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Investigating Environmentally Responsible and Sustainable Development of Pre-service Teachers

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Abstract

This study aims to investigate environmentally responsible and sustainable development of 56 pre-service teachers which relevant to framework of sustainable development goals. The qualitative data were collected and analyzed by summarizing general perspectives. The 9 concepts were found and reported. The ways to sustain environments and education students to reach sustainable development can be done by Reduce, reuse, recycle; Conserve water; Save energy; Sustainable transportation; Grow trees and keep open areas green; Waste management; Support eco-friendly products; Reduce carbon footprint; and Conserve biodiversity. These frameworks and perspectives should be incorporated in education and classroom in action.

Keywords: environmentally friendly, perspectives, pre-service teacher, sustainable development

1. Introduction

Education for Sustainable Development, often known as Education for Sustainable Development (ESD), is an essential part of the 2030 Agenda for Sustainable Development. It is considered a driver for the accomplishment of all 17 Sustainable Development Goals (SDGs), with its goals being one of the objectives of the Sustainable Development Goal (SDG) on education (SDG 4.7). The Education 2030 Sustainable Development Agenda was agreed upon by the leaders of the world in 2015. This agenda lays out a methodical plan to ensure that education is available to all people and serves as the basis for both sustainable development and global peace.

Education is one of the most important aspects of the agenda for international development, and as we had anticipated, the fourth objective on education is far more ambitious than its predecessor. In principle, the Goal 4 Targets for Quality Education intend to enhance education by providing better access and equality for learners of all ages, as well as by enhancing learning spaces to make them safer and more comfortable and by increasing the number of competent instructors. Through collaborations, policy advice, capacity building, monitoring, and advocacy using the Education 2030 Framework for Action as a roadmap, UNESCO coordinates the efforts of the international community to fulfill the education-related objectives of Sustainable Development Goal 4.

Goal 4 goes even further and, via policy level commitments, emphasizes the relevance of Education in emergencies and the necessity to meet the educational needs of children who are living through a war or disaster. This is necessary in order to achieve the goal. Target seeks to provide equitable access to all levels of education and vocational training for the vulnerable, which includes individuals with disabilities, indigenous peoples, and children who are in precarious living conditions (Burmeister et al., 2012). In addition, the provision of secure classroom settings, which is to prevent attacks on educational institutions. Children living in places afflicted by crises are placed firmly on the SDG4 agenda at both the national and international levels (del Carmen Pegalajar-Palomino et al., 2021; Estellés & Fischman, 2021).

Education for Sustainable Development gives everyone the opportunity to make educated choices in favor of maintaining the integrity of the environment, maintaining economic viability, and maintaining a fair society for both the current generation and future generations (Kioupi & Voulvoulis, 2019; Seikkula-Leino et al., 2021). Its goal is to provide participants with the information, skills, attitudes, and values required to solve the problems posed by sustainable development (Bourn & Soysal, 2021; Imara & Altinay, 2021). Especially, education required effective curriculum and pedagogical approach which lead students learn to deal with environmentally changes in balances (Blewitt, 2018). Teachers are change agent and key element to make a linkage between

knowledge and understanding (Shirley et al., 2020).

The responsibility of training future generations to meet the problems posed by the present state of unsustainable growth falls on the shoulders of teachers. They also have an impact on the course (Hogan & O'Flaherty, 2021). This calls for the use of the engagement from a variety of fields, as well as the need that teachers have a complete and in-depth understanding of the current world situation. Therefore, it is very necessary to incorporate the sustainable development concepts into the curriculum that teachers receive (Karpudewan et al., 2009). They are essential for educators to acquire in order to acquire the skills required to implement holistic view and sustainable development into their classroom practice (Sinakou et al., 2019). The ways in which teachers see concepts have a substantial impact on the ways in which they instruct and prepare their students for the future (Bengtsson et al., 2018). Their worldviews serve as the foundation for their pedagogical approaches.

Because of its complexity and circumstances, sustainable development requires the collaboration of many stakeholders. Therefore, pre-teacher education is seen as an important factor in achieving high levels of success (Albareda-Tiana et al., 2018). Although there are many ways to incorporate sustainable practices into teacher education, it is important to remember that not all learning styles support growth. In order to transform individual and social security skills, there must be a holistic education process that includes knowledge, thoughts, and behaviors in balance.

When they provide a basis for people to develop their own practices and set more or less goals for change in response to environmental problems or environmental crises (Leicht et al., 2018; Lee and Louis, 2019). Similarly, the concepts of sustainability and sustainability in education often diverge views on the almost unexpected emergence of the connection between the environment and business and the social, ecological, and social good problem. Considering all this, it seems necessary to determine teachers' pre-service understanding of stability and integration in order to develop a training program that expresses the difficulty of changing ideas from simple and inconsistent to complex and advanced. . scene. This was done to clarify pre-service teachers' perspectives on the concepts of sustainability and inclusivity.

Researchers who focus on developing effective teachers for sustainability are effective in teacher education programs. This project aimed to survey prospective teachers who were new to sustainability studies and were already taking relevant courses. Therefore, her background and experience as a science teacher shaped her thinking about the environment, sustainability, environmental education, and sustainability education. He is especially an environmental teacher. This helps explain why the survey focused on the ecological and environmental perspective rather than seeking a more defined definition of sustainability as others in the industry have done. During the study, participating universities actively reviewed their teacher preparation programs to prioritize sustainability. This is based on the continuous improvement of sustainability, which is a priority for many issues.

2. Method

2.1 Participants

Fifty six pre-service science teachers participated in this research, third-year of program of study. The participants were chosen among those who were enrolled in the Bachelor of Education (General Sciences) course at Mahasarakham University. They enrolled the course Environmental Science and learn through the concept of environmental science and do a project to deal with community service. A group of students classified by purposive sampling between 4-5 students.

2.2 Research Instrument

An anonymous questionnaire was used to survey the participants in this study so that researchers could get a more in-depth grasp of the knowledge and comprehension that pre-service teachers have about education sustainable development for the purpose of teaching about sustainability. The question is left open as to how to combat the effects of global warming. The pre-service teachers have the freedom to voice their opinions on this matter and the potential solutions to the problem of global warming. In addition to this, students are able to produce some suggestions for their classroom as well as their learning design.

2.3 Data Collection and Analysis

The primary researcher gave a brief presentation to the pre-service teachers as the first step in the process of participant recruiting for this study. The objectives of the study as well as the scope of the research were outlined for the students, and they were given the opportunity to take part. The pupils were also given the option to raise questions that would help to explain the material. Those individuals who had shown interest in taking part in the study were sent an informative letter as well as a questionnaire. The letter providing information made it quite

clear that participation was entirely optional. Those students who were interested in taking part in the study filled out the questionnaire and submitted it using the Google form after the lesson was over.

3. Result

The environment is now concerned all sectors, education required students to have understanding and awareness about environmental protection and sustainable development. Due to the advancement of technology and situations that are essential for life, the environment is the foundation upon which our existence is built. There has been a rising understanding of the need to preserve and protect our environment in order to guarantee a sustainable environment and social development in the future. This study investigates the perspectives and viewpoints of pre-service teachers in relation to the significance of preserving our natural resources through conservation efforts.

3.1 Reduce, Reuse, Recycle

Reducing consumption can be defined as using resources efficiently and avoiding unnecessary purchases. People should be careful to use resources wisely and avoid unnecessary purchases. This idea represents a shift in psychology that allows students to rethink their purchasing habits and make more rational choices. It challenges the culture of materialism and wealth, encouraging them to live more and waste less.

Reusing things can be defined as reusing things as much as possible instead of throwing them away. Using this idea as a guide, you can find creative and clever ways to recycle things that would otherwise go to waste. Reducing waste and saving valuable resources are two benefits of people extending the life of products through recycling. This approach promotes health while reducing the environmental impacts associated with production and waste. A simple step towards achieving a circular economy is to embrace the idea of reusing products, using products in a way that can be used effectively in a circular economy, and at the same time reducing the impact on the environment.

Recycle paper, plastic, glass, and other materials and metals. Reducing the amount of materials thrown into landfills is an incentive for recycling, which requires the collection and processing of products. When it comes to trash management and protecting the environment, recycling is an essential component. It helps keep pollution levels down, preserves resources, and encourages a circular economy that makes full use of materials. Recycling is a concrete way to show that you care about living sustainably.

3.2 Conserve Water

Saving water requires many strategies, and finding and repairing the pipe as quickly as possible is an important part of our commitment. In addition to being effective in preventing wastewater, quickly eliminating leaks is also an important step in keeping the water in the house clean. Another important aspect of water conservation is the installation of water-saving products and equipment. Examples of water-saving products include aerated faucets, low-flow toilets, and washing machines. In addition, a water-saving lifestyle should pay attention to the use of water in every aspect of daily life. Using a toothbrush instead of a hose for external cleaning, turning off the taps when not in use, and using the dishwasher and washing machine only when they are fully loaded are examples of habits that reveal this knowledge.

3.3 Save Energy

Careful management of energy use is a good way to reduce our impact on the environment and increase its sustainability. It's a good idea to make energy-saving lights and appliances a part of people's lives. People can help save energy and support the sustainability of the environment by choosing this technology, which can reduce the amount of electricity required for certain activities.

It is equally important to encourage positive attitudes in the pursuit of a sustainable lifestyle. Encouraging the practice of leaving devices, lights, and sleep equipment away when not in use is an easy way to make a big impact. This action not only helps save energy but also leads to responsibility and awareness in the use of resources, which will lead to a concerted effort to reduce electricity consumption.

Also, one of the most important things you can do for the environment is to switch to renewable energy. An effective way to meet our energy needs while reducing the environmental impact associated with the production of fossil fuels is to switch to renewable energy sources such as solar or wind power. Sustainable and reliable electricity infrastructure can only be created by investing in these renewable energy resources and supporting their use.

3.4 Sustainable Transportation

People are trying to reduce the environmental impact of traditional transportation by using public transportation,

carpooling, or choosing to cycle instead of driving alone. Choosing these options has many benefits, including reducing greenhouse gas emissions, improving community connectivity, and reducing traffic congestion. One of the most important aspects of efficient transportation is the choice of electric or gasoline vehicles. Using this technology enables people to be part of the global transition to greener, more energy-efficient transportation. Taking this measure will help the automotive industry reduce its dependence on fossil fuels, thereby reducing emissions and protecting the environment.

As a simple but effective method of transportation, keeping the journey as short as possible is a good start. This approach not only promotes a better lifestyle and reduces dependence on driving but also improves physical health. As a result, people can pay attention to their surroundings and work to make their communities walkable.

3.5 Grow Trees and Keep Open Areas Green

An important part of protecting the environment is the effort to plant trees and protect and improve green areas. Trees absorb carbon dioxide and release oxygen during photosynthesis to help reduce greenhouse gases in the atmosphere. This process causes the wood to produce carbon monoxide. One way to prevent deforestation, reduce the effects of climate change, and promote biodiversity is to support community tree planting projects.

The development and protection of green areas are within the scope of community planting. Students can create a shared sense of environment by participating in the development of local ecosystems through community gardens. Sustainable production of fresh local vegetables, educational opportunities, and the potential for community connection are among the benefits of these measures, while also promoting visual awareness. The two main elements of environmentally friendly lifestyle choices (renewable energy, parks, and other open spaces) are interrelated. Everyone can play a role in the struggle for a more sustainable and strong future by doing their part in improving and protecting the green environment and transitioning to transportation.

3.6 Waste Management

A healthy and long-lasting ecosystem cannot be maintained without efficient waste management. An essential component of this system is the correct disposal of trash and dangerous items. Minimizing trash creation, recycling resources, and exploring creative methods for sustainable garbage handling are all part of responsible waste management, which goes beyond simple disposal. Promoting and engaging in responsible waste management entails lending support to efforts that place an emphasis on eco-friendly methods of trash disposal.

3.7 Support Eco-friendly Products

An effective and smart form of customer service is to support businesses that value sustainability. By purchasing from companies committed to protecting the environment, students can support fair trade practices and increase demand for quality products. Businesses that are committed to behaving ethically, using environmentally friendly production techniques, and working to reduce their overall environmental impact will be supported. Promoting environmentally friendly products also supports circular economy principles, which refer to the efficient use of resources and the creation of long-lasting and recyclable products.

People can also show their support for principles such as conservation, environmental responsibility, and preventing climate change by purchasing environmentally friendly products. Many companies will adopt good environmental practices to meet customers' needs because this sends a clear message to the business that safety is important to customers. One way to encourage consumers to support responsible consumption and hold businesses accountable for their environmental impact is to promote environmentally friendly products. Students can play an important role in creating a sustainable and conscious economy by making informed decisions about the products they purchase.

3.8 Reduce Carbon Footprint

One of the most important things students pay attention to the crisis of global warming is to reduce carbon emissions based on various kinds of methods. It is possible to reduce energy consumption and buy appliances and cars that use less energy. There is general agreement that the production of meat and other animal products has a greater impact on the environment. Some of the things that can be done to prevent impacts on the environment include planting trees and other carbon offsets. During photosynthesis, trees absorb carbon dioxide from the air and store it as carbon. Individuals can play an important role in carbon sequestration and environmental recovery by supporting tree planting programs or planting their own trees. Being an environmental advocate means actively working to promote culture, practices, and policies. This may include supporting legislation related to climate change, protecting natural resources, and reducing pollution.

An effective and smart form of consumerism is to promote businesses that benefit sustainability. By purchasing

from companies committed to protecting the environment, students can support fair trade practices and increase demand for quality products. Businesses that are committed to ethical behavior, use environmentally friendly production methods, and work to reduce their overall environmental impact will be encouraged.
Encouraging environmentally friendly product selection also encourages circular business models that emphasize the efficient use of resources and the creation of long-lasting and recyclable products.

Students can also show their support such as conservation, environmental responsibility, and opposition to climate change by purchasing environmentally friendly products. Many companies will adopt good environmental practices to meet customers' needs because this sends a clear message to the business that safety is important to customers. One way to encourage consumers to support responsible consumption and hold businesses accountable for their environmental impact is to promote environmentally friendly products. Students can play an important role in creating a sustainable and conscious economy by making informed decisions about the products they purchase.

3.9 Conserve Biodiversity

All life forms on earth, from ecosystems to animals and biodiversity, have value and should be protected. The basic principle of this work is the protection of natural ecosystems and habitats. Protecting important places that support many species of plants and animals is a collective effort that begins with people's vision and provides the benefits of diverse ecosystems. In order for these natural areas to develop without degradation, people must avoid damaging or destroying them.

One way to support biodiversity conservation is to carefully select projects that are considered sustainable. Another way to participate in biodiversity conservation is to advocate for and promote conservation and protected areas. It requires the positive cooperation of many parties, including those who live in relationship with nature, those who make purchasing decisions, and those who participate in the savings initiative. By making these habits a part of daily life.

Pre-service teachers play an important role in determining the environmental behavior and actions of future generations. The extent to which environmental awareness is included in the curriculum is directly proportional to the extent to which views on environmental problems are considered. This benefit requires integrating environmental learning into the curriculum, a topic that often comes up when talking to pre-service teachers. Many pre-service teachers talk about the value of experiential learning and outdoor learning in developing environmental knowledge. These problems must be solved for the learning environment to be successful.

They believe that this shows the combination of environmental values and social culture and shows their commitment to being environmentally friendly in their lives to show unity. They believe that schools have the ability to be agents of positive change in their communities and emphasize the importance of collaboration with parents, local groups, and businesses in programs aimed at educating people about the environment.

4. Discussion

Education is an important part of every success and plays an important role in determining the life path of a person and the fate of the entire world. On the other hand, the traditional education system is being questioned because it cannot solve complex problems such as environmental degradation and insecurity. However, the traditional education system does not make people responsible for the world and its resources because its main purpose is to transfer the knowledge and skills necessary for personal and professional development (Ghorbani et al., 2018; Ferreira et al., 2020; Figueiró et al., 2022). Based on this, the creation of good environmental practices has become necessary for the future (Firth and Smith, 2018; González and Skultety, 2018; García-González et al., 2020).

Eco-consciousness refers to a personal commitment to understanding and considering the wider impact of lifestyle choices and decisions on the environment. It requires a deep understanding of how our daily choices can lead to environmental damage or protection and how that choice impacts the world's health. This requires looking at how variables such as transportation, energy use, and food choices affect the environment. The entire stability of the order and the processes of its origin, production, and destruction must be investigated. Practicing mindfulness in daily life can manifest itself in making decisions to reduce our impact on the environment. This term means choosing actions that have the least impact on resources, waste, and the environment. Products that are sustainable and fair, reduce water and energy, and show conservation behavior may fall into this category. The main aim of making good environmental decisions is to promote a lifestyle that is kind to the planet, and this includes everything from the products you buy to the mode of transport.

The impact of personal education can spread to the public level when knowledge is shared with loved ones. To

raise awareness and promote integration, it is important to have an open discussion about environmental issues, exchange cultural knowledge, and share the importance of conservation (NUangchalerm et al., 2022; Nuangchalerm et al., 2024). People sharing what they know with each other increases environmental awareness by creating a domino effect when making conscious decisions. A good and active way to learn about environmental issues is to participate in environmental studies.

The practice of integrating sustainable development goals into education is the concept of "sustainable development education." Its mission is to promote education that is ecologically responsible, equitable, and accessible to all. A generation that is not only equipped with the knowledge and skills necessary for personal and professional success but also understands the importance of sustainability and its role in promoting it as the goal of sustainable educational development. This generation will be the product of sustainable development.

There are three fundamental foundations behind the sustainable development of education: environmental sustainability, social sustainability, and economic sustainability. The concept of environmental sustainability refers to increasing people's awareness of the importance of protecting the natural environment and reducing damages caused by human activities in the world. Economic sustainability emphasizes the importance of promoting economic growth while ensuring that it is sustainable and inclusive, while social relations seek to promote equality, fairness, and justice (Bürgener and Barth, 2018; Rieckmann, 2018).

Incorporating sustainability concepts into the curriculum is an important part of creating a positive learning environment. This can be done by integrating the concept of sustainability into existing subjects such as science, geography, and social studies. Additionally, schools will provide students with opportunities to take sustainability-focused courses (Brandt et al., 2021). These courses may include environmental studies or permaculture studies. In this way, students will be able to gain a deeper understanding of the complex issues surrounding safety and the environment and will be equipped with the necessary knowledge and skills to contribute to the development of sustainable practices (Roorda, 2020). This can be done by creating laws that have an impact on the environment, such as laws that reduce waste, save energy, and encourage the use of sustainable transportation. If schools promote a culture of sustainability and make it a priority, students will be more likely to adopt environmental friendliness in their daily lives (Manasia et al., 2019; Meesuk et al., 2020). This will help achieve the goal of sustainable development.

In summary, the development of sustainable education is absolutely necessary for the future, as it provides the knowledge and thinking skills that will make a significant contribution to sustainable development and save the world for the benefit of future generations. (Ferguson et al., 2021). If we integrate sustainability into our education and encourage environmentally friendly behavior in schools, we can create new technologies committed to sustainability and protecting the environment.

Promoting the work environment in schools is another important aspect of improving learning outcomes (Pieters et al., 2019; Nousheen et al., 2020). This can be done by creating more environmentally friendly laws, such as those that reduce waste, save energy, and encourage the use of sustainable transportation. If schools promote a culture of sustainability and make it a priority, students will be more likely to embrace environmental friendliness in their daily lives (Richter et al., 2021).

This will help achieve the goal of sustainable development. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) considers the inclusion of the learning environment in pre-service teacher education as the most important factor in developing the capacity of teachers. The content of the relevant documents reveals the importance of the learning environment in the teacher training system and reveals the importance of learning environment skills (Merritt et al., 2018; Mojekwu et al., 2021).

Principles are important, and students must develop observation and inquiry skills, as well as the ability to apply theoretical knowledge to real-life situations that have been tested in their own communities (Favier et al., 2021). According to Cantor et al. (2015), in order to find solutions to severe depression, a person must be able to interact with others. One way to achieve this is to create connections between education and local stakeholders and allow students to collaborate on projects they are working on. It is necessary to give children time to think about their possibilities, needs, and ideals when they leave childhood.

Hard problems. According to Munro et al. (2019), the ability to cope with bad situations requires the ability to think not only from one's own perspective but also from the perspective of others. As a direct result, young people's understanding of climate change is unclear and not alarming (Bosschaart, 2019).

In addition, children are not taught how to deal with uncertainty and may not know that they can be agents of change in their own lives. In order to complete the concept of competence and sustainability, it is important for

participants to use the knowledge and skills they acquired during the training week in their daily lives. That's why we give students the opportunity to work together in small groups to develop educational plans for local schools about climate change and water challenges. Setting learning goals, transferring knowledge to content that can be used in the classroom, and creating challenging exercises. There is a connection between this and the techniques used in teaching.

Authors contributions

Prasart Nuangchalerm is responsible for research, design, data collection, drafted manuscript, and edited. Titiworada Polyiem drafted manuscript, and edited. Veena Prachagool advice on research methods, drafted manuscript, and edited, all of which equally helped to improve and support this research.

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