Environmental Literacy Education of Studentsin Highland Rural Area, Northern, Thailand

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Abstract: Environmental literacy education plays a vital part in building a future generation capable of dealing with global issues in both developed and developing countries. Environmental issues are one among them. The goal of this study was to look at knowledge, cognitive ability, and attitude skill. We employed a survey approach with three components to collect data, and the study's respondents were Highland Rural students. The results demonstrated a moderate level of environmental literacy in terms of attitudes (mean=3.57, SD.=1.03), lack of environmental knowledge, and high awareness of global problems. Results can be making-decision for environmental education in school and reflections on curriculum.

Keywords: Environmental literacy, Environmental education, Northern Thailand

1. Introduction

Environmental issues are a major concern in today's world, affecting both industrialized and developing countries(United Nations, 2018). Environmental issues are having an increasing impact on social, economic, political, technological, and health issues (Naipinit et al., 2014; UNESCO, 2016). Thailand has one of Asia's most serious environmental problems. The environmental literacy is goals to protect environment (Archie et al., 2005) and surprisingly important for population to change my life-style and findways to preparation people involve them in environmental education and environmental literacy.

The goals of education and environmental literacy, or EL, was to develop people of awareness and concerned about the environment and its associated issues, and, according to the Tbilisi conference, to promote environmentally literate citizens who undertake environmental projects (UNESCO, 1980; Hungerford and Peyton, 1976). Indeed, environmental education aims to build an environmentally literate populace, and environmental literacy is a necessary condition for maintaining and improving environmental quality. Many researchers obviously reported that the environmental literacy focus on graduated and undergraduate students such as(Chen et al., 2020b)showed positive relation between environment education, literacy, and learning outcome. (Curdt-Christiansen, 2021)examines to reflection children's awareness and environmental issue,(López-Alcarria et al., 2021; Negev et al., 2008; Ramdas & Mohamed, 2014; Shobeiri et al., 2013; Spínola, 2015; Srbinovski et al., 2010; Tuncer et al., 2009; Yingyang et al., 2019; Zhu, 2015)Therefore,many researchers (Goldman et al., 2006; Goulgouti et al., 2019; Pe'er et al., 2007; Yavetz et al., 2009) investigate of environmental literacy in teachers (Golman, 2006), Greece (Goulgouti et al., 2019), assess of teacher's environmental literacy effects to student's environmental (Goldman et al., 2006).Moreover, this research found in-term of some cases of study investigated to assess environmental literacyby of senior student (López-Alcarria et al., 2021; Naipinit et al., 2014; Watcharathanrongkul, 2009). This study focused on environmental literacy of highland rural students.

This paper we adopt the definition of environmental literacy used by concept of environmental literacy indicators (Coyle, 2005), including (Owusu et al., 2017; Petkou et al., 2021; Ramdas & Mohamed, 2014)for the comprehensive performance measurement of environmental literacy while considering all relevant stakeholder. An attitudes, knowledge, and awareness were key in formation in EL. To achieve the more realistic analysis, this study was to investigateenvironmental literacy in Highland rural area, Thailand.

2. Literature reviews

In the twenty-first century, the environment has become increasingly important to humans around the world, and many countries desire to safeguard natural resources such as eco-systems, biodiversity, and the environment in the short and long term of knowledge (Sulthon, 2016).

UNESCO (1975) defined environmental literacy as "awareness and helpful eco-friendly spanning knowledge, skill, satisfaction, and association with personal to personal" in the Belgrade Chapter.

In the Tbilisi Declaration, UNESCO (1977) outlined five dimension of objectives and aims for environmental education: knowledge, awareness,attitude, skills, and action. Furthermore, Dinsinger and Roth (1992) explained environmental perception based on a relationship between natural and societal systems that included four dimensions: (1) the fundamentals of eco-system and societal systems, (2) problems issues related to social, economic, political, technological, cultural, history, and ethics, and (3) environmental perception based on a relationship between natural and societal systems. (3) Personal environmental perceptions are crucial in resolving a difficult situation. (4) Applying critical thinking and problem-solving skills to best practices

In terms of environmental literacy (EL) perceptions of high school students in Florida, (Bogan & Kromrey, 1996)identified five dimensions: (1) knowledge ecology, (2) Attitudinally Predisposed to the environment, (3) responsible environmental behavior, (4) participate in responsible environmental behaviors, and (5) knowing political action strategies.Related with (Ramdas & Mohamed, 2014) found that the knowledge is a component of environmental literacy.

One of the four factors that affect human life is the environment. Furthermore, pollution is the most severe form of contamination, including water pollution, soil pollution, air pollution, and natural pollution. As a result, scientific knowledge was critical for human well-being and environmental awareness. Knowledge management skill, awareness skill, and attitude or cognitive skill are three categories of environmental literacy (Kuruppuarachchi et al., 2021; Srbinovski et al., 2010; UNESCO, 1975). Environmental literacy, according to other researchers, is defined as "learning and society skills for increasing human well-being" (WHO, 1998). Additionally, in 1998, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) defined operations and management from an environmental standpoint. Its goal is a sustainable development goals (SDGs) those SDGs emphasize inclusive, gender equality, quality education, and environmental education. Furthermore, other researchers have investigated environmental literacy, such as (Agfar et al., 2018), who found that one's educational background has a direct impact on one's environmental literacy, that students lack awareness and problem-solving of environmental issues such as keeping the environment clean, recycling waste, and so on, all of which are part of literacy (Abdillah et al., 2021). (Watcharathanrongkul, 2009) to create and survey a climate change effect question for high school students, which was then compared to their level. The exploratory factor analysis resulted in two groups: group 1 has 18 items for waste reduction and energy conservation, whereas group 2 has 10 items for environmental preservation that were not significant.

According to (Boonin et al., 2015) to investigate Construction of Awareness on Global Warming Scale for 1-3 High School Students under Uthai Thani Primary Educational Service Area Office 1. A result showed the content validity of the awareness on global scale was in the range of 0.60-1.00, and all items had a discrimination index between 0.23-0.64. Then, on a worldwide scale, local norms awareness for 1-3 high school students revealed a normalized T-score ranging from T5 to T74, indicating that the manual was adequate and convenient for usability and easy to comprehend composition. (Mihanpour et al., 2018) discovered a statistically significant association between environmental literacy and age, status, and education level. While, (Shobeiri et al., 2013) found that the association between energy conservation, environmental preservation, and energy literacy is statistically significant. According to Owusu (2017), environmental literacy among these pupils was relatively strong in all cases, and respondents were very familiar with CSR terms, as well as waste management, water supply, and global warming (Owusu et al., 2017). According to Tuncer et al. (2009) and Hemmati&Shibeiri(2016), Turkey's efforts to reinvigorate its education curriculum are promising. Furthermore, environmental literacy promoters and awareness were positively associated to teacher environmental literacy backgrounds (Hemmati & Shobeiri, 2016; Tuncer et al., 2009).

3. Objective of this study

Toinvestigate of students' environmental literacy skills of students inHighland Rural Area.

4. Methods

4.1 Study area

The study area, A Centre of InsriArsar School located in Chiang Kham district, Phayao province, Northern Thailand. It Highland rural area near Myanmar and LAOs PRD. It extends for 101 km along from Phayao urban and 780 km from Bangkok showed in **Figure 1.**

Figure 1. The located of A Centre of InsriArsar School in Phayao Highland Rural.

4.2 Participants

Students from InsriArsar School in Phayao, Thailand, took part in the study. According to InsriArsar School's database of student information. A total of 26 students from Pathomsuksa were included in the sample. In terms of research inclusion requirements. We chose students from Pathomsuksa 1-6 since they all had better cognitive and reading abilities than the seniors.

4.3 Design of the study

A structured questionnaires design(Cohen et al., 2002; Punch & Oancea, 2014)is based on the conceptual framework of environmental literacy indicators(Coyle, 2005). And adapted from some appropriate criteria for the study are included three parts of environmental literacy as follow.

1. Knowledge were seven questions adapted from environmental literacy context of study; the answer was correctly answer.
2. Attitudes indicatorsincluded seven questions were assessment with question ranked based on five-level Likert scale (Munshi, 2014)
3. Awareness(cognitive)were a total three question in the awareness categories. Two are multiple choice questions. Awareness questions in various survey instruments in the literature, are established as multiple choice questions to allow for case of computation and analysis.

4.4 Data collectionand analysis

The level of environmental literacy (attitude) of the students in the centre is the subject of this descriptive-analytical study. The data collection tool was a set of three surveys created by the researcher: 1- an awareness of environmental literacy questionnaires, 2-environmental knowledge questionnaires, and 3-environmental attitude questionnaires.

Descriptive statistic the mean and standard deviation of the test were used to determine the distributions of the participant's background variables and environmental literacy in knowledge, awareness, and attitudes dimension (Arbuthnot, 1977).

5. Results and Discussion

We received 26 completed survey. This study was to the results including three dimension of Environmental literacy indicators.

Table1 Knowledge of environmental literacy indicator

Questions	**Alternatives Knowledge**	***Answers***				
		1	**2**	**3**	**4**	**5**
Q 1	What a sources impacts of water quality, river and oceans?	8 (30.79%)	10 (38.46 %)	6 (23.07%)	1 (3.84%)	1 (3.84%)
Q 2	The population of the earth is now approximately	1 (3.84%)	7 (26.93%)	6 (23.07%)	3 (11.54%)	9 (34.62%)

Q 3	What is the most common cause for animalspecies and plant to become extinct?	8 (30.79%)	9 (34.62%)	6 (23.07%)	1 (3.84%)	2 (7.68%)
Q 4	Most of the power-energy that people use worldwide come from?	10 (38.46%)	4 (15.39%)	7 (26.93%)	2 (7.68%)	3 (11.54%)
Q 5	What is not to be renewable energy resource	1 (3.84%)	18 (69.26%)	2 (7.68%)	3 (11.54%)	2 (7.68%)
Q 6	What is Sustainable Agriculture?	16 (61.54%)	-	6 (23.07%)	4 (15.39%)	-
Q 7	Many people around the world suffer from hunger. With……	7 (26.93%)	1 (3.84%)	2 (7.68%)	12 (46.16%)	4 (15.39%)

Table 1 from table one shows knowledge items. a total of seven questions were in the code of the knowledge sections of the survey. table one displays the number of respondents, percentage of questions answered right, as well as call relations among the 7 questions. A question one (Q1) the respondent selected trash washed into the water from polluted shorelines "mostly" was 38.64 % (10 respondents) related with(Alimah et al., 2016; Chen et al., 2020b), waste disposal from the cities, and waste disposal from industries and factories (30.79%, and 23.07%). While an answer to Question two (Q2) shows the respondent's lack of basic knowledge of the population on the earth. They are don't know in population approximately (34.62%). Question 3 the respondents were correct with habitat loss and fragmentation, predation by other species, and temperature change (34.62 %, 30.79%, and 23.07%) respectively. In others of Question 4, the answer from the respondents mostly was fossil fuels (38.46%), hydropower (26.93%), wind power (15.39%), respectively. Question 5 the respondents selected in answer 2 was freshwater, not renewable energy (69.26%), and non-renewable energy is trees (11.54%). Furthermore, Question 6,7 show a percent of sustainability and a suffer from the hunger of people in the world. Most respondents were known about a definition of sustainable agriculture aims to "Produce enough food for sustainable human society in 61.54% from 16 respondents. In terms of Question 7, many people suffering from hunger was "Highest" 46.16% from 12 respondents. As well as there is not enough food production to fulfil the global demand, food trade is in the hand of multinational exportation companies, and food is not equally distributed among, between, and within nations.

Table2 Awarenessof environmental literacy: How do you feelrelated environmental problems and issues in general? (N=26)

Alternatives	**Frequency (number)**	**Percentage (%)**
A little	2	7.69
A reasonable amount/moderate	13	50.00
High	6	23.08
Very Highest	5	19.23
Summary	**26**	**100**

table two awareness's itemsa questionwith awareness sections of this survey and selected the only one answer,most of respondents were feeling in EL had either"a reasonable amount/moderate"50 % from 13 respondents, while that they knew problems issue "High"(23.08 %out of 6 respondents), the students indicated that "very high"5 respondents (19.23%),and a considered small number of respondents claimed to know "little"was 7.69% about of environmental problems, respectively.

Figure 2 Learning of Environmental literacy in the area.

A B

Figure 2the implementation of laerning of environmrntal literacy, (A)EL throuhg problem based learning, (B) students make a work sheets of EL.

We used a questionnaire and environment medias for problem-basedlearning by teacher in this area. Moreover, we used activity such as learning across YouTube, Media, Flash card, and work sheets for all students.

A researcher also what primary sources of environmental information and self-evaluated the general level of environmental awarenesswere used by respondents. Results show that Television (TV) is the source of environmental information most useful (88.64 % of the students) with (McClaren, 2019).Radio (76.92 %). YouTube and Other (waste pickup activity) are next (61.54%). And books, friends/relations,and classroom (42.31%, 83.46%, and 34.62%, respectively).Thesources in the list (Table 3).

Table3 Awareness: self-assessment of sampled InsriArsar Center students about the general level of environmental knowledge.

Alternatives	**Frequency**	**Percentage**
Television	23	88.64
Radio	20	76.92
YouTube	16	61.54
Books	11	42.31
Classroom	9	34.62
Friends/relations	10	38.46
Other: waste pickup activity	16	61.54

Figure3 Percentage of GLOBAL Environmental issue**.**

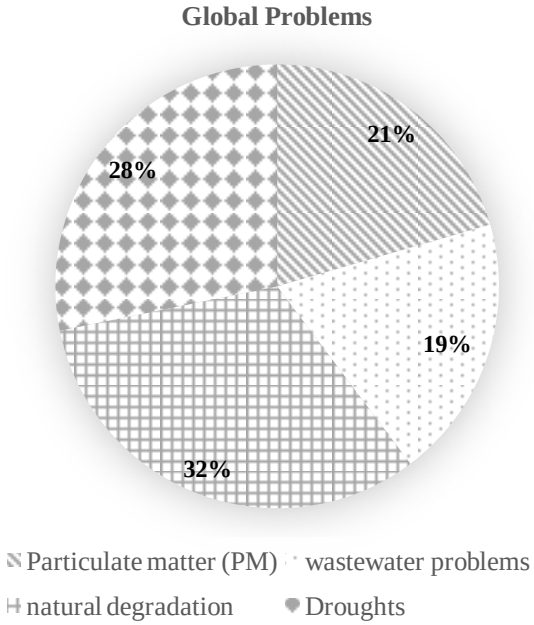

Figure 3 represents Global problems in the study show percentage of issues is mostly of natural degradation (32 %), Drought's problem was 28%. While Particulate matter (PM) is 21 % and lastly wastewater problem 19 %, respectively. Key informants were the highest concern of environmental issues is natural degradation.

Table 4. Attitudes of environmental literacy indicator (N=26)

No	Alternatives of Attitudes	*Mean*	*Standard Deviation*	*Satisfaction level*
1	All of life on Earth has the right to exist for no required reasons, and value to humans.	3.58	0.95	Moderate
2	We willto protection an animal in the my space only.	3.31	0.93	Moderate
3	A lot of environmental activity over exaggerate leads to others disaster such as particulate matter (PM)	3.73	0.96	Moderate
4	I do not change of my life style, and I'll to protect our environmental.	3.73	1.22	Moderate
5	Environmental education is important to ELO curriculum.	3.88	0.91	Moderate
6	We don't worry about the future of our environment because, Nowadays, it advancing new technology for environmental issues.	3.54	0.99	Moderate
7	Global warming is huge a scare tactic by environmentalists.	3.19	1.23	Moderate
Average		**3.57**	**1.03**	**Moderate**

Table 4 which environmental literacy attitude was assess with seven questions based on rank of five-point Likert scale. All most the questions were positive. The average of environmental literacy attitudes that they have a 'moderate' (M=3.57, SD = 1.03), (a maximum of 5 points on Likert-type scale).Similar with (Liang et al., 2018) found the environmental attitudes in Taiwan was moderate level and also indicated no significant between attitudes and knowledge or behavior and knowledge. Question 2 show the average of we will to protect plant and animals in my land space was 'moderate' level. Related with (Clayton et al., 2019) found that the younger child in china were almost positive about nature and the need to protect nature. Similar studies have managed among school children across different part of the world likely Israel (Negev et al., 2008), Korea (Chu et al., 2007), Indonesia(Suryawati et al., 2020), Taiwan (Chen et al., 2020a). Question 5, "environmental education is important to ELO curriculum," elicited a parallel moderate level score (M=3.88, SD. 0.91), Whereas Question 3,4 "A lot of environmental activity over exaggerate leads to others disaster such as particulate matter (PM)," "I do not change of my life style, and I'll to protect our environmental," were moderate level (3.71, SD = 0.96, 1.22), respectively. However, Question 6 found that the respondents was no worry about future environmental, because we believe

new technology for environmental management issue (M= 3.54, SD = 0.99).Question 7 Global warming is huge a scare tactic by environmentalists was 'moderate level' (M=3.19, SD=1.23) relation with (Owusu et al., 2017) found that the most respondents were familiar with CSR term in. a highest average level whilst solid waste management, global warming, renew and non-renewable natural and water uses.

6. Conclusion

To investigate environmental literacy (EL) from students in a highland rural area (N=26) regarding components of environmental literacy and environmental education including three dimensions, knowledge, awareness, and attitudes. The environmental literacy of students can be improved through knowledge, basic knowledge population around the world. In terms of awareness, most students get moderate in environmental problems and issues. While the general source on environmental literacy in the area was television. Furthermore, the attitudes of environmental literacy are moderate. Thus, it suggests to integrated skills in developing environmental education and literacy will be better on education practice and curriculum.

7. Recommendation

The study focused on Knowledge, attitudes, and awareness of highland rural students. this result shows just only one of the questionnaires was adopted and implemented in the highland area. So, if future research should be compared the environmental literacy (knowledge, attitudes, and awareness) with rural students and urban students for making-decision and planed to the ELO curriculum.

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