Exploring school teachers' perceptions and experiences of environmental education in the Western Province in Sri Lanka

A qualitative study on teachers' meaning making of environmental education

Pannala Appuhamilage Chathuri Sumithra Pannala

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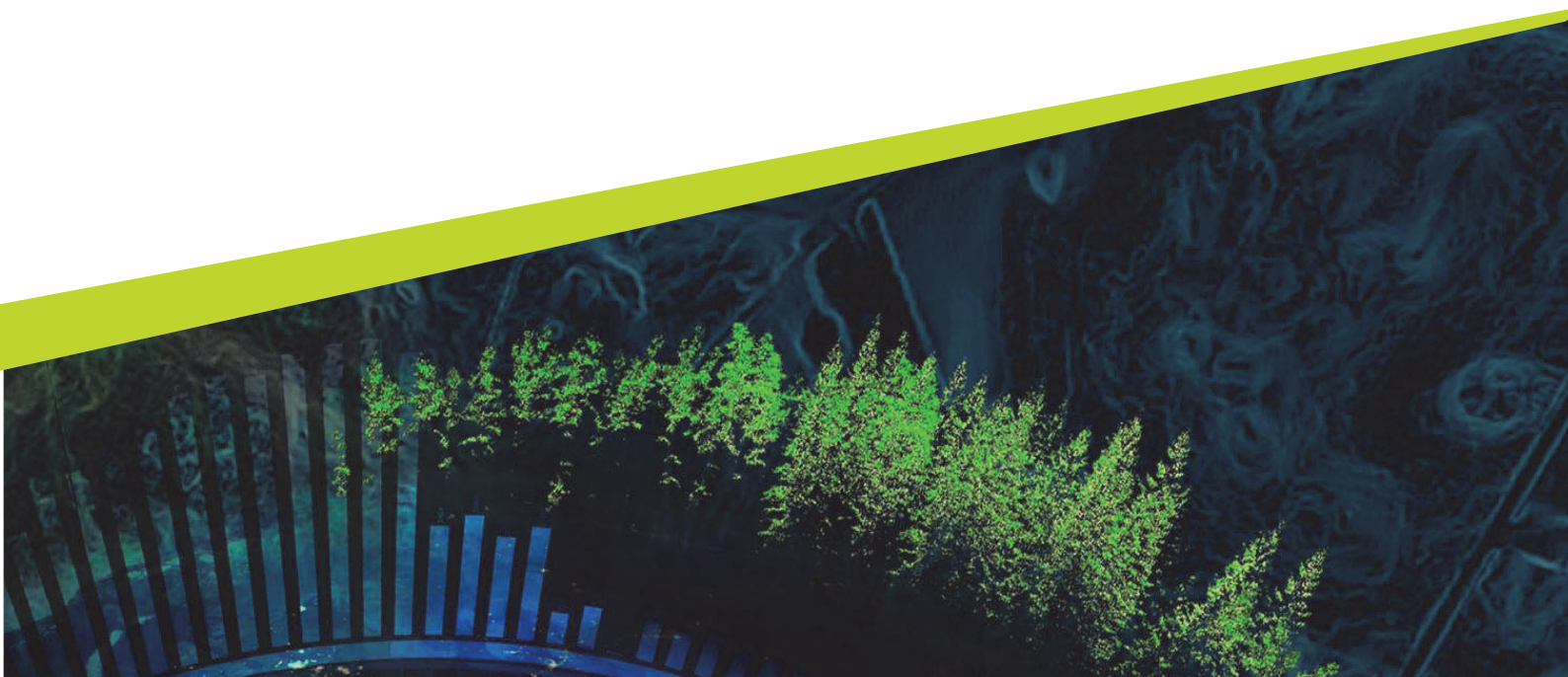

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Supervisor:	**Ann Grubbström, Swedish University of Agricultural Sciences, Department of Urban and Rural Development**
Examiner:	Sofie Joosse, Swedish University of Agricultural Sciences, Department of Urban and Rural Development

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Swedish University of Agricultural Sciences
Faculty of Natural Resources and Agricultural Sciences
Department of Urban and Rural Development
Division of Environmental Communication

Abstract

Environmental Education (EE) plays a vital role in addressing current environmental challenges. Attitudinal and behavioral changes regarding environmental concerns are seen as slow and inconsistent in Sri Lanka, though structured EE approaches have been implemented since 1984 in the Sri Lankan education system. Teachers are the primary actors involved in transferring environmental knowledge to the younger generation. Therefore, understanding the teachers' meaning making process of EE is important. This study seeks to explore the meaning making process and transformative learning experiences regarding EE among Sri Lankan school teachers through semi structured interviews with six teachers currently engaged in EE practices in schools in the Western Province of Sri Lanka.

Interview data were analyzed through thematic analysis, giving attention to the theoretical framework of Vygotsky's (1978) constructivist learning theory, and Jack Mezirow's (1978) transformative learning (TL) theory. The findings were elaborated under four themes. Firstly, experiential understanding of EE explained how meaning making is shaped through the teachers' educational and professional backgrounds, lived experiences and active participation in EE approaches including how different critical experiences led to perspective shifts. Secondly, collaboration with others described how training programs, interactions with students, parents, peer teachers and institutional actors shaped their understanding of EE. Thirdly, the contextual understanding of EE highlighted the influence of institutional and policy frameworks on the understanding of EE. The last theme addressed challenges faced during EE implementation within the school context along with suggestions for future improvements based on teachers' experiences and understanding. Teachers perceived the importance of taking more responsibility for attitude development as initiators rather than only transferring factual knowledge. The study demonstrates that teachers gave different meanings to EE but expected to achieve an environmentally sensitive younger generation that is aware of, cares about and acts on, environmental concerns through changes in attitudes.

Teachers' understanding of EE was constantly evolving and being reshaped during their engagement in EE practices. Further, teachers' understanding of EE can be defined as a progressive, transformative, and experience based process. Systemic and institutional constraints may limit the successful implementation of EE. However, integration of EE into the curriculum as a subject with a dedicated time slot, policy support, teacher training, and collaborative approaches may facilitate the achievement of EE objectives while addressing the major challenges of time constraints, an exam oriented education system, and resource scarcity. Positive attitudes, values, motivation, and participation involving EE approaches among educators and learners may contribute to sustainable environmental outcomes through EE.

Keywords: Environmental Education (EE), teachers, meaning making, Transformative Learning (TL), Social constructivist learning

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Abbreviations

Abbreviation	Description
CEA	Central Environmental Authority
EE	Environmental Education
EPP	Environmental Pioneer Programme
SDG	Sustainable Development Goals
SL	Sri Lanka
TL	Transformative Learning

1. Introduction

Human societies are currently experiencing numerous environmental challenges, such as climate change, unsustainable resource exploitation and pollution of water, air, and soil across the globe (IPCC, 2023; UNEP, 2022). Education can be understood as one of the most important structured efforts conducted worldwide, aiming to improve knowledge, attitudes, and skills in individuals. Quality education (the fourth Sustainable Development Goal (SDG) among the seventeen goals) is identified as one of the most crucial sustainable development goals and emphasizes the development of "knowledge and skills in the areas of environment, food security, and agriculture"(United Nations, 2015). UNESCO is expected to contribute to ensuring longterm community development by incorporating practical learning as a foundational element of education (UNESCO, 2005).

Although individual behavior appears small, when a large group of individuals consistently engage in environmentally harmful behaviors, such as throwing garbage and polythene on roads and into waterways, it ultimately contributes to severe flooding issues. Therefore, it seems to be a significant challenge to develop a society with positive attitudes and behaviors towards environmental concerns by adopting effective Environmental Education (EE) (Ardoin *et al*., 2023).

Parry & Metzger (2023) emphasized that teachers are key actors in education. Furthermore, they argued that sustainable development in society can be achieved through a holistic, multidisciplinary approach to education by integrating social, economic and environmental dimensions. Therefore, it is essential to raise awareness regarding environmental aspects and achieve pro environmental behaviors through EE (Westerman, 2026). The new vision of environmental conservation approaches is seen as a collective effort of all human beings (Ardoin *et al*., 2023; Grund *et al*., 2023). Developing knowledge, attitudes, and skills related to environmental matters that support responsible behavior and better decision making on environmental concerns is aimed for EE.

Sri Lanka (SL) has rich ecological biodiversity, internationally recognized as a biodiversity hotspot (Sarathchandra *et al*., 2021). Various political and economic constraints affect the nation while it faces serious environmental issues such as deforestation, waste management challenges, and biodiversity loss. The government allocates substantial financial resources to environmental awareness programs and has recently introduced the Green School concept in schools

(Annual Performance Report, Ministry of Environment, 2023), by identifying EE as the best way to combat environmental issues (Davis, 2010).

When drawing attention to EE in SL, structured programmes are conducted in schools by teachers in collaboration with the Ministry of Education and the Ministry of Environment, aiming to raise awareness and promote environmental conservation. These programs have been conducted since 1984 (Central Environmental Authority, 2023). However, EE is not currently taught as a separate subject within the education curriculum. It is practiced as an extracurricular activity within the context of schools. According to Perera et al. (2024), school aged children in SL show limited knowledge of environmental awareness, attitudes toward recycling and recovery, and environmentally friendly behaviors. This further emphasizes the need for focused interventions and educational strategies to generate a responsible younger generation within the sociocultural landscape of SL (Perera *et al.,* 2024).

With regard to the effectiveness of these programs, they are not yet seen as effective in improving environmental awareness among school aged children. Their impact on promoting pro environmental behaviors, and environmentally friendly decision making remains unclear. Ultimately this may limit the development of an environmentally friendly nation. Adoption of pro environmental behaviors is seen as slow and inconsistent, though there is rising interest in awareness of environmental challenges (Portus *et al.*, 2024).

Children are considered one of the most adaptable and motivated groups for environmental conservation approaches (Pathirana, 2014). In SL, a large number of EE related programs engage in schoolchildren, teachers, and government officers. Therefore, teachers' understanding of EE is very important to achieve the goals of EE by ensuring responsible engagement in EE. Further, teachers are playing a mediating role in implementing EE initiatives introduced by the Ministry of Environment in schools. The smooth functioning of the EE process and communication with the Ministry of Environment and the Ministry of Education is largely influenced by the teachers' understanding of EE.

However, limited qualitative studies are available that directly examine school teachers' perceptions and experiences of EE in SL. In addition to that, there is a lack of explicit teacher training and support on EE within Sri Lanka's national policies and curriculum frameworks, despite EE being encouraged within the school context. The gap is significant as teachers play a key role in transforming policy framed EE goals into practical classroom applications. Limited understanding may hinder the effective implementation of EE and the development of meaningful environmental learning among Sri Lankan students.

There is an urgent need to investigate how teachers' perceptions of EE shape their responses to the rising environmental crisis, as teachers play a crucial role in shaping students' environmental behaviors (Georgiou *et al.*, 2021).

This study seeks to explore Sri Lankan school teachers' perceptions and meaning making processes of EE through a qualitative research approach. The findings of this study contribute to an understanding of teachers' meaning making processes and provide insights and suggestions to improve EE approaches within the school context by addressing current challenges faced by the teachers. The Western Province of SL was selected as the study area. Qualitative data were gathered through semi structured interviews with six teachers who are currently engaged in EE practices in Sri Lankan schools. Interview data were analyzed through thematic analysis, giving attention to the theoretical framework of constructivist learning theory (Vygotsky, 1978) and Jack Mezirow's (1978) transformative learning (TL) theory. The constructivist perspective was applied to understand how meaning is co created through the personal experiences, interactions with others and contextual engagement, while Mezirow's (1978) theory was adopted to examine how teachers experience TL aspects following some critical incidents. The study also addressed challenges in EE implementation and possible future improvements.

2. Research Aim & Questions

2.1 Research aim

The purpose of the study is to investigate how Sri Lankan school teachers understand and experience EE in the school context with a focus on teachers' meaning making and their experiences. Furthermore, this study seeks to explore how teachers' views on EE have transformed over time and to identify the challenges involved in the implementation of EE approaches, as well as potential strategies for future improvement in relation to EE in SL.

2.2 Research Problem

In SL, EE is not taught as a formal subject in the education curriculum. Some environment related concepts are integrated into formal subjects such as Science, Geography and Social Sciences. Structured EE programs are conducted in schools as extracurricular activities. The meaning making process of teachers regarding EE is important in practical EE approaches within the school context. Some teachers are voluntarily involved in these activities, while others are assigned to this task. Therefore, teachers have different perspectives and understandings of EE based on their practical engagement within different contextual and institutional settings. The teachers' active involvement, prioritization, and actual implementation in EE approaches are mostly influenced by their own interpretation, although teachers are guided by the aims and goals defined by the Ministry of Environment and the Ministry of Education.

In addition to that, the success of EE largely depends on teachers' meaning making process as mentioned earlier. Therefore, the study explores how teachers understand EE through meaning making and how their views and practices on EE have shifted over time. I further explore the challenges faced during the practical implementation of EE and suggestions for future improvements based on their perceived understanding and experiences.

This study mainly focused on the teachers' individual background, institutional engagement, and practical implementation of EE within the school context because these dimensions are critical in shaping how EE is interpreted, implemented, and experienced by the teachers. Institutional policies and

curriculum explain what is expected, and practical aspects determine how teachers translate these into classroom activities. Therefore, examining both institutional and practical dimensions is essential to understand the realities, challenges, and suggestions for the effective EE implementation.
By drawing attention to the institutional and practical nature of teachers' understanding of EE, this study addresses three research questions:

1.How do Sri Lankan school teachers create meaning in EE in their school context?
2.How do Sri Lankan school teachers experience EE practices in schools?
3.How have Sri Lankan school teachers' perspectives and practices on EE shifted over time?

3. Background

3.1 Sri Lanka and the role of EE in its education system

3.1.1 Sri Lanka as a country

SL is a small island nation located in the Indian Ocean. Its current population is approximately 21.9 million people as of 2024 (Central Bank Report, 2025). Of this population, 20.7 % are children under the age of 15 years (Department of Census & Statistics, 2024) and its land area extended up to 62,710 Sq Km. SL has been considered as a popular tourist destination due to its rich cultural heritage, long history and prominent biodiversity. Administratively, SL is divided into nine provinces.

SL is abundant with natural resources including forests, land, minerals and water resources. The highest diversity of species belonging in natural forests are representing biodiversity hotspot in the South Asian region (Sarathchandra *et al*., 2021). SL is shifting from an agricultural economy to an industrial economy by experiencing urbanization and faces a lot of environmental challenges, such as land degradation, industrial pollution, improper waste disposal, biodiversity loss, and coastal resource damage. However, preserving the environment is important to maintain the well being of all living organisms (Lu *et al*., 2015, cited in Perera *et al.*, 2024).

3.1.2 Education in SL

Education in SL is offered as a free service for every child in the nation from primary schools up to higher education in universities. This ensures the human right of access to education regardless of individuals' socio economic status or background. Importantly, a literacy rate exceeding 90 percent, the highest in the region has been achieved by the Sri Lankan education system (Central Bank Report, 2025). SL was ruled by the Dutch, Portuguese, and British in the past. The education system was reformed through the post colonial interventions. Lately, it was revised after independence from British rule in 1948 by ensuring equitable access to all citizens for formal education. The education system is structured as primary, secondary, and tertiary levels, along with two national examinations: the General Certificate of Education Ordinary Level (GCE/OL) and Advanced Level

(GCE/AL). Academic progress is evaluated at the end of the year, determining progression to the next grade. The government schools mainly provide education as a free service. Private and international schools also play an important role in the current education system.

The competition among students for university admission is seen as the most complicated challenge faced by the Sri Lankan education system. Private education classes after school and weekends and pressure created by parents to pass examinations place additional burdens on students' lives. Uneven resource distribution between rural and urban schools, a strong focus on exam oriented learning, economic and political instability also limit improvements in the education system, though education plays an important role in social development in SL.

3.1.3 EE programs in SL

Structured EE programs in SL are designed and implemented by the Central Environmental Authority (CEA), which is governed under the Ministry of Environment. These programs are conducted as extracurricular activities within the schools. CEA collaborates with the Ministry of Education to obtain support from the teachers and school administration. Both primary and secondary school students are targeted by these structured programs. Three eco clubs, such as "Thurulatha" "Vihanga" and "Sobha" have been implemented for the primary school students in grade 1-5: age group 6-10 years for the development of environmental attitudes in early childhood. The Environmental Pioneer Programme (EPP) "Parisara Niyamu," "Haritha", "Rajatha" and "Presidential Award" are conducted for the secondary school students beginning from grade six onwards: age group 10-18 years. Each program is defined by a set of activities and participants receive allocated badges and certificates upon successful completion. Consequently, students are expected to progress through the higher levels by achieving the "Presidential Award". However, most students complete only one or two programs due to academic pressure. Target based activities are monitored by assigned teachers within schools.

Several guideline books have been published by the CEA to support teachers in gaining knowledge to better implement EE programmes within schools. Officers from the CEA are responsible for guiding teachers under the program. In addition, a teacher is assigned as a "Divisional commissioner" on a divisional basis by the CEA to enhance communication between teachers and CEA officers. The annual monitoring of EE approaches is also conducted by the CEA at the district level. In parallel with the above programmes, special awareness approaches such as tree

planting, beach cleaning, and environmental exhibitions are organized by schools to commemorate several environmental related dates such as “World Environment day” “World Water Day”, “Wetlands Day” and “Earth Day” with the collaboration of experts and government institutions (Ministry of Environment & Central Environmental Authority, 2023).

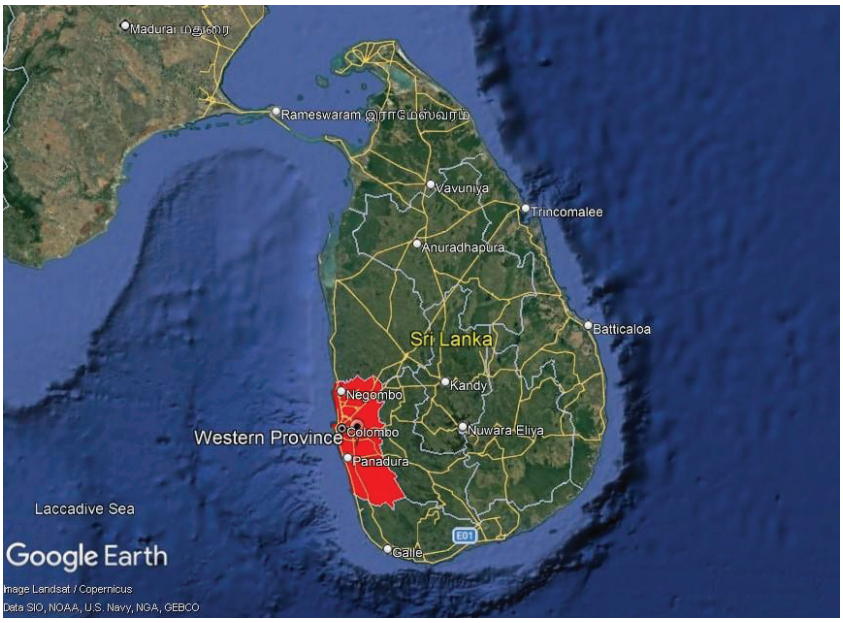

Figure 1. Map of SL highlighting the Western province. Source: Google maps. Edited by author

4. Literature Review

4.1 Education as a Sustainable Development Goal

Education can be understood as the most important structured effort conducted worldwide, aiming to improve knowledge, attitudes, and skills in individuals. Quality education, the fourth Sustainable Development Goal (SDG) among the seventeen goals, is identified as one of the most crucial SDGs, emphasizing "knowledge and skills development in the areas of environment, food security, and agriculture" (United Nations, 2015). UNESCO is expected to ensure long term community development by incorporating practical learning as a foundational element in education (UNESCO, 2005). Garcia et al. (2020) also describe quality education as a "most powerful and proven driver for sustainable development" by generating multiple benefits for the general public while applying across various contexts, from formal to non formal settings.

4.2 Conceptualizing the EE

With regard to EE, it was formally established globally through the Tbilisi declaration of 1977, which emphasizes the roles, objectives, characteristics, and guiding principles (UNESCO, 1977). Later on, EE became popular as education for Sustainable Development (UNESCO, 2005). EE is also identified as a structured effort to improve knowledge, attitudes, and skills that enable active participation in environmental conservation practices. Within EE, "environmental citizenship" is identified as an important concept where responsible, informed and active participation is expected from individuals in environmental management (Georgiou *et al*., 2021). The ultimate goal of EE is to demonstrate actual environmental behavior in the long run. Critical thinking and the efforts of both learners and educators play a vital role in achieving this goal. Incorporation of EE into the school system is vital to empower children toward environmental citizenship. Further, school teachers are identified as a "main driving force in fostering students toward environmental citizenship" (Georgiou *et al*., 2021; Parry & Metzger, 2023). A significant responsibility therefore lies with school teachers when fostering school children toward environmental consciousness (Pandey & Pandey, 2025).

A study conducted in India reviewed previous research to explore the relationship between environmental issues and EE. The result shows that the EE curriculum

needs to be reoriented by appealing to and sensitizing regional environmental concerns (Pandey & Pandey, 2025; Mishara, 2025). The systemic integration of EE into the education curriculum (Singh & Almad, 2025; Gebrekidan & Gebremedhin, 2024) and capacity building of the teachers may foster TL and action oriented EE (Singh & Almad, 2025; Liyanage, 2026). It is important to recognize policies to raise environmental awareness among the general public and school children by emphasizing the need for EE to enhance environmental knowledge, attitudes, intentions, and behaviors. Additionally, they discussed the need for structured and prepared EE approaches to gain better outcomes (Pandey & Pandey, 2025, Pino-Perdomo & Velásquez-Mosquera, 2026).

Many educators think that EE is only involved with raising awareness of simple waste management issues, recycling practices, tree planting, etc., rather than achieving behavioral outcomes through attitude changes and critical thinking (Tilbury, 1995; Stevenson, 2007). EE is identified as a “change oriented learning process that largely depends on educators' orientation and their practical usage of teaching tools to motivate learners toward behavioral changes” (Tilbury, 1995). EE has evolved gradually over time. It initially focused on simple aspects of nature study and routine environmental conservation practices without much questioning of them. In later stages, students were encouraged to think critically about how broader social and political aspects are connected to environmental issues and how possible solutions can address environmental degradation by questioning different beliefs and ideologies. However, the school context, structure and time constraints may limit the effectiveness of EE programs (Stevenson, 2007; Pathirana, 2015). Numerous research studies have been conducted on various aspects of EE involving teachers and students (Husin *et al*., 2025; Zhou, 2024; Imran & Almusharrafa, 2024).

Internationally, several studies were carried out focusing on qualitative aspects of teachers’ perceptions of EE and other subjects as discussed in the next section. Researchers have explored how understanding and the methods used for EE are affected by individual, contextual, and institutional factors. Further, researchers have discussed that deep personal transformations in beliefs and assumptions about sustainable approaches may be essential to combat current environmental challenges (Grund *et al.,* 2023).

4.3 International qualitative studies related to EE

Georgiou et al. (2021) have systematically reviewed the sixteen studies (1995-2020) that relate to teachers' perceptions of environmental citizenship and their practical usage in the school context. Goldman & Alkaher (2024) examined the

content, values, pedagogies, and difficulties teachers face when implementing environmental and sustainability education, as well as how they view their role as educators. Linhares & Reis (2023) studied pre service teachers' perspectives on education for environmental citizenship. Further, Uygun & Bayrakci (2025) evaluated teachers' perceptions of EE in schools. Findings showed that teachers are generally demonstrating a limited and fragmented understanding of environmental citizenship. Their perception of environmental citizenship is more reliant on local scale individual action, responsibility, and behavior within the personal space while overlooking the broader socio economic aspects, which can be achieved through collective, political, and global dimensions (Georgiou *et al*., 2021). Further studies reveal that teachers' perceptions are significantly influenced by classroom teaching practices and different interconnected components, such as teachers' educational and cultural backgrounds, and personal identities. These related components shape teachers' perception of environmental citizenship. Additionally, teachers' own conceptualization of environmental citizenship is more linked to their real practices and their professional identity. Importantly, the study highlights how teachers can be supported to strengthen their understanding of environmental citizenship through both pre service teacher education and in service professional development initiatives supported by educational policies (Georgiou *et al*., 2021).

The qualitative research study conducted in Indonesia focused on how teachers' perceptions shaped climate change education. The result revealed that teachers' own cultural background and their lived experiences shaped their perceptions, and these perceptions were correlated with practical implementation (Makrooni *et al*., 2025). The master's study conducted in Kenya reveals that the teachers are well informed about current environmental issues and their differing characteristics and interests significantly influence how they convey this environmental knowledge to school children. Further, that knowledge is partly conveyed to the children by focusing more on natural science aspects while deemphasizing social aspects of environmental issues (Jatzko, 2016). According to a review study conducted by Garcia et al. (2015), primary school teachers show positive attitudes towards environmental education, but they have some constraints in understanding broader ecological concepts.

4.4 Studies related to the Sri Lankan context

Several research studies have been conducted in SL related to EE. However, many research studies have examined environmental knowledge, attitudes, and practices within the school setting, focusing on students, teachers, and institutional factors. Uruthirathasan & Piratheepan (2023) evaluated the

significance of environmental concepts in the science curriculum in secondary education in SL. Chathurika (2026) investigated the teachers' roles in promoting young children's environmental literacy through play in early childhood education centers in SL. Some studies are based on children's attitudes and behaviors toward environmental concerns (Perera *et al*., 2024; Vinoharan & Vinoharan, 2024; Liyanage, 2025; Kuruppuarachchi, 2023). Pathirana (2014) investigated perceived practices such as tree planting, water saving, and attitudes of the Sri Lankan preschool children pertaining to environmental protection through quantitative approaches. She suggested that "practices pertaining to environmental protection rely more on the teamwork of educationists, policymakers, and administrative settings. If and when possible, evaluations should be carried out, and they should be ongoing to identify new strategies to promote EE within the young generation" (Pathirana, 2014). However, many of them rely on quantitative aspects using survey questionnaires rather than focusing on qualitative methods. Moreover, limited qualitative research has been carried out in relation to the meaning making process by teachers.

Pathirana (2015) studied the relationship between knowledge, attitudes, and perceived environmental protection practices among Sri Lankan school teachers and preschool teachers. Two hundred fifty teachers were investigated through a survey questionnaire, and it was found that teachers had high levels of knowledge and positive attitudes toward environmental protection approaches. However, this knowledge did not actively translate into actual environmental practices, showing a negative correlation between perceived knowledge and actual environmental protection practices in schools (Pathirana, 2015). Furthermore, she concluded that "knowing about environmental issues does not translate into actual practices in EE" (Pathirana, 2015). These findings align with the persistent "knowledge action gap," where increased awareness does not necessarily lead to pro environmental behaviors, broadly discussed in the field of EE (Kollmuss & Agyeman, 2002). Liyanage (2026) investigated Sri Lankan teachers' perceptions and practices of integrating environmental sustainability into science education, and the majority expressed dissatisfaction toward current professional development opportunities, and highlighted the importance of having structured, targeted training on integrating environmental concepts into science education while demonstrating some superficial knowledge on EE, concentrating on key frameworks such as environmental competencies and SDGs (Liyanage, 2026).

4.5 Barriers and improvements in EE

In the South African context, EE is embedded in the Geography subject. A research study reveals that EE is a "paper based concept" rather than an

implemented concept in schools due to numerous contextual barriers. They also found that EE is not constructively accommodated in the current curriculum, and educators are not very interested in EE. Further, scarce resources also restricted EE implementation within the schools. The study proposed introducing a separate time slot for environmental education while revising the national curriculum policy. The allocation of resources and proper assessment methods also led to enhancing EE implementation (Fru & Ndaba, 2023).

A study related to SL emphasizes the need for professional development by highlighting the critical need for organized, focused training to more effectively incorporate EE into science instruction (Liyanage, 2026). Parry & Metzger (2023) focused on identifying barriers faced during the learning process through their study on barriers to learning for sustainability by investigating teachers' perspectives. Limited teacher training and inadequate practice based approaches may restrict the use of EE approaches (Gebrekidan & Gebremedhin, 2024; Liyanage, 2026).

Information and Communication Technology (ICT) serves as a mediator of environmental learning by adapting digital tools. However, inadequate infrastructure, insufficient teacher training and tension between digital engagement and direct integration with nature may limit technological engagement within EE approaches (Pino-Perdomo & Velásquez-Mosquera, 2026). Furthermore, the “collaborative, interdisciplinary, experiential learning activities” may improve future teachers’ competencies while integrating EE into the curriculum by introducing well developed training models combining content knowledge and practical aspects of implementation (Garcia *et al*., 2015).

Together, these studies demonstrate the importance of EE within the education system. The understanding of teachers’ perceptions and experiences plays a crucial role in enhancing the quality of the EE approaches. However, there is a limited in depth qualitative research related to EE that explores how teachers create meaning in EE within their specific school settings. Therefore, this study aims to address this gap by examining the teachers' meaning making process based on their experiences and practices within EE approaches in the Western Province of SL.

5. Theoretical Framework

This study was informed by the theoretical framework that combines the perspectives of constructivist learning theory (Vygotsky, 1978) and transformative learning theory (Mezirow, 1978). The process of meaning making of individuals evolves gradually, beginning from an initial understanding as explained by constructivist perspectives. It is later developed as a perspective shift, or developmental process through changes and negotiations of existing understanding and prior assumptions. These transformations occur as a response to critical reflection on experiences encountered in an individual's professional and social journey. The ten consecutive phases of transformative learning theory (Mezirow, 1978) describe how gradual changes and shifts in perspective occur. Together, these theories were used to understand how teachers construct and reconstruct the meaning of EE over time within the broader context.

5.1 Social Constructivist Learning Theory

Social constructivist theory explains the construction of knowledge involving different factors such as social interaction, cultural involvement, and how they interact with each other and tools. Here, learning is understood as a dynamic process that is shaped by the teacher's beliefs, values, attitudes, motivations, and lived experiences within specific structural norms (Vygotsky, 1978). Teachers' attitudes, environmental values, motivations, and lived experiences toward EE approaches were the focus of analysis.

The learners' own knowledge construction mechanism, based on their experiences, attitudes, and ability, facilitates individuals' learning process (Vygotsky, 1934/1986). Social constructivist theory has been used as a foundation for much social science research and cognitive development theory. The theory "stresses the fundamental role of social interaction in cognitive development and strongly believes that community plays a central role in the process of 'meaning making" (Nagi, 2023). In line with that, the study focused on examining interaction with others, such as students, peer teachers, parents, school administration, and institutional actors, which shaped the teachers' understanding of EE.

Interaction with "more knowledgeable others" rather than independent realization, tasks achievable by collaboration -Zone of Proximal Development(ZPD) and

“Scaffolding”, where support is given and removed gradually to increase competence and language development, where the start of speech and thought are explained as key concepts within the theory of social constructivism (Nagi, 2023; Arduini-Van Hoose, 2020). The ZPD is defined as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978). Within the study, the concept of ZPD was used to understand how teachers' learning and understanding developed through support from others, such as senior teachers, institutional actors and through training programmes.

According to Vygotsky (1978), learners should receive instruction within the ZPD. A more knowledgeable other determines learners' ZPD and assists them in moving beyond the current level of knowledge. After that, the more knowledgeable others progressively reduce assistance until the learner is able to complete the activity independently (Arduini-Van Hoose, 2020). The study focused on the engagement and support of senior teachers, government officers, and environmental experts in facilitating junior teachers’ understanding of EE, in line with the concept of guidance from more knowledgeable others.

Vygotsky believed that learners’ inner thought and speech are also important in constructivist learning; learners talk to themselves by aiming to solve problems or clarify their thoughts. As learners learn to think in words, they do so aloud, known as private speech, and learning gradually becomes a practice (Vygotsky, 1978). In my view, it is best aligned with critical thinking, where they talk to themselves after facing a disorienting dilemma and shifting their current perspectives and reintegrating into the learner's life in Mezirow's (1978) TL theory.

Teachers’ perceptions of EE are not developed in isolation. Various interconnected factors that influence understanding of EE, such as teacher education programs, professional experiences, curriculum guidelines, school structure, culture, peer collaboration, and societal attitudes. In addition, environmental issues themselves are reframed within the wider context of power, poverty, and resource distribution, which further influences how EE is understood and implemented. In this study, these variables are not directly measured and were explored to determine how they affected the meaning making process from the perspective of social constructivism. This means that the analysis paid attention to how teachers describe their experiences within the above discussed factors and how these factors influence the shaping of their understanding of EE. To handle this complexity, the study adopts an approach that explores patterns in teachers' narratives to identify how different contextual factors influence teachers’ meaning making process.

In summary, social constructivist theory allows for investigating how teachers interpret EE concepts and practices and how they negotiate their individual and institutional environmental protection aims with the education curriculum, in addition to exploring how teachers work with limited resources and time.

5.2 Transformative Learning Theory

TL theory focuses mainly on how adults critically reflect on their assumptions, beliefs, and experiences and how these reflections lead to perspective shifts and potential changes in practice in later stages (Mezirow, 1978). Further critical examination of references through reflections, discourse, and dialogues associated with experiences that challenge current thinking patterns is involved in TL (Mezirow, 1991). As school teachers are adult learners who are professionally engaged in teaching, they are continuously interpreting their professional role and tend to find new ways to approach and achieve changes in attitudes and behaviors of the younger generation through EE. Moreover, the study investigated how changes happen in the understanding and practices of EE over time by focusing on identifying “disorienting dilemmas” from teachers' explanations of situations and experiences that led to perspective shifts. Moreover, how teachers started to think and act differently was examined by drawing attention to Mezirow's TL process.

Through TL, one is expected to have a “new understanding, which is different from one’s prior perceptions and lived experiences and which holds the potential for education”. These changes may not occur automatically but can happen unexpectedly. During the TL process, preconceived understanding is challenged and reoriented in a new way. These changes can have an impact on both personal and structural outcomes (Kunwar & Ulak, 2024).

Mezirow (2000) described a model for the TL as an emancipatory process including ten phases elaborated as follows.

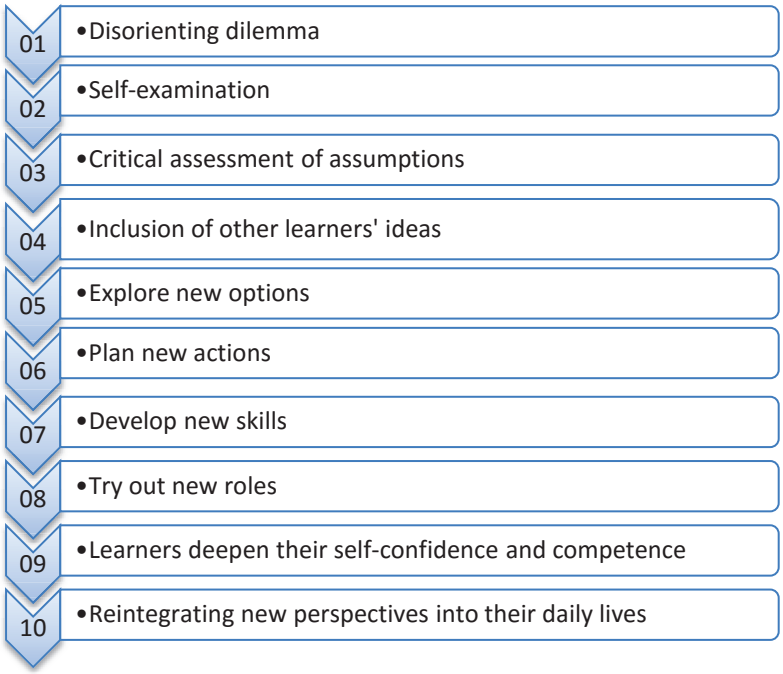

Figure 2. Ten- Phases involved within TL process (Mezirow, 1991). Edited by author

During the analysis, I decided not to apply the sequential process of transformative shifts, considering all ten phases. Instead, I focused on phases 01, 02, 03, 05, 08, 09, and 10 as my dataset did not clearly align with the other phases.

Phase 01- Disorienting dilemma

Disorienting dilemmas arise in physical or emotional transformative situations where individuals begin critical reflection on their own professional and self role within the first phase. Mezirow defined “unexpected disruptions” as a trigger for critical thinking. It may be some kind of change that happens in role perception, physical situation, or within interactions. Disorienting dilemmas can be recognized as a nondetermining start at the beginning where “novelty, neither anticipated nor planned, breaks into life” (Grund *et al*., 2023). Further, disorienting dilemmas occur as response to different situations such as affirming, alienating, celebration, rejection, violence, indifference, or transformation (Kunwar & Ulak, 2024).

Phase 02- Self examination

The critical reflection on one's own assumptions is very important. The discourses based on critical judgment in the TL process are characteristic of the high level of

adult moral reasoning (Mezirow, 2006). Most of the time, people move directly from one way of being and behaving to another. In the second phase, people create meaning as a response to disequilibrium. Mezirow identifies conscious reflection as playing a crucial role within the TL process and characterizes meaning making as an emotional and non rational process. “The shift of meaning phase is a core result of TL” (Grund *et al*., 2023).

Phase 03- Critical assessment of assumptions
The different perspectives, beliefs, and assumptions were compared by the learner during the third phase. The new perspectives and experiences may challenge the previous assumptions and may feel disturbing, or they may not be perceived as meaningful as the prior understandings, but may be motivated to further explore. These explorations may happen consciously or unconsciously (Mezirow, 2000; Grund *et al*., 2023). In the third phase, “building commitment and personal responsibility,’’ the role of passion and of intense emotion where self examination with feelings of fear, anger, guilt, or shame (Mezirow, 2000), is central (Grund *et al*., 2023).

Phase 05- Explore new options
During the fifth phase, learners investigate new possibilities and consider different ideas to align their actions with fresh perspectives.

Phase 08- Try out new roles
Learners tend to "try out new roles” by adopting new behaviors and practices during the eighth phase. This learning further develops new abilities and competencies, as well as supporting the experimentation with and establishment of new roles and behaviors.

Phase 09- Learners deepen their self confidence and competence
In this phase, learners are experienced and understand themselves and the world in a fundamentally different way than they did in previous situations. Emotions of learners are important in this stage of TL.

Phase 10- Reintegrating new perspectives into their daily lives.
During the final phase, learners integrate new perspectives and practices into their daily routines by transforming them.

In general, adults seek to create meaning through their lived experiences, having a sense of both self and others. It involves “mindful effort to learn” by rationalization, both within and outside of awareness. The acquired frames of reference may cause a reorientation of existing assumptions and expectations through “cognitive, affective and conative dimensions” that reshape the current

understanding, through new interpretations; this process of advancing and assessing reasoning may result in TL. Finally, opinions or actions may prove to be true or justified. These justifications are based upon other beliefs and understanding. Here, adults and young learners learn to transform their existing frames through critical self reflection on assumptions and dialogical reasoning when they arise in problematic situations based on their own beliefs and understandings (Mezirow, 2006).

6. Methodology

The qualitative research approach was selected as the aim of this study is to develop an in depth understanding of school teachers' perceptions and experiences of EE in SL.The study focuses on teachers' meaning making processes and TL experiences in relation to EE. Qualitative methods are the most effective approach for exploring participants' beliefs, perspectives, and personal experiences (Creswell & Creswell, 2018).

The constructivist perspective is relevant to my research, as it emphasizes that individuals strive to comprehend the world around them and create personal meanings based on their experiences (Creswell & Creswell, 2018). According to Moon & Blackman (2014), it is related to the epistemological constructivist worldview, as epistemology discusses how knowledge is constructed. In order to address the research questions, data was collected through semi structured interviews that reveal how teachers interpret EE based on their backgrounds and personal experiences. The study also explored the challenges these teachers encountered while implementing EE and their recommendations for future improvements.

6.1 Data Collection

Purposive sampling of participants was carried out to have different perspectives. Six experienced teachers from the Western Province of SL were interviewed (Table 1). During the short period of time, it was more difficult to interview teachers from all nine provinces in SL, and I selected one province as my study area among the nine provinces. Western Province is a major urbanized and densely populated region in SL, which is associated with numerous environmental issues. A variety of schools with differences in resources, facilities, and access to EE programs and experienced teachers in EE are also available within this province. The selection was considered to provide rich analytical insights because of this diversity, providing a more comprehensive understanding of how EE is implemented across various educational settings and socioeconomic conditions. Two male teachers and four female teachers were interviewed.

Table 1. Interviewers' information

Interviewee	Rural/ Urban	Gender	Age (Years)	Teaching Subject	Educational Background	Teaching Experience (Years)	Experience with EE (Years)
1	Urban	Female	35	Science for Technology	Science Graduate Reading for Environmental related postgraduate	10	5
2	Rural	Female	38	Agriculture	Agriculture Graduate Reading for Environmental related postgraduate	12	3
3	Urban	Female	33	Science	Science Graduate	08	6
4	Urban	Female	50	Music	Art Graduate	16	12
5	Rural	Male	37	Science	Science Graduate Environmental related Post Graduate Holder	10	6
6	Urban	Male	45	Art	Art Graduate	20	10

Semi structured interviews with an interview guide were conducted. This method allowed the use of a set of predetermined questions while still allowing participants the freedom to elaborate on their experiences and introduce issues they considered important. The Sinhala language was used for the interviews as it was more natural for them to express themselves, as it is the native language of all participants. Interviews were conducted through WhatsApp calls. Each interview took around 30 to 45 minutes and they were recorded with the consent of the participants.

Data was gathered with teachers' explanations of personal experiences related to professional and personal life. All participants were open and willing to share their ideas. Some participants elaborated their views by answering several questions at once. Some questions were omitted to avoid repetition. At the beginning, participants expressed little stress within the formal nature of the topic and the questions, but progressively, they were able to comfortably express personal experiences, including reflective insights on EE. However, I experienced some time constraints which made it difficult to move to the next question without disturbing the participant. Interviews were translated into English. One interview was translated word for word. As it takes time, transcribed notes were taken by uploading five minute audio segments to an AI tool (Voice Chat GPT) due to the unavailability of a proper transcription tool for direct Sinhala to English translation. The relevant documents, such as EE guidelines, education curriculum, and program reports, were studied to have a contextual understanding before conducting interviews.

6.2 Analysis

The interview data was analyzed through thematic analysis, which was considered an "accessible, flexible, and increasingly popular method for qualitative data analysis in its own rights (Braun & Clarke, 2012). Furthermore, thematic analysis is identified as a technique to recognize and interpret collective or shared ideas and experiences by concentrating on creating meaning through systematically identifying, classifying, and providing insights into the themes across the dataset (Braun & Clarke, 2012).

Three main approaches are described under thematic analysis: inductive versus deductive or theory driven data coding and analysis, an experiential versus critical orientation to data, and essentialist versus constructionist theoretical perspectives (Braun & Clarke, 2012). In my study, abductive approach was applied, which started with some theoretical understanding, and later, during the interviews, the most interesting responses and applicable parts of the theories were discovered to support further understanding and analysis.

Theoretical perspectives of social constructivism (Vygotsky, 1978) and TL (Mezirow, 1978) were employed in the analysis. TL theory explains how these understandings and experiences emerge through critical reflection and perspective transformation, while social constructivism describes how knowledge is co constructed through social interactions and contextual factors.
Social constructivist theory (Vygotsky, 1978) was applied to analyze how teachers create, develop, and negotiate the meaning of EE through their

background, interaction with others, institutional setting, and classroom experiences, where the process of knowledge co construction occurs. Critical reflective situations, in which teachers challenged their prior assumptions, understanding, and practices regarding EE, and how their perspective shifted, as well as new adaptations adopted by teachers were analyzed through the ten phases described by Jack Mezirow's 1978 TL process. In this study, such disorienting dilemmas were identified when teachers explained their specific experiences within their school context and individual social journey. By combining these perspectives, the analysis drew attention to both the socially co constructed nature of meaning making of EE and the individual process of critical reflection and TL aspects within EE.

The analysis was done according to the six phases discussed in thematic analysis by Braun & Clarke (2006). The audio recordings were carefully listened and the interview translated notes were reviewed several times to familiarize myself with the data. The coding was done in alignment with the theoretical framework; this approach focuses on finding commonalities in the way a topic is discussed or written about and on interpreting those commonalities (Braun & Clarke, 2012). The following codes were used during the analysis.

Based on constructivist learning theory;

- Learning through experiences
- Learning through professional development approaches
- Interactions with others
- Active participation
- Learning through contextual aspects

Based on TL theory

- Critical reflection
- Perspective shift
- Professional learning experiences
- Development approaches (awareness, practices, methods)

Patterns and themes related to teachers' perceptions and experiences were identified. A theme is defined as something that "captures important in the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006). In some analyses, the themes found may not be directly related to the research questions, and researchers should focus on conducting analysis to answer the research questions (Braun & Clarke, 2012). The analysis was primarily focused on identifying suitable themes to clearly represent participants' views in relation to the research questions.

The coded data was reviewed to identify the similarities and overlaps across the themes. The fourth phase, refining, is considered a “recursive process whereby developing themes are reviewed according to the coded data and entire data set” (Braun & Clarke, 2012). Defining and naming themes were carried out by focusing on the uniqueness and specificity of each theme. Finally, the data were presented within the themes as a report (Braun & Clarke, 2006).

Thematic analysis is a flexible method that allows the researcher to concentrate on the data in a variety of ways. Researchers can analyze meaning throughout the entire data set or delve deeply into a single aspect. The entire data set was considered without focusing on a single part of the data during the analysis. Further, thematic analysis allows examining the explicit meaning by considering the researcher’s presumptions (Braun & Clarke, 2006). However, the explicit meaning of participants' views was not discussed within the study to avoid potential biases arising from prior assumptions and to ensure ethical considerations.

6.3 Ethical Consideration

Ethical considerations were carefully considered at the beginning, and ethical procedures were adapted throughout the study to reduce potential harm to participants. Research ethics is identified as a process, not as an endpoint (Creswell & Creswell, 2018). During the study, it was not only considered as obtaining initial approval from participants. Participants were volunteers. Consent was obtained through e-mail by sending a consent form regarding voluntary participation, right to withdraw without consequences, anonymity, and data recording. The purpose of the study was clearly informed to the participants.

During the data collection, comfortable conversational space was developed to avoid pressure on participants and to remain sensitive to their responses. Gathered information was securely stored by ensuring confidentiality and anonymity. Identifying information was removed when storing the data. All participants’ perspectives were represented accurately by minimizing biases and misinterpretations. Reflective notes on my thoughts were maintained. Additionally, a continuous coding process was applied and revisited to check whether themes were grounded in the data during the process of analysis. These stages demonstrate that ethical consideration is an ongoing process throughout the study.

6.4 Reflectivity

Examination of my own beliefs, judgments, background, and practices during the whole research process was very important. Reflective notes on my own thinking were maintained throughout the study, especially during the planning and data collection processes. During the analysis, I was more carefully considering my professional background, my own interpretations, and the information that participants considered more concerning. Relying on my own judgments and biases in data interpretation was carefully managed through the reflective notes, continuous coding process and the revisiting and refinement of the themes (Creswell & Creswell, 2018).

I have a previous professional background related to the EE approaches in SL as a government officer attached to the Ministry of Environment. I have experience in instructing and arranging teacher training programmes related to EE. During the period of engaging EE, I saw that, from previous perspectives, teachers have both positive and negative perceptions of EE. In addition, I experienced that EE approaches are not reaching their purposes despite a lot of stakeholders being committed to them. Therefore, I am personally motivated to carry out a study related to EE in the Sri Lankan context. Along with that, teachers play a vital role in EE, and I really wanted to know about their understanding of EE within the school context.

My previous contacts and understanding were very helpful in carrying out this study. During the interviews, it was easy to grasp the information from teachers, as I was already familiar with the process. I have prior knowledge of the education curriculum, policies, and guidelines as well. Some teachers were very willing to express their views, as I was aware of the practical situation, and they pointed out the institutional barriers as well, without any reluctance.
While my previous professional background and contacts provide valuable insights, I experienced some contradiction with my own previous assumptions on teachers' understanding and their participation, institutional barriers, and peer teachers' engagement on EE. I thought it might create unintentional bias in data interpretation based on my own beliefs and judgments instead of elaborating on participants' real perspectives. It created some stress during the interviews and the analysis. To overcome this challenge, open ended questions were adopted by avoiding leading questions during the interviews, and I was more careful not to express my opinions to participants. Further, I relied more on reflective approaches to data, codes, and themes by giving attention to my prior assumptions during the analysis and reporting.

7. Results & Analysis

This section presents the findings from the interviews and examines teachers' understanding and practical approaches in EE. The findings show that teachers' understanding of EE is shaped by their personal experiences, collaboration with others and contextual engagement. Further disorienting dilemmas also contributed to shifts in perspectives and changes in practice. Challenges during the EE implementation and future improvements were also discussed within the analysis.

7.1 Experiential understanding on EE

Teachers' educational and professional background plays a crucial role in understanding EE, and their practical engagement within the school reshapes the understanding of EE. According to a social constructivist viewpoint, learning is shaped by experiences, past knowledge and social context (Vygotsky, 1978). Teachers strongly believe that their education provides a foundational background to the understanding of EE by equipping them with prior knowledge of environmental processes, ecological systems, sustainable issues and their root causes and severe consequences on unconscious environmental actions. This enables teachers to better approach EE with more confidence, drawing on relevant scientific knowledge.

However, teachers understand EE should extend beyond the transfer of knowledge based on facts and consequences. Most importantly, teachers recognized that conceptual knowledge alone does not lead to significant attitudinal and behavioral changes. Through EE, teachers are more focused on developing a younger generation by emphasizing their responsibility to protect the environment for future generations. This view is supported by recent studies on EE. In order to promote environmentally conscious behavior in the younger generation, environmental literacy should not only be based on knowledge, but it should also involve critical thinking, values, and participatory approaches (Xiong, *et al*., 2025). Based on the Environmental Pioneer Programs (EPP), "Parisara Niyamu" and other structured programmes which are introduced by the CEA to the schools, teachers view EE as a target based program which is only conducted for the selected group of students.

However, teachers understood that EE should involve different experiences such as observational activities, field visits, tree planting, and waste separation

activities, instead of teaching knowledge facts within the classroom, beyond completion oriented activities. Those hands on experiences may reshape students' thinking and behaviors towards environmental protection, and may remain in their minds over the long term. Experiential learning may become more memorable and influential in students' childhood.

Personal motivation towards the environmental aspects is also reshaping the understanding of EE within the school. The teachers' childhood attitudes and sense of environmental conservation may play a vital role in helping them understand the importance of EE in comparison to other subjects. Interviewee 1 expressed this view as;

"I was curious to learn environmental concepts from childhood and developed a sense of environmental conservation gradually, and I understood that EE is very important to the younger generation, as other major subjects like Mathematics, Science."

Prior experiences with environmental issues, such as flooding, land filling also helped to improve the knowledge of environmental matters. Their individual actions to solve these matters also contributed to the understanding of EE within the school. Interviewee 2 described her view as;

"I'm more concerned about what I can do within the EE. I saw the land filling area by itself on the route to the school. I was thinking about what I can do myself. I created some posters with school children and hung them along walkways to inform people about the negative effects of landfilling".

Teachers are more likely to understand the value of teaching the next generation about environmental conservation when they personally engage with environmental problems.

These results demonstrate that meaning making is based on lived experiences. According to a social constructivist perspective (Vygotsky, 1978), knowledge is not simply transmitted, rather such experiences serve as a significant context where teachers build their understanding of environmental challenges. The research study conducted among Geography teachers in Sweden shows similar findings, where teachers' informal experiences such as outings, holidays, and childhood memories have a significant impact on teaching practices and didactic choices in Geography (Molin *et al.*, 2015). These results are in line with a review study on EE that emphasizes the significance of individual experiences in fostering pro environmental attitudes (Rickinson, 2001).

Overall, these findings show that teachers' understanding of EE is not a static or uniform body of knowledge that is derived solely from the education curriculum, but rather an actively co constructed process according to Vygotsky (1978) shaped by their educational and professional background, and their personal experiences of environmental challenges. These experiential understandings of EE can be considered as a starting point for reflection in line with theTL process.

Furthermore, some critical experiences create emotional connections to the environmental issues and strengthen their motivation to engage with environmental awareness among students. In this context, personal experiences may become important learning moments that shape understanding and attitudes towards EE. They also influence teachers' own teaching practices. All interviewees have experienced different situations where their prior knowledge of EE was questioned or challenged. These situations may encourage them to re-evaluate their current understanding and teaching strategies related to EE. Natural disasters, environmental degradation issues, and some challenges faced during the practical implementation of EE, that trigger critical thinking act as a disorienting dilemma, causing teachers' perspective shifts, which are discussed as follows .

Conducting the EPP programme for grade six (age 10 years) students was experienced as a challenge by interviewee 1, as she had more teaching experience with advanced level students (age 18 years). As per Mezirow's (1978) TL theory, the above kind of unexpected disruptions represent the disorienting dilemmas discussed in phase one. The TL process begins through the disruption of the individual's current worldview by a disorienting dilemmas. Individuals are triggered to engage in critical reflection on their current understanding and practices at the beginning of the process (Calleja & Mifsud, 2024). The teacher began to reflect on her current teaching methods and her perspectives on EE according to phase two of Mezirow's (1978) TL process. She made an effort to explore new methods for approaching younger age students in line with phase five.The teachers' professional background may help them identify, students' feelings and needs allowing them to adjust their teaching according to the situation. She considered adopting simple language, simple concepts, images, videos, and presentations to reach the grade six students in line with phase eight.The shifting perspectives may encourage the adaptation of different methods through learning from them. Interviewee 4 expressed her view as; "Environmental songs and musical activities were used to communicate environmental messages to the students". She then realized that younger students grasp the concept more quickly through new approaches rather than through fact based teaching. Furthermore, her understanding that, students' motivation and commitment towards this programme had been improved by inspiring other students as well.

Interviewee 4 highlighted that;“After seeing the activities carried out by the students and the photographs displayed on the notice boards, some students and even their parents later asked if they could join the EE programme.” Interviewee 1 was initially reluctant to conduct this program when it was assigned by the principal as it was not voluntary. However, she later became motivated to engage with this programme by accepting the challenge. She changed her perspective by critically thinking about her responsibility as a teacher according to phase nine, where she deepens her self confidence and competencies. She moved from obligation to personal commitment as a responsible professional.

Interviewees 2 and 3 reported that their dedication to EE was improved through critical reflection following personal experience of sudden environmental disasters. The severe consequences on human life and property may be felt as emotional disruptions that cause disorienting dilemmas. Recently, SL has experienced a major environmental disaster caused by “Ditwah Wind whirl”. In addition to that, events such as deforestation, pollution, and floods raised awareness of the urgency of environmental conservation and promoted critical thinking about current EE practices in the school context. As a result, critical reflection becomes a crucial tool for teachers to change how they perceive EE. Teachers are taking steps toward more effective teaching strategies by challenging conventional methods and critically assessing their teaching practices, according to phase three. They are trying to adapt novel techniques to promote positive responses and active engagement among the younger generation. Teachers have internalized the new perspectives of EE. Actions and decisions are taken with the aim of fostering attitudinal changes in students and continue to work on it, and these practices are aligned with Mezirow’s ninth and tenth phases -building competence and reintegration. Teachers are reintegrating their role as role models rather than advisors or controllers within the school context (Calleja & Mifsud, 2024). This emphasizes stewardship, relational ethics, reflective practices, and responsibility is defined by the reintegration phase.

The knowledge gained through the TL process facilitates the teachers’ confidence and motivation (Calleja & Mifsud, 2024) in relation to EE, with the aim of achieving the ultimate purpose of developing an environmentally sensitive nation. The results show that teachers' involvement in EE may lead to profound shifts in their professional identity as teachers. Teachers begin to view themselves as both knowledge transmitters and environmental responsibility facilitators.

The findings indicate that teachers' environmental consciousness is gradually becoming reflected in their day to day practices, such as bringing lunch boxes, separating waste, and involving in tree planting activities. Interviewee 3 expressed her view as;

“I can see that environmental awareness is gradually becoming part of our daily practices. For example, many teachers now bring their own lunch boxes, separate waste properly, and actively participate in tree planting activities. These small actions show how environmental consciousness is slowly becoming a habit in our everyday lives.”

More importantly, teachers' perspectives shifted, as they began to see themselves as leaders in environmental stewardship. Teachers are moving away from their existing professional identity as teachers.

Overall, personal experiences create emotional connections to the environmental issues and strengthen teachers’ motivation to engage environmental awareness among students. In this context, personal experiences may become important learning moments that shape the understanding and attitudes towards the EE. They also influence teachers’own teaching through perspective shifts.

7.2 Collaboration with others to understand EE

Another important factor influencing the understanding of EE is collaboration with others. The findings reflect a social constructivist perspective (Vygotsky, 1978) where knowledge is constructed through social interaction. Teachers’ engagement in training programme, peer discussions, and institutional actors, students, and parents creates opportunities to construct and reconstruct the meaning of EE. All interviewees reported that they had participated in several training programmes conducted by institutions such as the CEA (Ministry of Environment) and the Ministry of Education. According to interviewees, these training programmes provided updated information on environmental concerns and instructional techniques that can be applied to enhance students’ awareness of environmental issues. Interviewee 2 and 6 stated that some field based residential programmes were very useful in gaining more practical engagement with environmental teaching approaches.Teachers were also exposed to various pedagogical methods to EE through training programs. Through these various training engagements, teachers begin to view EE as a practical participatory approach rather than as the mere transfer of theoretical knowledge.

However, the interviewees came to understand EE as an important aspect within the school context after participating in training programmes. Because the training emphasized the importance of communicating consequences on environmental unconsciousness actions, with a focus on promoting attitudinal change among younger generation.Teachers believe that these training programmes are very

helpful in understanding the need for EE within the school, despite having limited time and resources. Interviewee 4 expressed her view as follows;

“Absolutely, training programmes are very important to us because they motivate us to practically engage in EE. They make me feel that I should act as a responsible citizen within the school. Participating in these programmes also gives me a sense of self satisfaction as a teaching professional, as I am involved in such a valuable approach. Therefore, I am always looking for opportunities to take part in such training programmes.”

This training programme sometimes provides knowledge of environmental issues through experts while supporting the understanding of the value of integrating new methods into traditional teaching approaches to enhance EE within the school. Teachers were aware of the expected outcomes of EE and the importance of adopting innovative approaches by integrating both technology and careful planning within EE programmes. Interviewee 2 expressed her views as follows;

“It also explained how to use the surrounding environment in EE and connect environmental knowledge with practical learning. After participating in several training programmes, I began to think differently about teaching EE. I then planned a small practical activity on soil erosion using the small water stream behind the school premises. The students were very happy with the activity and later asked for more opportunities to participate in similar hands on experiences.”

Interviewee 5 expressed his view as; “After participating in this training, knowledge became more than scientific knowledge; it included practical environmental awareness,” and interviewee 6 expressed his view as; “If teachers receive special support or awareness programs, we can get greater cooperation. If such opportunities exist and can be utilized, that is considered good,” regarding the training aspects of EE. Teachers' perceptions of EE are also shaped by professional learning groups and collaborative networks (Vygotsky, 1978).The training program also provided space for discussion and opportunities to connect with experts.

Teachers receive support from school principals and administrative officers, share experiences with their peers, and receive advice from more experienced senior teachers. Opportunities for discussion and access to information on teaching methods help develop their understanding of EE. Interviewee 4 expressed her view as;
“I was motivated to engage in EE after receiving advice from the deputy principal of the school and his wife, who, along with one of my close friends, maintain a

tree garden at their home. They invited me to visit and observe their activities, and after seeing what they were doing, I felt inspired to start doing the EE."

Teachers emphasized the importance of leadership from principals and other senior teachers on EE. Interviewee 3 noted that; "Leadership of the principal and senior teachers is essential, and their role is very helpful". EE approaches involving students should be approved in advance by the principal and the Ministry of Education. The effectiveness of these activities often relies on the support of the principal, other teachers and parents, highlighting the need for a collaborative and integrated approach.

The results, however, also demonstrate that collaboration is not always consistent within the school context. According to some interviewees, initial participation of some teachers was limited. Environmental activities were often seen as extra duties.Teachers had to take the initiative to engage with environmental activities in addition to their regular teaching within the school context. Despite these challenges, teachers have eventually received some support from other staff members to take part. Teachers' individual commitment and motivation became an important factor in EE for a fostering a shared understanding and group engagement in EE initiatives. Interviewee 4 expressed her view as follows;

"Actually, to be honest, in my school, there was not much support from other teachers at the beginning. Many teachers did not have much awareness about these environmental activities and were not involved before. However, I tried to take initiative and continue these activities myself. Gradually, a few members of the staff also became a little involved."

Social interaction is one of the main components in constructivist social theory, and it is argued that social interaction and conversation with others are the means by which knowledge is created (Vygotsky, 1978). Teachers can improve their knowledge and implement new teaching techniques by sharing ideas with peers or receiving input from professional experts. Students' active participation may also contribute to a better understanding of EE within the school context.Their expectations from EE, valuable feedback, questions, and motivations may reshape teachers' understanding of EE. Interviewee 2 elaborared her view as follows;

"Some students come to me in the morning and tell me that the trees we planted are now bearing fruits. They also say that they are taking care of the plants and the waste separation area. Seeing their responsibility and interest makes me very happy."

Teachers understand that EE receives active participation from students initially. However that participation may gradually decrease due to academic pressure. Interviewee 1 put it as;

“At the beginning of EE, teachers explain environmental matters based on facts. There is a need for practically organized engagement so that students can gradually understand the importance of the environment without feeling pressured.”

In response, teachers are more focused on encouraging active participation from both students and parents through the careful planning and designing of EE approaches. Since students are expected to apply what they learn beyond the school environment under the guidance of their parents, parental awareness of environmental matters is also very important. Interviewee 2 expressed her view as follows;

“When we teach and practice waste separation at school, students often do not continue these practices at home because their parents are not aware of them. Therefore, the success of these activities largely depends on parental awareness as well.”

Teachers seek to assign some responsibility to the students to encourage their active participation during the learning process, as they understand that EE should focus on developing individuals’ responsibility toward nature. Interviewee 4 stated that;“Each child was given responsibility for maintaining a garden plot”. All participants stated that they would tactfully integrate EE activities with other interesting activities, such as sports, to increase student involvement.Teachers attempt to convey environmental knowledge by acknowledging the importance of EE while managing limited time and resources. Interviewee1 mentioned that; “I always try to encourage active student participation by integrating EE activities with other interesting extracurricular activities, such as sports, and through different school clubs.”

Teachers’ active involvement in EE also reshapes their view on EE. They are curious to gain new knowledge on environmental concepts, sustainable issues, and their severe consequences. Interviewee 6 reported that;

“When these environmental regulations and discussions came up, I realized that earlier I did not have such a strong awareness about trees, plants, and the environment. Later, when I started teaching children about environmental conservation, I began to think differently. I reflected on my own understanding and tried to improve it”.

Teachers' professional learning experiences in EE are enhanced by these collaborative activities.Teachers constantly improve their knowledge of EE through training programs, conversations with colleagues, and engage with students and parents according to Vygotsky (1978) , knowledge is co constructed through social interaction. Furthermore, these engagements provide a learning space by facilitating reflection through the inclusion of others's idea, according to the TL process.

Additionally, in line with Vygotsky (1978), the findings show that more knowledgeable peers, institutional instructors, and experts are more helpful in understanding and sustaining EE approaches within the school context. More knowledgeable others help expand the Zone of Proximal Development of teachers, and they provide instructions and practical exposure within this zone to enhance their understanding and the practices of EE. After that, more knowledgeable others progressively reduce assistance until the learner is able to complete the activity on their own. The short term assistance provided by more knowledgeable individuals to learners in completing a task is known as scaffolding (Arduini-Van Hoose, 2020). In the context, training programmes can also be considered a form of scaffolding where teachers are guided through instructions to develop their own understanding and later apply it independently within the school.

7.3 Contextual understanding of EE

According to social constructivist theory, meaning making is context dependent (Vygotsky, 1978). The study also reveals that the institutional, social, and legislative frameworks within which teachers cooperate also influence how they perceive EE. Interviewee 4, 5 and 6 stated that peer teachers who are not involved in the process have a different understand of EE. Policies have introduced EE as a target based extracurricular activity , separate from formal subjects, conducted for selected student groups within the school context. The programme should be implemented according to the instructions given by the officials from the CEA. Within the fixed school timetable, additional effort should be made to identify common time for environmental related activities outside regular teaching schedules for students from different classes. Conducting after school programs for students also placed extra responsibility on teachers. The government education curriculum is more focused on students' academic performance with an emphasis on national exam based results. At the end of the year, teachers are also assessed by the students' exam results. Therefore, teachers sometimes perceive EE as an additional burden and responsibility beyond their regular teaching within institutional framework.

However, teachers who are involved in the process still understand that EE is an important responsibility that should be carried out by teachers as education professionals. They believe they should be the founders or initiators of attitudinal change in younger generation. Interviewee 4 elaborated her view as;

“Children are like small plants. If we nurture them carefully, they can grow strong and develop good habits. But if we try to change them later, it becomes very difficult. That is why it is important to cultivate these values when they are young”.

Some interviewees stated that teachers’ actions are also very important in guiding their students toward environmental stewardship. Interviewee 2 expressed her view as; “I am also bringing a lunch box instead of taking polythene to school, because children are watching our actions”. Teachers sought to manage contextual barriers to some extent by introducing EE as an enjoyable practice for students rather than perceiving as a burden. Interviewee 5 felt that; “We do not want children to see environmental protection as a burden. Instead, we want them to enjoy doing it and feel that it is a natural part of their lives”.

All interviewees reported that they have received some support from the school administration, peer teachers, and the parents. However, in urban areas, they do not receive much parental collaboration as parents are engaged in a busy lifestyle. In rural areas, parental collaboration may be significant for the continuation and success of these programmes. All interviewees viewed government support as very important for providing better guidance and relevant instructions when they face challenges in practical implementation. One interviewee stated that government support is not evenly distributed among all schools. Some urban schools have received more opportunities than rural schools, based on accessibility and financial support. Interviewee 5 noted that; “Government officers also support these goals, providing resources over extended periods, and facilitating implementation.”

Teachers’ understanding of EE has been shaped by the institutional structures, government policies, and circulations. Most EE related activities are implemented according to government circulars, and prior approval must be obtained from the education administration. It is considered difficult to arrange practical, observational based activities within the fourty minute time period. On the other hand, teachers bear an additional responsibility around thirty students when planning after school or outdoor activities. Teachers' understanding of EE as a practical approach is limited by the time and financial constraints within the school context. Interviewees 2 and 3 stated that recent education curriculum amendments in SL are planning to incorporate observational activities into

subjects by emphasizing the value of experiential learning. All interviewees reported that the ultimate purpose of EE should be achieved through the younger generation.They perceive that changing adults' thinking patterns is very difficult.

Therefore, efforts should be made to develop an environmentally responsible nation through a few consecutive environmentally conscious younger generations. All interviewees understand that the purpose of EE is the internalization of attitude rather than the completion of scheduled activities or obtaining certificates. EE has been understood as a structured process of improvement of practical consciousness in decision making. Interviewee 5 felt that;"We would be happy when students bring lunch boxes instead of taking lunch sheets by awakening their parents too. Students should have an internal sense to reduce the usage of polythene." Interviewees reported that community participation also plays an important role in implementing EE with students. Most outdoor activities are facilitated by the community.These opportunities are enhance student's knowledge and experience. Interviewee 4 reported that;

"I can remember that I have organized a lot of tree planting programmes with community participation. One was in hospital premises after discussing it with the hospital director. The doctor gave full support to the programme and even took responsibility for taking care of the planted trees. Now those trees have started bearing fruit, which makes me feel very happy and satisfied."

These findings demonstrate that institutional structures, government support, education curriculum, policies, social setting, and community engagement play a vital role in teachers' meaning making and practices on EE. Teachers understand that EE is an extracurricular target based programme according to current context. However, teachers are receiving stakeholders' active participation to some extent, even from the community. It aligns with Vygotsky's (1978) constructivist perspective, where knowledge is co created through contextual engagement.

7.4 Challenges and future improvements

Although teachers demonstrate strong commitment to EE, numerous challenges associated with EE implementation in Sri Lankan schools. The major problem associated with it is the time constraint. In addition to limited time, lack of physical, financial resources, and institutional recognition also limited the effectiveness of EE programs. Arranging experiential learning approaches such as field visits and knowledge centers within schools required more time, resources, and financial assistance. Interviewee 2 expressed her view as;

“If such opportunities exist and can be utilized, that is considered good. The financial provision is limited. If transportation or meals are provided by someone else, and funds are available, then the teacher can easily arrange more practical experiences for the students.”

All the interviewees expressed their views on the importance of having a dedicated time for EE. The findings suggest the need to include EE as a formal, separate subject to the educational curriculum or to further integrate environmental concepts within existing formal subjects such as Science and Geography. Within this inclusive approach teachers are expected to reduce the burden of time management. Current EE approaches focus only on a selected group of student. With greater inclusiveness all students are able to be participate in this kind of programme, as they should develop knowledge, attitudes, and skills on environmental concerns. Further within the school context, only some teachers are aware of and actively participate in EE approaches. Therefore, all teachers’ awareness and participation are essential for improving institutional recognition of EE approaches, and this will enhance the effectiveness of these programmes.

In addition, professional development training for teachers can be specially designed to include methods for students’ attitudinal development based on experiential learning. In line with this, financial support may be directly allocated through the government budget without delay. This may reduce the additional burden to teachers when designing the EE programmes for the students. Government assistance is thought to be crucial for enhancing EE approaches. Teachers recommended that improved regular assistance and advice from the Ministry of Environment, professional development programmes, monitoring mechanisms, more efficient policy frameworks, and efficient approval procedures are required to increase the effectiveness of these programs.

One interviewee suggested the need for a long term national plan and achieving it through the committed and consistent participation of all teachers, students, and parents, rather than a selected group of stakeholders. In this regard, another interviewee stated that increasing parental awareness of environmental issues through a separate community project may be valuable in the long run for EE approaches in SL. Interviewee 3 reported that;

“Teaching children to separate waste at school is important, but if parents don’t understand its value, the practice is unlikely to continue at home. That’s why raising awareness among parents is equally essential sustainable behavior requires support from both school and family environments.”

Furthermore, the successful completion of the current programme should be recognized as a valuable component in students' lives, for example, awarding some additional marks at the university entrance, etc. It may build confidence to ensure the continuation of the programme, as the country already has a competitive education system.

Interviewee 01 emphasized that establishing small innovative knowledge centers, farm based activities, medicinal plant gardens, compost yard, and incorporating information and communication technology (ICT) may enhance the active participation of students, teachers and parents. These practical scenarios may attract the students to EE approaches rather than force them to participate. These practical experiences may enhance the interest in and emotional connections to environmental concerns by fostering positive attitudes. Teachers are hopeful about the potential benefits of EE while carefully managing existing challenges. They believe that educating the next generation can eventually produce citizens who care about the environment. Further teachers tend to critically assess current understandings and approaches after facing institutional constraints, and they try to find new ways to address these challenges in line with TL process.

Together, these results imply that teachers' perceptions of EE are continually shaped by critical reflection on their experiences and practices, as well as being socially co constructed through interaction with others and contextual settings. Overall, the findings demonstrate that important transformative movements within EE in SL such as obligation to commitment, instructor to facilitator, and teacher to environmental steward/ leader within the EE aspects in SL.

8. Discussion

This study explored how Sri Lankan school teachers create meaning of EE and how their perspectives and practices regarding EE have shifted over time. The findings show that the teachers' understanding of EE is not static or uniform. It is a dynamic and socially constructed process shaped by teachers' personal and professional backgrounds, experiences, contextual engagement, interaction with others and reflection.

Teachers' meaning making in EE

One of the major contributions of this study is the finding that teachers' understanding of EE extends beyond the passive transmission of knowledge to students. It emphasizes the importance of achieving meaningful attitudinal and behavioral changes while improving students' knowledge, attitudes and skills regarding environmental concerns. This study makes a qualitative contribution to understanding how teachers construct meanings of EE. Teachers' understanding of EE is shaped by their educational as well as their personal and contextual engagement with EE. This strongly aligns with Vygotsky's (1978) theory of social constructivism, where knowledge is actively co created through personal interaction and contextual engagement. Furthermore, the study shows that teachers' practical implementation of EE largely depends on their meaning making process.

Additionally, teachers did not describe EE as merely teaching knowledge about biodiversity, climate change, pollution, or waste management. Environmental awareness alone is insufficient unless it develops values, responsibility, and environmental consciousness in students' daily practices. For example, teachers expect students to bring reusable lunch boxes instead of merely knowing the harmful effects of unconscious polythene usage. Students are encouraged to separate waste and engage in tree planting by being given the responsibility to behave in an environmentally conscious way. Moreover, teachers' understanding of EE was related to goal of fostering an environmentally sensitive younger generation while emphasizing the importance of incorperating more practical, participatory, and experience based approaches into EE.

Similar arguments have been made in the EE literature, which suggest that environmental literacy should be developed through a pedagogical shift toward collaboration, critical thinking, and active engagement beyond classroom teaching. Also, the study highlighted the need to integrate of all dimensions of

environmental literacy, such as knowledge, skills, attitudes, values, behaviors and actions into pedagogical designing (Xiong *et al*., 2025).

This study implies that the teachers' understanding of the value of experiential learning components in EE is not developed solely through theoretical knowledge or formal guidelines. Teachers began to understand that practical based experiences foster positive childhood attitudes and environmentally friendly behaviors rather than relying on classroom based teaching alone. Furthermore, the findings show that teachers' understanding of EE is continuously recreated and co constructed through their practical engagement in training programs, advice from senior teachers and administrative officers, and involvement in student based activities. This implies that professional learning is an ongoing and socially embedded process. These interactions may enhance practical adaptations in response to new challenges supported by experienced guidance. For example, one teacher designed a practical based lessons on soil erosion for the students after participating in a training programme, while another teacher was inspired to engage with EE after receiving guidance from the deputy principal of the school after observing his own fruit garden at home.

This study further contributes to developing a holistic understanding of the meaning making process related to EE among Sri Lankan teachers, by integrating both social constructivist and transformative learning theories. Social constructivism helps explain how EE shaped through interaction and contextual factors, while transformative learning theory accounts for how teachers' perspectives evolve over time through critical reflection particularly in response to some emotional or professional challenges.

The teachers' role in EE

Within the school context, the teacher's role is crucial in EE, and the findings show that teachers perceive the importance of taking greater responsibility for attitude development as initiators. These findings support previous research (Negi, 2023), where teachers identify themselves as initiators of attitudinal changes. Despite the strong influence teachers have on students, teachers believe they should behave in an environmentally conscious manner and act as role models for students. One participant elaborated her view as; "Teachers are the most accepted role in students' lives, and students tend to be motivated by teachers' actions". Therefore, teachers play an important role within EE approaches in SL by bridging the gap between policy and practical implementation, translating abstract EE goals into meaningful classroom practices. This is significant in SL, as EE is often practiced through action based programs such as the EPP rather than being taught as a separate subject. The findings show how teachers carry the responsibility of translating broad

environmental goals into practical classroom activities, where students can easily understand and follow.

Transformation of teachers' perspectives on EE

Teachers expressed their views on some recent environmental challenges, “Ditwah cyclone," which caused significant environmental disturbances and human casualties along with issues such as flooding, pollution, land filling, and deforestation in SL, and how these challenges influenced their understanding of EE. Teachers tended to reflect critically about their responsibility to guide their students. Some teachers were changing their practices to become role models within the school. Emotional experiences related to challenges may trigger actions. Some negative emotions such as anger over injustice in global environmental crises, such as climate change and global warming, can inspire individuals to take responsible actions (Agostini & Van Zomeren, 2021). When people engage in collective environmental action, they experience positive emotions such as pride, satisfaction, awe and hope (Landmann & Rohmann, 2020). In this study, teachers also reported feelings of pride and satisfaction after engaging in EE approaches within the schools, and they expressed enjoyment of the positive feedback from students, parents, and the community, further reinforced their commitment to continued planning and implementation.

Teachers’ personal motivation, stemming from childhood attitudes developed through engagement in environmental awareness programs, tree planting activities, and simple nature experiences such as protecting plants and animals, may generally lead them to understand EE later as an important subject area within school. Similarly, a study in Sweden shows that childhood memories have an impact on teaching Geography in later stages of life (Molin *et al.*, 2015). The educational and professional background may improve knowledge that can be practically applied. The teachers’ attitudes and commitment toward the practical implementation of EE within the school context have developed over time. These findings show that the attitudes of both teachers and students are important in the EE process. Further, this study contributes to the finding that emotional and reflective experiences may also transform teachers’ perspectives and professional identities while strengthening their long term commitment to EE approaches. Earlier research also discusses that deep personal transformations in beliefs and assumptions about sustainable approaches may be essential for addressing current environmental challenges (Grund *et al*., 2023).

Challenges in EE

The study shows that there is a gap between ideal EE practices and their practical implementation. A similar view was elaborated on EE as a “ paper based concept” within the South African context (Fru & Ndaba, 2023). Time limitations, target

based programs rather than focusing attitude change; exam based, results oriented education systems; competition among students; subjects assigned to teachers; limited resources and lack of financial assistance are identified as major constraints involved in EE in Sri Lankan schools. This aligns with research from the Global South, where exam focused educational systems make it difficult for multidisciplinary programs like EE to gain institutional support (Tilbury, 1995).

While earlier studies show that Sri Lankan teachers have better knowledge and positive attitudes towards environmental matters (Pathirana, 2015), this study contributes to understanding why this environmental knowledge is not translated into actual outcomes by emphasizing the institutional and contextual challenges faced by teachers in the school context. Especially, not all teachers are involved in EE approaches, and the exam oriented education system can be interpreted as a major factors behind this situation. Most importantly, some teachers perceive it as an extra burden, and tend not to be involved voluntarily.

Need for policy support and collective responsibility

Currently in SL, EE is not taught as a separate subject and is not allocated a time slot, and only a selected group of students are actively involved in these programs, depending on students' and parents' willingness. It is entirely voluntary to participate. Only some students gained this knowledge within the school context. As a nation, all younger generations should be involved in these kinds of activities to develop awareness and foster positive attitudes. Therefore, teachers sugget a separate time slot in the school curriculum that can involve all students from early childhood while ensuring the participation of all teachers.

Teachers are considering achieving greater attitudinal changes by introducing new methods. Teachers are being more careful in planning and designing innovative, practical activities by combining technology and extracurricular activities such as sports and cadets to achieve the goal of EE while adapting their limited time and resources. Rickinson (2001) also emphasizes the importance of experiential learning approaches in EE. David Kolb (1984), who proponent of experienced learning theory, also explains learning through concrete experience and reflection. Additionally, personal experiences may create an emotional understanding of EE that is more abstract.

Additionally, the physical structures such as innovation centers, farm structures, waste management areas, and notice boards on school premises can motivate both students and teachers regarding environmental concerns, and these visible elements serve as reminders and practical learning tools that encourage environmental awareness among both students and teachers. These visible structures emphasize practical initiatives rather than theoretical knowledge

learned in the classroom. Therefore, the physical environment may provide a better setting for both awareness and practical engagement within the school context. Moreover, the study reveals that EE should be guided by a proper, consistent national plan supported by education policies. The strong commitment of all stakeholders and better monitoring are important for smooth functioning of EE within the school setting.

Additionally, the participant emphasized the provision of extra entrance marks for higher education opportunities or scholarships opportunities for the successful completion of EE programmes, as currently students are engaged in a highly competitive education system. Such efforts have the potential to promote long term voluntary engagement and commitment to environmental matters, even though they may initially function as external motivators. As it is difficult to change entire system within a short period, some practical based initiatives may be very useful within EE approaches.

In some schools, administration and peer teachers perceive EE as an extracurricular activity. Currently, the responsibility of EE approaches is entirely assigned to a designated teacher within the school setting. However, all interviewees stated that it could be more effective with full collaboration from peer teachers and the school administration. Because the knowledge, expertise, and different abilities of peer teachers may be very useful in conducting EE programs by managing limited time and resources. The engagement and awareness of all teachers in EE are essential for its successful implementation. This also aligns with the importance of collective action toward sustainable development.

Findings clearly show that environmental responsibility cannot be achieved through isolated activities alone. It required a long term collective approach with institutional commitment and community participation. Suggestions for improving EE approaches can be useful in designing national policies, curricula, and professional development programs relevant to EE approaches in SL.

Future research

The same topic can be explored with a larger group of teachers from different provinces in SL to understand whether similar experiences are found in rural, urban, and semi urban schools. Comparative findings may help further investigate how social, economic, and resource imbalances shape the understanding of EE. Moreover, the perspectives of other stakeholders on EE, such as officers from the Ministry of Environment, students, and parents, can be considered, since the findings show that EE approaches are largely influenced by these stakeholders, highlighting importance of collaborative engagement. Future research can

examine the current issues in teacher training programmes on EE and explore suggestions for improving such programmes with the aim of transformative perspectives toward EE approaches. The influence of various activities such as waste separation, gardening, and participation in the EPP on students' attitudes and behaviors could be further explored in future studies.

Overall, this study demonstrates that teachers attach different meanings to EE but expected to develop an environmentally sensitive younger generation through attitude change. Teachers' understanding has evolved gradually and has been reshaped through engagement in EE practices within different contextual backgrounds. Further, teachers' understanding of EE can be defined as a progressive, transformative, and experience based process. However, some systemic and institutional constraints may limit its full policy framed implementation and success. Integration of EE into the curriculum as a subject with a specific time slot, policy support, teacher training, and collaborative approaches can be helpful in achieving goals of EE while addressing major challenges such as time constraints and resource imbalances. Positive attitudes, values, and motivation toward EE approaches among both educators and learners may sustain environmental outcomes through EE.

9. Conclusion

This study explored how Sri Lankan school teachers create meaning of EE and how their perspectives and practices regarding EE have shifted over time. The findings show that the teachers' understanding of EE is not static or uniform. It is a changing and socially constructed process shaped by teachers' personal and professional backgrounds, experiences, contextual engagement, and interactions with others.

The study highlights that teachers' understanding of EE developed in alignment with Vygotsky's (1978) theory of social constructivism through lived experiences and social interaction, instead of through formal policies and directives alone. Teachers' understanding of EE goes beyond transmitting knowledge. It is understood as fostering attitudinal and behavioral changes through participatory approaches, emphasizing the importance of developing values towards environmental responsibility while improving critical thinking and active participation.

Importantly, findings show that teachers' perspectives on EE shifted over time after facing different "disorienting dilemmas" such as sudden environmental disasters, environmental degradation issues, in line with the transformative learning theory of Jack Mezirow (1978). That transformation is seen as a shift from perceiving EE as an additional responsibility to viewing it as an integral part of teachers' professional identity. Teachers identified themselves as facilitators of environmental stewardship and role models for the younger generation, beyond knowledge transfer after critical reflections on their previous understanding.

Despite teachers' strong commitment and positive views on EE, teachers face significant challenges within the school context, such as time limitations, an exam oriented education system, and scarce financial and physical resources. Teachers' insights emphasize the importance of having a separate time slot for EE within the education curriculum, teacher training, resource allocation, and greater involvement of parents and peer teachers to enhance the effectiveness of EE approaches to develop an environmentally responsible younger generation. Teachers recognize the importance of hands on activities, field based knowledge transfer, community engagement, and advanced technology within the EE. However, the practical implementation of these approaches are often limited by institutional barriers.

In summary, this study shows that how teachers create meaning, negotiate, and implement EE practices within the school context has a significant impact on how effective it is in Sri Lankan schools. The study further demonstrates that teachers are playing an intermediary role by bridging the gap between policy and actual practices based on their meaning making. The study contributes to a deeper understanding of social and institutional influences in EE understanding by teachers. It is important to pay attention to social and institutional dimensions of EE to achieve sustainable development in SL.

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Popular science summary

Environmental challenges such as climate change, unsustainable resource exploitation, and water, air, and soil pollution, including natural disasters, are creating severe problems in human lives all over the world. Therefore, it is important to take the appropriate immediate action to address the current environmental challenges. Aligning with that, Environmental Education (EE) plays a vital role in developing an environmental concern younger generation through enhancing knowledge, skills, and attitudes on environmental matters. In Sri Lanka, EE approaches have been conducted since 1984. But how do teachers develop their own understanding of EE and transfer those meanings into classroom activities?

This study explored how Sri Lankan school teachers create meaning on EE and how EE approaches are practiced within the context of schools. The study demonstrates that teachers' understanding of EE is not developed through the policy framework or textbooks. Teachers' understanding of EE is developed through their personal and professional backgrounds, training programs, and interaction with others such as students, parents, peer teachers, and institutional actors. Natural disasters, environmental crises, and professional challenges also show a significant impact on teachers' perspectives, which also shift and frequently enhance their feelings of responsibility and motivate them to take action.Teachers have become role models within the school context after critically thinking about their responsibilities.

Overall, this study demonstrates that the teachers gave different meanings to EE but expected to achieve an environmentally sensitive younger generation through changing attitudes and behaviors. Further, teachers' understanding of EE can be defined as a progressive, transformative, and experience based process. Systemic and institutional constraints may limit the successful implementation of EE within the school. However, integration of EE into the curriculum as a subject with an exact time slot, policy supports, teacher training, and collaborative approaches can be helpful in achieving the purpose of EE approaches while addressing the major challenges of time constraints, exam oriented education system, and resource scarcity.

Positive attitudes, values, motivation, and active participation in EE approaches in both educators and learners may sustain environmental outcomes through the EE. These factors may encourage environmental responsibility behaviors while enhancing shared responsibility for environmental conservation.

Suggestions for improving EE approaches can be useful when designing the national policies, curriculum, and professional development programs relevant to EE approaches in SL while giving attention to teachers' meaning making process of EE.

Appendix 1- Semi-structured interview Guide

Exploring School Teachers' perceptions and experiences on Environmental Education in, Western Province, Sri Lanka
Thanking for the participation
Introduce myself and explain purpose of the study.
Explain about participant's right of withdrawal and consent on interview recording and storage of data and aware the data confidential and anonymization.

Theme 01- Understanding the background of the participants and their exposure to the Environmental Education

1.Can you briefly explain about your background to environmental education?

Probes

•Years of teaching experience
•Subjects taught
•School type (Primary/ Secondary)
•Resource availability (Urban/Rural)
•How many years involve with environment education
•Have you received any discussions, interactions (training) related to environmental education and if so how you experienced those involvements?
•How do you think your teaching background and experiences have shaped the way you understand environmental education?

Core concept

To understand how teachers' professional background and their exposure influence to create meaning around environmental education.

Theme 02- Teachers' Understanding of Environmental Education and how creates meaning

01.Can you briefly explain how you perceive the environmental education in school context?
02.What factors do you think affect to shape this understanding and how?
03.What do you think the purpose of raising awareness on environmental matters through environmental education in schools?
04.Can you explain student's involvements and parents participation of the environmental education activities?

05.Can you explain how you're thinking on possibility to changing students thinking, attitudes and behaviors through environment education?

06.How effective do you think current environmental education programs are in achieving their goals?

07.Can you briefly explain about possible causes behind less progress in environmental conservation though practice environmental education within the schools?

08.Some researchers have found that school teacher's knowledge about environment matters in Sri Lanka is high and but this knowledge did not translated in to actual actions. Can you explain why do you think this happens?

Core Concept

Explore the teachers understanding and meaning making on Environmental Education.

Theme 03- Challenges and suggestions for improvements

09.Can you briefly explain about challenges you faced when implementing environmental education programmes in your school?

10.What kind of support do teachers need to be more supported/ efficient in environmental education practices in schools?

Core concept

To identify challenges and future improvements related to environmental education

Theme 04- Change over the time

11.Have your views or approaches used to environmental education changed over time? If so can you explain how and why changed?

12.Can you tell me an experience, situations or challenge within education that made you reshape your views about environmental education?

Core concept

To identify transformative experiences related to environmental education on teacher

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AI Disclosure

I used an AI tool to transcribe my interviews. However, it was difficult to transcribe interviews through standard transcription tools. Therefore, I uploaded five- minute audio clips to “Chat GTP Voice” to translate Sinhala into English. Interview quotes generated through this process were used for my analysis.

Word Count

14 950 Words (Except Front pages)