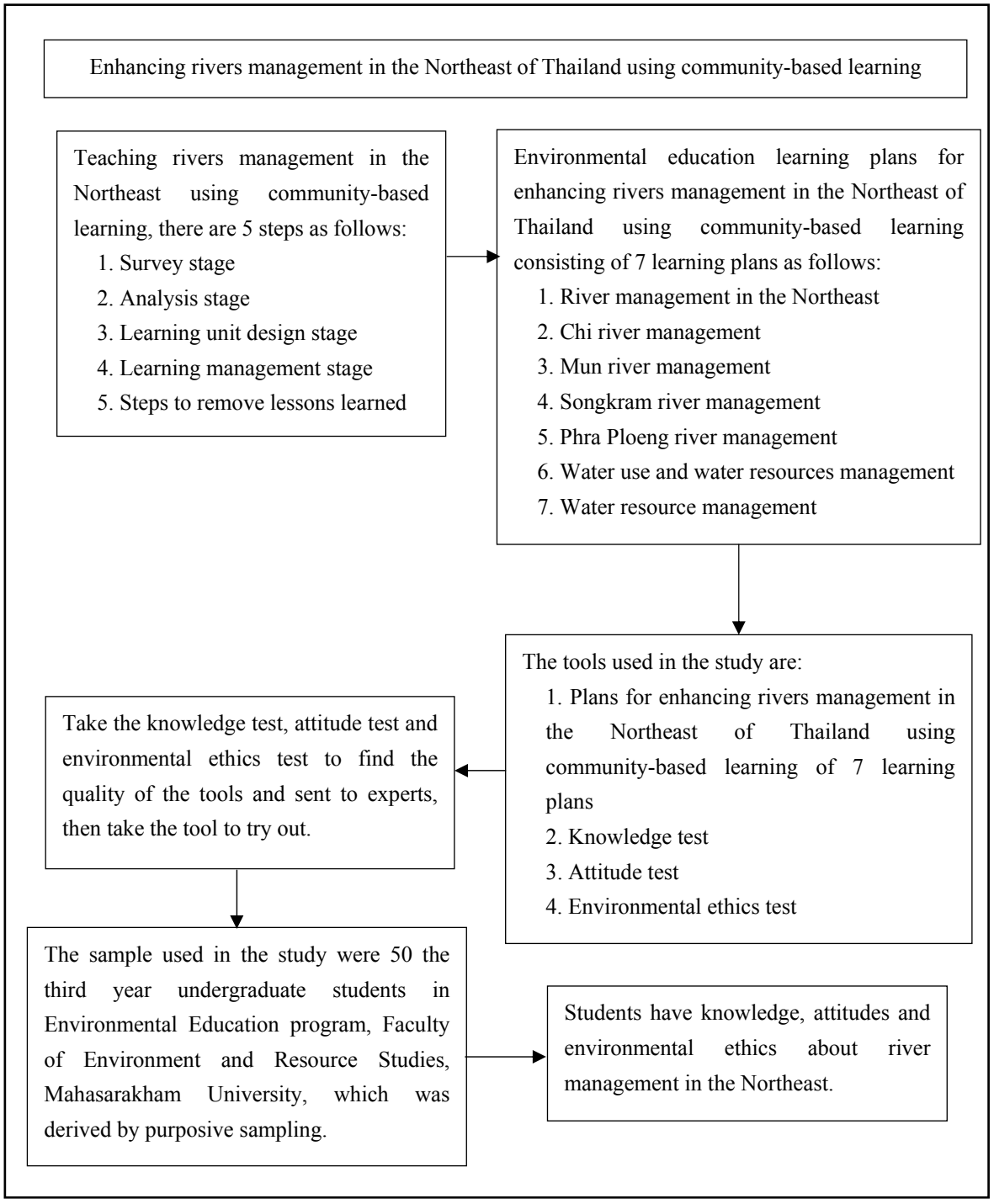

Figure 1. Research conceptual framework

3. Results

(1) The results of the study of environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning as an effective and effective showed that;

Results of a study on the efficiency and effectiveness of the river management learning plans in the Northeast using community-based learning, it was found that the efficiency of the process (E_1) was 81.08% and the efficiency of the result (E_2) was 85.43%. Therefore, environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning efficiency was 81.08/85.43, which met the 80/80 criterion as set. As for the effectiveness index, it was found that Effectiveness Index (E.I.) of the environmental education learning plan for enhancing rivers management in the Northeast of Thailand using community-based learning is equal to 0.7520. It means that the students have increased knowledge and resulted in the students having more progress in their studies after the implementation of the 75.20% learning plans, which meets the standard that can be used.

(2) The results of a comparative study of knowledge, attitudes and environmental ethics related to river management in the Northeast of Thailand showed that;

(a) The results of the study of knowledge about river management in the Northeast revealed that before study, the students had a low average score of overall knowledge ($\bar{x} = 12.74$) and after study, the students had an average score of overall knowledge was at the highest level, equal to ($\bar{x} = 29.90$). When comparing the average knowledge scores, it was found that after study, the students had score of overall higher knowledge than before study statistically significant level. 05.

(b) The results of the study of attitude about river management in the Northeastern region found that before study, the students had the average score of the overall attitude at disagree level, which was 1.98. After study, overall, it was at the agree level, which was equal to 3.60. When comparing the average scores of attitude, it was found that after study, the students had higher scores of attitude than before study statistically significant level. 05.

(c) The results of the study of environmental ethics about river management in the Northeastern found that before study, the students had an average score of overall environmental ethics at the for myself level, which was 1.47, and after study, the students had an average score of overall environmental ethics at the for society level, the value is 3.12. When comparing the average scores of environmental ethics, it was found that after study, the students had higher average score of environmental ethics than before study statistically significant level. 05.

(3) The results of the study and comparison of knowledge, attitudes and environmental ethics with different gender showed that;

(a) There was statistically significant different of score of knowledge about river management in the Northeast of students with different gender level ($p < .05$).

(b) There was statistically significant different of score of attitude about river management in the Northeast of students with different gender level ($p < .05$).

(c) There was statistically significant different of score of environmental ethics of students with different gender level ($p < .05$).

Table 1. Comparison of average scores on knowledge, attitude and environmental ethics about rivers management in the Northeast of undergraduate students, using Paired t-test before and after study (n = 50)

Item	Pretest			Posttest			t	df	p
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level			
Knowledge (N = 35)	12.74	3.33	Low	29.90	2.24	The highest	-32.555	49	.000*
Attitude (N = 5)	1.98	0.14	disagree	3.60	0.34	Agree	-27.414	49	.000*
Environmental ethics (N = 4)	1.47	0.29	For myself	3.12	0.28	For society	-28.238	49	.000*

Note. * Statistically significance .05.

Table 2. Comparative results of knowledge, attitude and environmental ethics about rivers management in the Northeast of students of different gender using One-Way ANOVA.

List	Gender	Number	One-Way ANOVA			
			$\bar{x}$	S.D.	F	Sig.
Knowledge about rivers management in the Northeast	male female	16 34	28.88 30.38	2.42 2.02	5.35	.025*
Attitude about rivers management in the Northeast	male female	16 34	3.26 3.77	0.28 0.22	47.08	.000*
Environmental ethics about rivers management in the Northeast	male female	16 34	2.75 3.30	0.11 0.11	259.60	.000*

Note. * Statistically significance .05.

4. Discussion

(1) Learning outcomes of environmental education learning plans for enhancing rivers management in the Northeast of Thailand using community-based learning.

Environmental education learning plans for enhancing rivers management in the northeast of Thailand using community-based learning, it was found that the efficiency of the process (E_1/E_2) was 81.08/85.43, which set the 80/80 criterion, showed that participating in learning activities was more efficient. Results of learning for learners to gain knowledge understanding of river management in the Northeast resulting in learning achievement in a better direction. The organization of learning activities using the community is learning base emphasizes on the learners to learn by participating with the community in doing activities related to existing problems in the area by taking real action in the community and truly in line with the needs of the community and carry out activities with the participation of the community according to the learning activities in the learning plans. Community-based learning management is strategy or learning management model that integrates curriculum content with community-based operations. They learn from real-life situations in the community under the participation of teachers, learners and people in the community and community organizations in addition to learning in the classroom. The critical process of learning uses critical reflection. This will help build knowledge of the content according to the course and better understand the community. It aims to promote learning and develop learners in a wide range of knowledge and skills. Which are essential skills in the 21st century with morals and ethics, ethics, desirable attitude, recognizing responsibility as part of the community as well as to meet the real needs of the community. Community and learners will get benefit together, both by achieving the course objectives and by meeting the goals set by the community and create positive social change. This is strengthen community in a sustainable way (Rithikupt, 2018). And teaching and learning by using community based learning so that learners can learn from real-life situations and go into the community, participate in discussions with one another and working with others cross-disciplinary work. Everyone is involved in learning and exchanging knowledge (Chiangkul, 2012). This is consistent with the research of Phijitkamnerd, Ruangaram, Netwong, Thamjutha, and Umboon (2020) studied the research and community-based learning for social service research awareness in higher education. It was found that the community-based learning, that integrated research-based learning and community-based learning. Research and community-based learning is an alternative instructional for students in higher education to practice, conduct research for solving problems within the community. The students and community have collaborated to create a joint research project, to use the research results to be useful in the community and learners are aware of the social service research consists of 5 steps: 1) prepare to learn content from research, 2) learning strategies to use learning techniques with research process and use the problems based from the community, 3) conduct research, 4) reflections through experiences that affect emotions and feelings of research awareness, and 5) evaluate learning results. By this approach focus on the development of the affective domain allowing students to get to know the community through a research process that analyzes community needs that can help solve problems for

the community by applying knowledge in the classroom to apply. Students and communities benefit from the activities that are mutually beneficial. And Malasam, Gumjudpai, and Prabhong (2021) studied the development of enrichment curriculum to enhance public mind based on service learning and community based learning for undergraduate students, It was found that the curriculum consisted of ten components: 1) backgroundand significance, 2) basic concepts, 3) curriculum principles, 4) curriculum aims, 5) curriculum outcomes, 6) structural components of public mind, 7) curriculum structures, 8) learning activity management approach, 9) teaching and learning materials, and 10) learning measurement and evaluation. The results of the curriculum evaluation was found that the overall picture was appropriate at the highest level. And Binbai and Sae-iab (2021) studied the research and community based learning integrated model to enhance research skills of pre-service teachers, It was found that the integrated teaching and learning model using research and community based learning quality was at a high level. And Wongchantra, Wongchantra, Kaeongam, Ongon, Junkaew, Sookngam, and Praimee (2020) studied the development of environmental volunteer spirit for high school students, it was found that environmental volunteer leader training course as efficient as 93.78/86.01. And Pronyusri, Boonserm, and Junkaew (2021) studied the teaching environmental education using problem and focus group based learning for undergraduate students, It was found that the problem-based environmental studies lesson plan and group learning for undergraduate students was efficient 86.12/82.12. And Thinkhamchoet, Wongchantra, and Bunnaen (2021) studied the effects of environmental conservation school activities development using team work based learning (TWBL) for students of Mueng Roi-Et Municipality Schools, It was found that the school activity manual for environmental conservation was as effective as 87.31/85.81. And Udornpim and Wongchantra (2021) studied the effects of training course for environmental protection volunteer in schools to enhance environmental knowledge, ethics and volunteers found that the environmental protection volunteer training program in schools was an effectiveness index of 0.6983, indicating that the students had increased environmental awareness. The students progressively increased at 69.83%. And Phakeewai and Wongchantra (2020) studied the development of environmental recreation camp activities for youth in Roi-Et province of Thailand, it was found that the environmental recreation camp activities for youth in Roi-Et province was the effectiveness index at 0.6117. Therefore, it showed that the development of environmental education learning plans for enhancing rivers management in the northeast of Thailand using community-based learning were efficient and effective learning processes in the activities.

(2) The results of the study and comparison of knowledge, attitude and environmental ethics before and after learning about rivers management in the Northeast of Thailand using community-based learning showed that;

(a) The results of the study of knowledge about rivers management in the northeast revealed that before learning, the students' average score of overall knowledge was at low level and after learning, the students' average score of overall knowledge was at the highest level. When comparing the average scores of knowledge, it was found that after learning, the students had higher knowledge than before learning statistically significant

level. 05. It showed that the students had increased knowledge of river management in the northeast. Which is in line with the concept of Phuwiphadawat (2001) said the level of knowledge that people will be able to talk to each other. If there is enough knowledge and understanding of the subject to discuss anything with too little knowledge will not be able to talk to anyone. And at the same time unable to listen to that story have understood enough and it has been noted that sometimes, having too much knowledge on a subject may be said to others without understanding as well. This is because having more knowledge will have a huge effect on communication people who study a lot often use difficult words in conversation or talk only about profound things, because they think that others have similar knowledge base. Therefore, the sender must first analyze his receiver at what level and then try to deliver the message in such a way that the listener will be able to understand it very well. Therefore, the communication process will be effective in accordance with the intention. And which is in line with the concept of Wangpanich (1983) said that when a person receives various from learning, practice, training and that have been seen through the coordination of various touches will make known facts or details. The story will be a person's experience which will be accumulated and passed on through the generations until it becomes knowledge from training on promoting household waste management by means of lectures and demonstrations and having the trainees take action, this is a model that will make the trainees especially interested in training and can be applied in daily life, thus resulting in a good or increased average score. This is consistent with the research of Thongkhumchuenvivat (2010) studied the people in Bangkok's knowledge, attitude and biological agent used behavior for environmental development found that the participants had low scores on biochemical knowledge prior to participating in the activity development and after participating in the activity. The level of knowledge was at a moderate level. When comparing the mean scores before and after the activities. After the activity, those who participated in the activity had more knowledge than before the activity statistically significant level. 05. And Siriwatthanamichai and Kurukodt (2018) studied the development of organic farming promoting manual for agriculturists of Ban Nongtokpan, Tambon Nongtokpan, Amphoe Yang Talat, Kalasin province. It was found that after the training, the farmers who attended the training received more knowledge about chemical use in their fields than before the training, statistically significant level. 05. And Utthawang, Wongchantra, and Neungchalerm (2012) studied the multiple intelligences integrated learning of environmental education to promote knowledge, attitude and awareness about environmental conservation of students of Chiang Mai Rajabhat Universnity. It was found that the after learning, the students' knowledge of environmental conservation among the students with integrated multi-faculty learning was higher than before the normal students statistically significant level. 05. And Chanwirat, Wongchantra, and Bunnaen (2021) studied the effect of environmental education activities for the developing environment and occupational health in school. It was found that after the training, the students had higher average scores on environmental development and occupational health than before the training. And Ongon, Wongchantra, and Bunnaen (2021) studied the effect of integrated instructional activities

of environmental education by using community-based learning and active learning. It was found that after studying, the students had higher average scores on environmental knowledge than before studying.

(b) The results of the study of attitude about rivers management in the northeast was found that before learning, the students had the average score of the overall attitude at disagree level. Overall, after learning, the students had the average score of the overall attitude at the agree level. When comparing the average scores of attitude, it was found that after learning, the students had higher scores of attitude than before learning, statistically significant level. 05. It showed that the learning activities about rivers management in the northeast as a result, students have more attitude towards rivers management in the northeast. Which is in line with the concept of Somprayoon (2007) said that attitude is about the state of readiness of the mind, which reacts to various environments in both concrete and abstract ways. And which is in line with the concept of Wiratchawong (1999) said that the factor that drives attitude consists of learning that may be motivated what we have until causing a positive impression, which is the feeling of liking and the negative impression, the feeling of dislike this may be due to the acceptance of attitudes from others and the media is an inducement to practice it manifests itself in the form of observable behavior. And which is in line with the concept of Wongsawasdiwat (1993) said that attitude would be affected not locally because of their influence influencing equilibrium. It also depends on the feeling of happiness or unhappiness due to the tendency to maximize returns and minimize losses. This group theory has explained how to solve the problem of different emotional imbalances and predict the rankings of the methods that should be used the most simple methods to enter equilibrium. The importance of coherence between elements of attitude is concept and feeling. Whenever there is a discrepancy between the two elements above a certain degree, one of the elements must inevitably change or both components to lead to conformity. And believe that changing one element will lead to changing another element of attitude. In addition, changing attitudes through the process of stimulating communication methods. Most of them focus on changing the element of knowledge, that is providing new information. This leads to a change in sentimental composition and a change in attitude. This is consistent with the research of Charoensuk (2016) studied the effectiveness of safety training program in pesticides utilization of farmer in Donchedi district, Suphanburi province. It was found that after the pesticide safety training program, the sample had higher mean scores of attitude towards pesticide use safety than before the pesticide safety training program. And Punsiri and Salee (2016) studied the development of ASEAN natural resources and environment training manual: Federation of Malaysia. It was found that after the training, the students had higher mean scores of attitude towards the environment than before the training, statistically significant level. 05. And Kraisomsart and Klaimongkol (2015) studied the development of citizenship characteristics respecting to the differences of sixth grade students by using project based learning. It was found that after school, the students had the mean score of attitude towards respect for differences among higher than before school, statistically significant level. 05. And Thinkamchoet and Wongchantra (2018) studied the

development of camp on natural resources and environmental conservation in the ASEAN for youths in Roi-et province. It was found that after joining the camp, the youths had more attitude towards conservation of natural resources and the ASEAN environment than before joining the camp, statistically significant level .05.

(c) The results of the study of environmental ethics about rivers management in the northeast of Thailand was found that before learning, the students had an average score of overall environmental ethics at for myself level, and after learning, the students had an average score of overall environmental ethics at for society level. When comparing the average scores of environmental ethics about rivers management in the northeast, it was found that after learning, the students had an average score of environmental ethics higher than before learning, statistically significant level .05. It showed that management learning about rivers management in the northeast, as a result, students have more environmental ethics. Which is in line with the concept of Chunkao (2004) said that the meaning of environmental ethics refers to the principle that one should behave towards the environment. Which has resulted in the existence of the environment in ecological equilibrium and contributing to all things that rely on the environment to survive without losing the relationship between people and the environment. Environmental ethics cannot be separated from the ethics of life, society and community. The potential in itself is the main factor in the integration of life, community, society and the environment for sustainable existence. Environmental ethics refers to the principles of environmental practice for human beings that uphold integrity, righteousness, morality and kindness that should be treated with the environment which will affect life and human beings together. The way humans treat the environment consists of the foundation of moral beliefs. And which is in line with the concept of Seehamphai (2007) has given the meaning that ethics refers to the principles of behavior that train behavior and instilling character traits for those who behave in the form and morals and values of that ethics point out the prosperity in life systematically according to the culture of a person with good mental characteristics. And which is in line with the concept of Prawanpruek (2005) has given the meaning that ethics has two implications: the first is ethics is the principle and reason to consider about the judicial action and the decision which is meaning common people traditionally understood. In the second sense, ethics is behavior or action. It's a decision judgment is an ethical virtue based on actions and attitudes that can be noticed which this meaning is a new concept. This is consistent with the research of Ritsumdaeng, Boonserm, and Sookngam (2021) studied environmental education teaching using case study and games based learning for undergraduate students. It was found that after learning, the students' average score of environmental ethics was higher than before learning statistically significant level. 05. And Praimee and Boonserm (2021) studied learning activities on waste and sewage management by using question and problems-based learning. It was found that after learning, the students had average scores on environmental ethics about waste and waste management higher than before learning at the statistically significant level. 05. And Junkaew, Wongchantra, and Bunnaen (2021) studied environmental education learning activities using area-based learning in Khok Hin Lad community forest in Maha Sarakham, Thailand. It was found that after the

activities, the students had higher environmental ethics than before the activities.

(3) The results of the study and comparison of knowledge, attitude and environmental ethics of students with different gender, it was found that:

(a) There was statistically significant different of score of knowledge about rivers management in the northeast of students with different gender. This was a result of male and female students participating in rivers management learning activities. There is different learning make students have knowledge and ability to learn effectively. As a result, students who have different purposes, there is difference in knowledge about rivers management in the northeast. Which is in line with the concept of Suwan (1977) has explained that knowledge is the primary behavior in which the learner develops memory and understanding. It may be recognizing or by seeing, hearing, remembering. Knowledge in this class includes knowledge of definitions, meanings, facts, rules, structures and solutions. Understanding may be expressed in the form of "translation" skills, meaning the ability to write a description of something using their own words. And "meaning" expressed in the form of opinions and conclusions. This includes the ability to "predict" or anticipate what will happen. Which is in line with the concept of Sophakan (2007) has given the meaning of knowledge, meaning the perception of facts, events, details caused by observation experiential education both in the natural and social environment, basic knowledge or background of the individual that a person has memorized or collected and can be expressed in observable or measurable behavior. This is consistent with the research of Saenkhampha (2007) studied the comparison of scientific process skills grade 6, during the learning management by using a set of activities to practice skills in the process of learning science and learning management according to the teacher's manual of Teacher Professional Development System, it was found that the students of different genders are knowledgeable using a different set of process skills training activities. And Lerdwisuttipaiboon (1993) studied the knowledge, attitudes and practices concerning the environment of secondary school students in Bangkok Metropolis, it was found that the male and female students had difference in knowledge of the environment, natural resource conservation, and their impact on health at the statistically significant level. 05. And Sookngam, Wongchantra, and Bunnaen (2021) studied the effect of environmental education training course in soil, water and forest conservation on the concept of the King Rama IX of Thailand. It was found that the students with different genders had different knowledge about soil, water and forest conservation according to the King Rama IX with a statistically significant level. 05.

(b) There was statistically significant different of score of attitudes about rivers management in the northeast of students with different gender. This is a result of male students and female students with different analytical ideas, resulting in male and female students having different ideas and different opinions. Which is in line with the concept of Sothanasathien (2013) has said that attitude is an index of how the person thinks and feels about the people around the object or the environment and various situations. It based on beliefs that may influence future behavior. Attitude is therefore only readiness to respond to stimuli and a dimension of assessment. It showed that you like or dislike an

answer to a particular point which is considered in-person communication (Interpersonal Communication) that is the effect of exposure that will affect behavior further. Therefore, it can be concluded that attitude is an overlapping relationship between feelings and beliefs or the person's knowledge of the tendency to react in some way to the goal of that attitude. In summary, in this work, attitude is about the minds, feelings, thoughts and inclinations of a person towards information and exposure to acquired situation filtering. This can be both positive and negative attitudes resulting in behavior being expressed. Which is in line with the concept of Wongchantra (2012) discussed solutions to problems that occur with the environment. That is the path leading to sustainable solutions using environmental education to solve problems. Because environmental education is environmental knowledge transfer process for people to have a positive attitude towards the environment. This is consistent with the research of Polsiri and Anambutr (2018) studied the attitudes towards changes in scenic from Chao Phraya river front extension project: temple and historic monument area. It was found that the males and females have different attitudes towards changing scenery. And Jaitae and Boonyaprapa (2019) studied the attitude on river deterioration and quality of life of people in Li watershed, Lumphun province. It was found that the male and female people had different attitudes towards the deterioration of the river and the quality of life of the people of the Li Basin. And Phonraj (2013) studied the people's participation in Kut Ting wetland conservation, Bungkan province. It was found that the sample with different gender had different attitudes towards work performance. And Wongphimsorn and Wongchantra (2021) studied training course development of green university management in campus, energy, waste, water, transportation and education. It was found that the students with different gender had different attitude towards green university management in terms of energy, waste, water, transportation and education.

(c) There was statistically significant different of score of environmental ethics of students with different gender. This is the result of different decisions or have been intervened with different environmental ethics as a result, students with different gender had different environmental ethics. Which is in line with the concept of Panngern (2010) said that environmental ethics is important to behavior in conservation of natural resources and the environment will be useful and guidelines for using it as a basis for solving environmental ethics problems. And which is in line with the concept of Chandrathakhantra and Sasithanakornkaew (2013) said that ethics is building trust, which comes from adhering to ethical practices that uphold justice and fairness and the versatility of acting in accordance with the sanctions of the free and responsible mass media. To reflect the idea of a wide range of opinions and facts of every aspect of the event that is fair to all parties involved without alienation that overlaps the correctness and fairness and hidden agendas that conflict with interests which is common to the moral principles and social values. This is consistent with the research of Chairunrueng (2009) studied the opinion concerning morality of students at Rajamangala University of Technology Thanyaburi. It was found that the students with different genders had statistically significantly different opinion on ethics at the statistically significant level. 05. And Chu Yingyang, Mangkhang, and Maneekul (2019) studied the literacy and

environmentally ethical behaviors of secondary school students in China. It was found that the male and female students had different environmental ethical behaviors statistically significant level. 05. And Promkot (2012) studied the moral behavior of Loei Rajabhat University students. It was found that students of Loei Rajabhat University had different ethical behavior statistically significant level .05.

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