



FACULTY OF EDUCATION
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TEACHERS' PERSPECTIVES ON TEACHING ENVIRONMENTAL EDUCATION TO SPECIAL EDUCATIONAL NEEDS STUDENTS

An interview-based study of special educational
needs teachers in the Indonesian context

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This study explores the experiences and strategies of special educational needs (SEN) teachers in Indonesia in teaching environmental education (EE) to SEN students. The research employs the conceptual framework of Environmental Pedagogical and Content Knowledge (EPACK) to analyse the findings. Using a qualitative method, the study collected and analysed data through semi-structured interviews. The findings highlight the positive perception of teachers towards teaching EE to SEN students, emphasising the engagement and awareness enhancement of the students. Additionally, proactive management and innovative teaching techniques become the teachers' strategy for maintaining student involvement in EE lessons. The study also reveals the challenges faced by teachers, such as the need for additional training and understanding of EE principles, as well as the impact of disruptive behaviour on the learning process. The study concludes with recommendations for improving EE instruction in SEN contexts, including the need for teacher professional development and further research to understand the reasons behind teachers' challenges in teaching EE to SEN students.

Foreword

This thesis is a reflection of my journey as both a researcher and a mother, not merely the outcome of my master's level education. It represents the culmination of many late nights, periods of doubt, and incredible discoveries. My never-ending curiosity, my family here, distant family, mentors, and friends have all inspired me along this path. I am grateful to everyone who has accompanied me on this journey. I appreciate all the encouragement, support, and belief in me. With special thanks to my husband, Muchamad Zaenal Arifin and my son, Zayn Arungbumi Arifin.

This work is equally yours and mine.

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Abbreviations

ASDAN	<i>Award Scheme Development and Accreditation Network</i>
CK	<i>Content Knowledge</i>
DI	<i>Differentiated Instruction</i>
EBD	<i>Emotional or Behavioural Disorder</i>
ECK	<i>Environmental Content Knowledge</i>
EE	<i>Environmental Education</i>
EK	<i>Environmental Knowledge</i>
EPACK	<i>Environmental Pedagogical and Content Knowledge</i>
EPK	<i>Environmental Pedagogical Knowledge</i>
IE	<i>Inclusive Education</i>
IEP	<i>Individual Educational Plan</i>
PCK	<i>Pedagogical and Content Knowledge</i>
PE	<i>Physical Education</i>
PK	<i>Pedagogical Knowledge</i>
SDG	<i>Sustainable Development Goals</i>
SEN	<i>Special Educational Needs</i>
SENCO	<i>Special Educational Needs Coordinators</i>
TI	<i>Towards Independent</i>
UN	<i>United Nations</i>
UNESCO	<i>United Nations Educational, Scientific and Cultural Organization</i>

1 Introduction

This chapter will examine the background, problems, relevance, scope, and limitations of the study. The research questions that this study aims to disclose will also be mentioned. The background will explain the key concepts of this research and the circumstances of environmental education (EE) teaching to special educational needs (SEN) students in Indonesia, and emphasise the problems and relevance of the study.

1.1 Background

The issue of environmental degradation is currently a significant concern as it threatens human life. As stated by Suryani et al. (2019) given that environmental degradation lowers human quality of life and that human well-being depends on the natural environment, urgent action must be taken to protect it. Parker & Prabawa-Sear (2020) stated that, by its definition, the term 'environment' is a social construct, which means what constitutes the environment and environmental issues are shaped by different understandings and interpretations by different societies, organisations, or regimes. As the notion of environmental issues evolves, it needs to be understood well by everyone. This has become the challenge for building a sustainable education system that involves all learners having better access to education, especially regarding environmental issues. In the 1960s, the field of Environmental Education emerged and led to the growing awareness of the threat of environmental degradation (Gough, 2013). EE was widely acknowledged during the Tbilisi Declaration of 1977, after the first UNESCO Intergovernmental Conference on Environmental Education in 1977. The Declaration outlined EE as the process of fostering an understanding among individuals regarding the interplay between physical, socioeconomic, cultural, and human biological systems. It empowers students to cultivate the necessary knowledge, values, attitudes, and practical abilities to responsibly address environmental challenges and manage environmental quality (UNESCO, 1977). Following the development of EE, Lucas (1972) defined the term EE into three categories. Those three categories are education about the environment (knowledge-based), education for the environment (aimed at preserving or improving the ecosystem), and education in the environment (basically outdoor education).

The intention of implementing EE is to foster inclusion and remove barriers to the full involvement of students in the educational environment (Stavrianos, 2016). However, EE in the SEN students setting has become a significant concern in the educational agenda. Many SEN students seem to struggle both with acquiring necessary skills and accessing scientific knowledge as they generally follow different educational paths from other students (García Terceño & Greca, 2023). In addition, adjusting teaching strategies and the need to teach SEN students about EE has created complexity in integrating EE in special educational settings. In fact, many international conventions promote equal access to education for all children, one of which is the World Declaration on Education for All 1990. As stated by Efendi (2018), under all circumstances, children with special needs living in the community should have equal access to high-quality education as equal as any other children. Thus, there is a need to adjust learning methods on EE based on SEN students' needs to facilitate their learning. For various reasons, additional support and adaptive pedagogical methods are required to participate and meet learning objectives in an educational program, particularly in EE.

Regarding teaching EE to SEN students, teachers are essential in establishing meaningful learning activities for students. Based on Yilmaz & Yeganeh (2021), it is the duty and dedication of educators to guarantee the welfare of every student in their class and enhance their learning experiences. Teachers are required to establish a learning environment that is suitable for students, especially those with SEN. Educators need to understand that their primary duty is to accommodate the diversity of all the students in their class, even the ones who are very resistant to learning (Rose & Howley, 2006). For

instance, teachers for SEN students can implement differentiated instruction (DI) as a strategy that allows for flexibility and variety in curriculum delivery (Tomlinson, 2017). In addition, Tomlinson (2017) added that teachers can differentiate based on students' readiness, interests, and learning profile by using content, procedure, teaching outcomes, or the learning environment. The teachers' experience of how they conduct EE in special educational settings is one indicator that determines success in teaching EE to SEN students. One study by Williams (1992) mentioned that the lack of experience of experts and opinions among educational personnel is one of the reasons for the ineffective incorporation of EE. Moreover, the teacher training program, as one of the tools for teachers to develop their teaching skills, also contributes to the success of integrating EE into the school program. Lappa et al. (2017) concluded that the most frequent reason EE school programs fail is that teachers receive inadequate additional training.

The main reason why SEN students need to be taught EE in their learning process is that creating equal education access for everyone is essential. Based on the Salamanca Declaration, which emphasised the importance of promoting inclusive educational models that ensure all learners, including those with special educational needs, can participate in normal programs, even if they require additional help (UNESCO, 1994). As part of the whole community, SEN students are entitled to experience a meaningful learning process as other students receive. By involving SEN students in EE, the aim of creating inclusive education will be achieved. Besides their right to access EE lessons, SEN students are responsible for taking part in environmental awareness and actions. They need to understand that between the environment and humans, there is a reciprocal relationship, so our actions can have a huge impact on our environment. One of The Tbilisi goals of environmental education is to provide every person with the opportunity to gain the information, beliefs, attitudes, dedication, and skills necessary to protect (UNESCO, 1977).

In Indonesia, where the present study will be conducted, both concepts of EE and SEN students are still progressing. In Indonesia, the guarantees for the operation of inclusive schools are made through the Regulation of the Minister of National Education Number 70 of 2009 concerning inclusive education for students who have disabilities and have potential intelligence and/or special needs (Minister of National Education, 2009). Articles 6 and 10 emphasise that the state is obliged to ensure the availability of resources, including special assistant teachers, in each inclusive school (Prasetyo et al., 2020). Besides, the Indonesian Ministry of Environment and the Ministry of Education have partnered to establish and support environmentally friendly schools through the *Adiwiyata* program, which teaches students how to preserve the environment for present and future generations (Prasetyo et al., 2020). Unfortunately, the *Adiwiyata* program has not offered a special strategy to teach environmentally friendly actions to SEN students. Furthermore, implementing inclusive education for SEN students in Indonesia faces many issues. As Tambunan (2018) mentioned, Indonesia's inclusive school optimisation has difficulty resolving issues with teacher preparedness, school infrastructure, government socialisation, managerial abilities, and collaborations between educational institutions and private businesses. To respond such issues, many private schools, especially international private schools, assisted the Indonesian government in establishing inclusive education, for instance, in the region of Bali. Thus, the awareness of supporting the SEN students' demand and taking part in environmental issues has become a concern for schools in Bali, both public and private schools.

The concepts of EE and SEN are emerging and still in the process of being implemented in Bali. Even so, following the national policy of providing inclusive education has been implemented in most schools, especially in public schools. As Bali is the main gate of international guests, many foreigners apply the idea of EE and focus more on SEN in the education sector. Many private parties established schools that focus on EE lessons and widen the possibility for SEN students to be included in their learning environment. As one example, the research site took place in a private school that is concerned with embracing SEN students in an inclusive community. The school provides options for SEN students based on their needs. With the help of a teacher assistant, some of SEN students are allowed to enrol in a mainstream class. In addition, depending on their age range, they have a possibility to attend special lessons with other SEN students. Regarding the class setting, the class ratio is a maximum of four students with two teachers and an option of one-on-one teacher. Academically, to promote a unique

educational experience, each SEN student has an individual educational plan (IEP) to follow their needs and help them gain the best learning experiences. Furthermore, the majority of the SEN students enrolled in special education classes, are spent with peers from other mainstream classrooms during lunch, break, and physical education (PE) sessions, which encourage SEN students to experience a variety of activities and learn different backgrounds from people in the community.

1.2 Statement of the Problem

SEN students in inclusive education (IE) have faced many challenges since many indicators need to be adjusted to make SEN students experience a meaningful learning process. The underlying assumption of this study is that, by emphasising the importance of inclusivity, all students ought to have equal access to EE. Notwithstanding the existing circumstances, SEN students need to experience EE to be included in the process of knowing and decreasing environmental degradation. Besides, promoting sustainable habits and environmental awareness among pupils requires EE. However, SEN students frequently encounter particular difficulties in obtaining and benefiting from the advantages of EE. Not all students can access EE as it becomes a sumptuous activity (Bialeschki, 1981). Thus, learning more about how educators and learners view the possibilities for addressing SEN students' needs in EE is crucial. Students are entitled to rights to an education that addresses the development of respect for the natural environment, which is enshrined in the UN Convention on the Rights of the Child in 1989. In Indonesia, government regulation number 13 of 2020 requires all educational levels, from elementary to post-secondary, to provide learning accommodations for students with special needs (Pujaningsih et al., 2021).

Regarding the implementation of EE in Indonesia, the World Wide Fund for Nature (WWF) had undergone the efforts of EE in 1974 (Nomura, 2009). Following that, a joint memorandum was established between the Indonesia Ministry of Education and Culture and the Office of the State Minister for the Environment No. 0142/U/1996 and No. 89/MENLH/5/1996 concerning the Guidance and Development of Environmental Education, which was an essential moment regarding the process of EE. By this, Nomura (2009) added that the Directorate General of Primary and Secondary Education of the Ministry of Education and Culture continues to encourage the development and consolidation of the implementation of environmental education in schools, including through teacher training, promoting environmental service month, and preparing a guidebook for the implementation of population and environmental education for elementary, middle, high school, and vocational education. This has created a shift of focus on EE, especially in the educational sector. Even so, there was no separate lesson for EE. Instead, it needs to be conducted during compulsory lessons in school. Furthermore, the research literature regarding the teachers' experience in the integration of EE merely focuses on the application for mainstream class students (Anderson & Jacobson, 2018; Ko & Lee, 2003; Torquati et al., 2013). Limited research exists on teacher experience regarding the integration of EE for SEN students, which is critical to understand to enhance inclusive educational practices and explore how inclusivity is embedded in EE curricula critically. Therefore, to explore how teachers perceive dealing with SEN students' learning about the environment is predominant.

1.3 Research Questions

The research aims to understand better teachers' experiences, strategies, and challenges for meeting the needs of pupils with SEN on EE teaching. To achieve these aims, the following research questions will be investigated:

1. What are SEN teachers' perspectives on teaching EE in SEN settings?
2. What are SEN teachers' strategies for teaching EE in SEN settings?
3. What are SEN teachers' challenges in teaching EE in SEN settings?

1.4 Statement of Relevance

EE is a global priority for promoting environmental stewardship, sustainability, and ecological awareness. This crucial educational component should include SEN students with diverse learning

needs. Thus, understanding teachers' experience in this context is vital. Examining EE within the international inclusive school's primary school curriculum holds significant relevance on multiple fronts. Firstly, as educators and institutions endeavour to create holistic learning environments, it is crucial to understand how EE complements inclusivity, such as in SEN settings. Secondly, the findings of this study can contribute to developing educational strategies that foster awareness of environmentally conscious as global citizens. Third, the findings can contribute to developing inclusive teaching strategies, curricular adaptations, and in-service teacher training programs. Lastly, the international school can benefit from insights that help a more equitable and sustainable future by ensuring that all students, regardless of their abilities, engage in and support initiatives for sustainable development and environmental stewardship through EE.

Through exploring EE within an international inclusive school's primary school curriculum, this study aspires to contribute valuable insights to EE, curriculum development, and inclusivity in SEN settings. By examining these dimensions through the conceptual framework on Environmental Pedagogical Content Knowledge (EPACK), this research seeks to unravel the teachers' perspectives on the complexities of integrating inclusivity within an environmentally focused curriculum. The anticipated outcomes of this study have the potential to inform the development of environmentally conscious educational strategies and special educational settings, thereby nurturing a generation of socially responsible and environmentally aware global citizens.

1.5 The Scope and Limitation

The broad concept of SEN creates a large spectrum of children who need special assistance in their education. Even among Special Educational Needs Coordinators (SENCO), the exact definition still seems contested. Given this, addressing the multiple SEN classifications is outside the researcher's competence and expertise. The intention is to focus on children who comprise a large segment of the SEN population: students with mild to moderate cognitive and emotional or behavioural disorder (EBD), and the term "special needs" will be used throughout this chapter to refer to this demographic. The research site provides this demographic and has taught EE in their education. Besides, this research will use the definition of EE stated by Arthur Maurice Lucas (1972). As researchers have mentioned above, Lucas (1972) categorised EE into three parts: education about the environment, education for protecting the environment, and education in the environment. This definition creates a concrete idea of a broad concept of environmental education, and observing the teaching practice of EE with SEN students offers valuable insights into how EE concepts are understood and communicated among this specific demographic.

1.6 Structure of the Thesis

Generally, the thesis will consist of seven chapters. The first chapter will examine the background of the study and will illustrate the problems, relevance, and aim. The conceptual framework underpinning the study will be covered in chapter two. The next chapter is a chapter of a review of previous studies on EE for SEN students. The study's research methods, such as the research approach, sampling techniques, participants, and limitations, will be depicted in chapter four. The findings of this study will be delivered in the following three chapters. Chapter 5 will explain the research results. Next, chapter 6 will demonstrate the discussions based on the findings. Last but not least, chapter 7 will examine the conclusion and recommendations for further research.

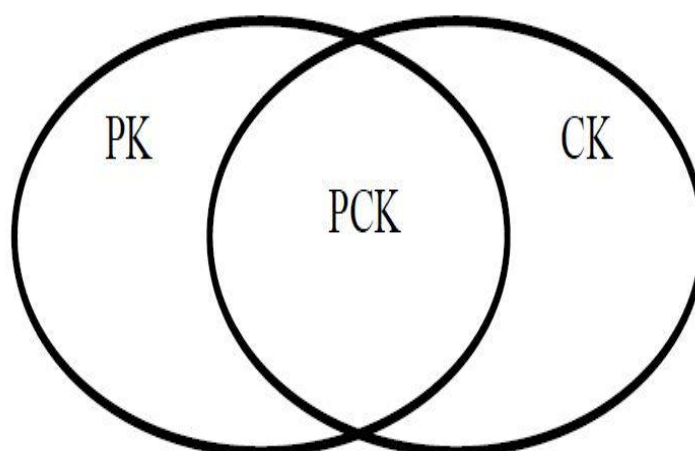
2 Conceptual Framework

The objective of this chapter is to introduce and explain the relevance of the conceptual framework that will be employed as the foundation of the study. The conceptual framework of Environmental Pedagogical Content Knowledge (EPACK) will guide this study as the main framework. The concept of EPACK is a modified concept of Pedagogical Content Knowledge (PCK) which contributes specifically to the issue of EE. Generally, the application of conceptual frameworks, as described by Miles et al. (2014), explained the study's primary subjects, including the crucial variables and factors, as well as the assumed connections between them. In order to help guide the researcher, a conceptual framework offers a logical structure of related concepts that help construct a picture or visual display of how ideas in a study relate to one another (Grant and Osanloo, 2014). In relation to this study, the conceptual framework of EPACK will be discussed to demonstrate the meaning and understanding of SEN teachers' experiences in teaching EE to SEN students.

2.1 Pedagogical Content Knowledge

The profession of teachers has been demonstrating a crucial need for better development as they are the essential key to achieving better education. Many researchers have had conducting studies to investigate how to provide better learning for students. One of the major contributions is developed by Shulman (1986) in developing teachers' professional skills, which is the concept of Pedagogical Content Knowledge (PCK). Shulman (1986) introduced the concept of PCK to integrate the two fields of Pedagogical Knowledge (PK) and Content Knowledge (CK) as the answer to examining the historical shifts in the relative importance of both fields in the practice and regulations of teaching education. The emergence of PCK is intrinsically linked to the 1980s effort to professionalise education in the United States (Deng, 2018). As stated by Bullough (2016), since there was a demand to improve the quality of teachers and teacher education, teacher educators suggested professionalising teaching as a response to the increased criticism of American schooling's quality. PCK blends content and pedagogy, with the teacher combining his or her knowledge of a topic with teaching strategies and additional understanding to facilitate student learning.

Figure 1. Pedagogical Content Knowledge (PCK)



Source: (Shulman, 1986).

Shulman (1987) explained PCK as *the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students* (p. 15). In addition, PCK, according to Magnusson et al. (2002) is the sum of teachers' understanding of the subject matter, pedagogy, learner context, and setting, all of which contribute to their capacity to instruct. The content in PCK was derived from the PK and the CK. Shulman (1986) did not define the phrase "pedagogical knowledge" directly, but readers can infer from his work that it encompasses information about teaching planning and evaluation, distinctive characteristics and student development, classroom management, educational policy, and other related topics. PK represents a teachers' general comprehension of ideas pertaining to children's intellectual and physical development, as well as the social and cultural aspects of teaching and learning, is reflected in their pedagogical expertise or pedagogical knowledge (Shulman, 1986). This knowledge is then applied to teaching in the classroom (Lyu, 2021). This information is organised together under a general idea that affects how all subjects are taught. Mishra & Koehler (2006) called it, *a generic form of knowledge that is involved in all issues of student learning, classroom management, lesson plan development and implementation, and student evaluation* (p. 1026).

Furthermore, CK is the subject-matter expertise of a teacher. It might contain concepts, theories, guidelines, and frameworks for that type of knowledge component (Shulman, 1986). The typical approaches for creating this kind of knowledge are also included, as are the standards for assessing knowledge claims. As Shulman (1986) noted: *The teacher need not only understand that something is so; the teacher must further understand why it is so, on what grounds its warrant can be asserted, and under what circumstances our belief in its justification can be weakened and even denied. Moreover, we expect the teacher to understand why a given topic is particularly central to a discipline, whereas another may be somewhat peripheral.* (p. 9). Subject-specific knowledge and inquiry styles vary widely, and for a teacher to teach a subject effectively, they must possess a thorough comprehension of it. Thus, CK is of critical importance for teachers when presenting a certain subject.

Shulman (1986) illustrated teachers' understanding of "the most useful forms of representation of the most powerful analogies, illustrations, examples, explanations, and demonstrations: the ways of representing and formulating the subject" (p.9). The combination of pedagogical and content knowledge will result the modification of what a teacher will teach and how the teacher will teach it to the students. As Deng (2018) emphasised, the belief that a teacher's content knowledge of an academic topic must be transformed into pedagogical forms underpins the concept of PCK. Omoseebi (2021) then explained what, why, when and how teaching skills can be effective in the classroom. "What" refers to subject matter knowledge, "why" refers to the reason or purpose of teaching a particular concept, "when" refers to the best time of teaching and whom the teacher is teaching (stage of the learners' development), and "how" refers to the instructional procedure and strategies to ensure meaningful learning (Omoseebi, 2021).

PCK also entails recognising what factors influence a certain age group of learners' level of difficulty in learning a given subject, as well as the prevalent misconceptions that students from various backgrounds and ages bring to the study of the most commonly taught subjects and lessons. One year later, Shulman (1987) further acknowledged that among an array of teachers' knowledge forms, PCK is of special interest because it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (Shulman, 1987, p. 8). Furthermore, according to Deng (2018), a teacher's PCK is a complex construct that involves the transformation and integration of multiple categories of knowledge: subject knowledge, learner knowledge, general pedagogical knowledge, and curricular knowledge.

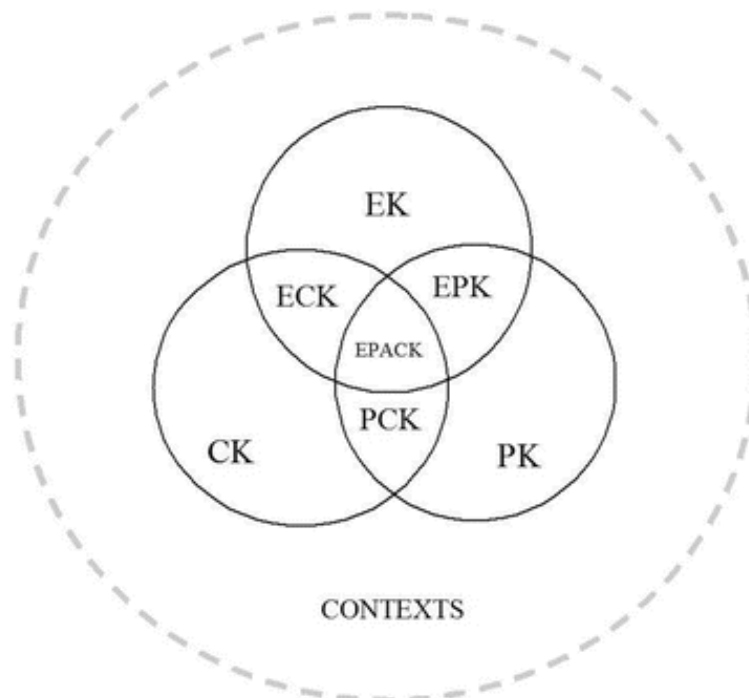
2.2 Environmental Pedagogical Content Knowledge (EPACK)

The growing of EE in schooling has yet to result the increase of EE-specific PCK, especially for SEN students. Teachers must possess a specific skill in engaging learners' cognitive, emotive, and action domains using a variety of teaching methods in order to implement effective EE (Uzzell & Rätzl, 2009). Besides, teachers must have a comprehension of concepts from a variety of

disciplines (Borg et al., 2012). In accordance with this, a specific EE for PCK is needed to ensure effective teaching in the class. By having this, teachers will address the environmental issues correctly and teaching the material in the most appropriate way for the different needs of students. As Eilam & Trop (2010) mentioned the development of specific pedagogical approaches that underpin sound EE has also been considered.

In order to assist teachers in having deeper understanding in narrowing the gap between curriculum policy and classroom practice in EE, Zhou (2015) proposed the Environmental Pedagogical Content Knowledge (EPACK) framework as the extended version of PCK. EPACK is applicable to incorporate EE. It refers to the interconnection of three knowledge domains: environmental knowledge (EK), content knowledge (CK), and pedagogical knowledge (PK). These three knowledge domains interact and yield various types of blended knowledge: PCK, Environmental Content Knowledge (ECK), Environmental Pedagogical Knowledge (EPK), and lastly EPACK (Zhou, 2015).

Figure 2. Environmental Pedagogical Content Knowledge (EPACK)



Source: (Zhou, 2015).

EK refers to the teachers' understanding of environmental issues that they will include into their subject-matter instruction is referred to as their "environmental knowledge." It includes the understanding of a series of what-questions: What are the environmental issues? What caused them to happen? What impacts do these issues have on the ecosystem, economic development, and social, political, and cultural relations? What are the possible solutions? (Inwood, 2019). For example, in the case of climate change, teachers need to know about the causes of global warming, the consequence of continuous temperature rise, the behavioural changes required to reduce human footprint on the atmosphere to mention a few. In the case of the loss of biodiversity, teachers should have knowledge about why biodiversity is important, what re-habitation is, and how effective this has been so far.

The next domain is the ECK. The intersection of topic CK and EK is known as ECK. It reflects to the teachers' understanding of how common environmental challenges relate to the curriculum's compulsory subjects. Since environmental problems vary widely, they can also have multiple dimensions: biophysical, economic, social, cultural, and political dimensions (Kim & Fortner,

2006a). Each field of study has distinct boundaries when it comes to discussing environmental issues. To effectively incorporate environmental education into their topic teaching without rigidly adding environmental concerns to the curriculum, teachers must possess ECK. In order to cover pertinent environmental subjects in the subject context, teachers must, on the one hand, be able to identify the right teaching opportunities. However, teachers also need to understand when and how best to turn certain environmental problems into relevant teaching subjects.

The domain of EPK is related to the understanding of how specific environmental challenges might affect teaching and learning when they are included in school curricula. This entails being aware of the limitations and educational importance of various environmental challenges in relation to the proper disciplinary designs and teaching strategies. For instance, environmental concerns offer new perspectives on the subjects being taught. Educating students about environmental issues through a connection to their lives and society can make learning more relevant, useful, and engaging for them (Strife, 2010). The general understanding of efficient pedagogies for environmental challenges is also included in EPK. Among the educational strategies that academics advise using include experiential learning, active learning, inquiry-based learning, community partnerships, and multidisciplinary approaches. Meanwhile, teachers must be aware that environmental problems vary widely in terms of their complexity, unpredictability, and intangibility. When incorporated into subject-based instructions, they could be considered for various pedagogical strategies (Kim & Fortner, 2006).

The domain of EPACK that includes such knowledge as meaningful integration of environmental issues into subject curriculum; clear scope and scale of such integration that promote and enrich, rather than jeopardise and sacrifice the subject teaching; pedagogical techniques that use environmental topics in constructive ways to teach subject content and strengthen the connection between subjects with student life and the society; and pedagogical approaches that grab students' attention and provide students experiential learning opportunities through incorporating environmental issues (Zhou, 2015). As the interrelated knowledge of environment, pedagogy, and content is crucial in teaching, alteration in one domain will affect how other domains will operate. Different environmental issues require different pedagogical method and subject or lesson content. In addition, a specific subject or lesson content will be more effective when presented with certain environmental issues with different pedagogical techniques compared to other subjects. By utilising the framework of EPACK, teachers will be equipped with the capability to answer what-, why-, how-, and when questions. What-questions point out to knowledge about what are the environmental issues that will be integrated into subject teaching; what impacts do these issues have on the biophysical environment, economy, and society. Why-questions refer to answers about the rationale of the integration of certain environmental issues into a subject and the goals of such integration. How-questions request to pedagogical methods that amply student learning outcomes. To answer the when questions, teachers need to know about at what points environmental issues should be introduced, either as a context for the learning of subject content or as an example of the application of subject knowledge.

Several previous studies have addressed the concern what is the best way to teach EE to the students. As McKeown-Ice (2000) claimed, "a major question among environmental educators is whether environmental education should be integrated into the curriculum or taught as a separate course" (p. 7). Then Zhou (2015) believed that the EPACK framework will lead us to consider a solution that blends both options. Although Zhou (2015) focused more on teacher education programs, the EPACK framework will also be helpful in assisting teachers with experience who are still struggling to integrate EE into their teaching. A professional development program for teachers that covers both EE material and pedagogical approaches will be helpful if EE becomes a standalone course and highly pedagogical training needs to be improved.

Within the notions of EE as 'education about the environment', 'education for protecting the environment', and 'education in the environment', EPACK provides a systematic approach to comprehend how educators incorporate environmental content into their educational activities while obtaining with consideration the unique needs and features of their SEN students. The first notion of 'education about the environment', EPACK is a valuable instrument for evaluating how educators understand the fundamental concept of environment to SEN students. The EPACK instruments include assessing educators' understanding of environmental issues, their ability to adjust curriculum to SEN

students' cognitive skills and learning preferences, and their techniques for developing conceptual comprehension and awareness of environmental challenges. The second notion, 'education for protecting the environment', EPACK enables researchers to investigate how educators engage SEN students in participatory and action-driven learning experiences about environmental issues. The investigation includes examining educators' instructional techniques intended to instil environmental responsibility, support sustainable behaviours, and encourage SEN students to contribute positively to their environment and society. The third notion, 'education in the environment', EPACK is used to assess how educators incorporate outdoors and learning experiences into their EE practices for SEN students. The assessment includes evaluating instructors' ability to use natural surroundings as instructional resources, coordinating hands-on learning experiences that accommodate a variety of sensory demands, and encouraging sensory exploration, curiosity, and exploration in the outdoors.

3 Literature Overview

The research involved a comprehensive collection of books, journals, and articles pertaining to education. In performing a literature review, this study adopts a comparing perspective technique to examine and present various viewpoints, arguments, or frameworks relevant to environment education (EE) and special educational needs (SEN) topics. The technique allows the synthesis of material from several perspectives in order to construct a cohesive narrative. This process includes grouping the literature into key themes that emerge from the selected studies and using subheadings to guide the reader through different themes to help the reader understand the nature of the study.

The researcher focused on the studies with outcomes of research that addressed the implementation of EE in SEN settings, the benefit of teaching EE to SEN students, and barriers in teaching EE to SEN students, emphasising teachers' experiences. Analysing the existing literature can identify successful and diverse strategies for teaching EE to SEN students. Furthermore, identifying the benefits of teaching EE to SEN students contributes to recognising the benefits of integrating EE into SEN. The literature examines the context of teaching barriers that teachers face when teaching EE to SEN students; scrutinise the barriers vary from practical issues, such as limited materials and access to outdoor settings, to pedagogical challenges related to adapting content to diverse learning needs and abilities. The literature review presents two main concepts: the integration of EE and SEN and the barriers to implementing EE in the SEN setting. Moreover, a summary of the previous research works is provided to explain relevant gaps within, highlighting the possible contributions of the current study to address these gaps.

3.1 The Teachers' Perspectives on Integrating EE into SEN Settings

3.1.1 Benefits of Environmental Engagement for Students

Early studies on integrating EE into SEN settings through Outdoor Education (OE) attempted to increase the students' physical activities (Bialeschki, 1981). In addition, teachers observed that integrating EE into SEN through outdoor recreation positively contributes to students' attitudes toward the environment (Dominguez & Schilling, 2001). Berger (2006) emphasised the finding after leveraging the interaction with nature as a therapy method and discovering that contact with nature supports the personal learning of children with learning disabilities to increase their self-esteem and lower aggressive behaviour. Similar research conducted by Fox & Avramidis (2003) also found that learning to care for nature increases self-esteem and improves the students' willingness to work as a team and complete tasks. Furthermore, Farnham & Mutrie (2003) discovered that implementing EE improves trust and group cohesiveness in diverse students with mild to moderate learning difficulties.

Moreover, studies show that teachers find that EE helps SEN students to prolong their attention and participation during learning. Szczytko et al. (2018) determined that outdoor EE can be a beneficial instructional method for children with emotional and behavioural issues (EBD), as it contributes to longer attention spans and reduced disruptive behaviours outside following the observation. Faber Taylor & Kuo (2011) also investigated the benefits of green spaces for EBD students and discovered that when students with ADHD participated in routine play in green spaces, their attention spans improved. EE can combine outdoor activities, science courses, hands-on activities, and instructional practices, making it a promising technique for assisting SEN students. However, there is an absence of explanation for the effects of treatment on attention and behaviour in the classroom. Although Kuo et al. (2018) discovered that a lesson in nature increases classroom participation for the next lesson, the study did not compare the long-term benefits of outdoor classes versus indoor lessons.

3.1.2 Teaching Practices for Environmental and Special Education

The research on integration focuses on the teacher's approach to teaching fundamental concepts of the environment by maximising direct engagement with animals and nature to SEN students. Direct engagement with nature through entertaining outdoor activities such as hiking and gardening improves the comprehension of causal interaction between humans and nature (Rynders et al., 1993). Although EE contributes positively to SEN students, teachers must establish an adapted EE curriculum for the classroom that matches the student's characteristics. In doing so, Dominguez & Schilling (2001) discovered the need to explore the most significant knowledge discrepancies and misunderstandings in teaching EE. The study emphasised that created EE resources were excellent instruments for starting the planning process (Dominguez & Schilling, 2001). Furthermore, the planning process encourages teachers to communicate with outdoor educators and green spaces administrators to provide a more integrated strategy in teaching EE (Dominguez & Schilling, 2001).

Regarding the strategy in teaching EE, teachers employ different approaches to meet students' needs. According to studies focusing on students with sensory stimulation needs, EE effectively empowered students to build sensory connections in their learning and approach different settings with heightened sensory awareness. Melber (2005) reported the benefits of science taught hands-on in the schoolyard for students with disabilities in applying EE through science lessons. McCarthy (2005) carried out further study by contrasting two methods of teaching sciences, a traditional textbook and a hands-on approach. The results suggest that SEN children who received hands-on teaching performed better on two of three evaluations. Lynch et al. (2007) supported the argument that guided inquiry, hands-on methods, and diverse groups in scientific instruction can be practical and valuable for SEN students.

In terms of assessment, it is supposed to be highlighted that the teaching and assessment process in science subjects for SEN students often comes with challenges (McGinnis & Stefanich, 2014). However, McGinnis (2013) expressed concern about the impact of the assessment on SEN pupils during the assessment process. Early research conducted by Mastropieri et al. (1999) showed that activities-oriented instruction required more preparation from teachers, time, behaviour management, and organisational skills than standard textbook instruction. Furthermore, Zembylas & Isenbarger (2002) stated that the approach's effectiveness is contingent on attentive teaching. Furthermore, Kaldenberg et al. (2015) examined how texts are still heavily utilised in science classrooms despite the shift from a traditional textbook-based approach to a more inquiry-based method, leading SEN students to struggle with reading vocabulary on textbook instruction in science classrooms (Mason & Hedin, 2011).

3.2 Teachers' Barriers to Teaching Environmental Education in Special Education

3.2.1 The Insufficient Readiness in Teaching EE

Investigating barriers at more negligible levels is crucial because obstacles vary depending on various contextual factors that function at different scales to influence teachers' experiences. Ham & Sewing (1988) discovered challenges and found that educational, conceptual, logistical, and attitudinal factors hindered teachers in teaching EE. Regarding the conceptual barrier, teachers' misconceptions about EE as a subject lead to the assumption that EE is merely taught in science class. Thus, other teachers who do not teach science perceive that EE is relevant to their curriculum (Ernst, 2007). Regarding the educational issue, teachers may not have sufficient training or workshops in integrating EE into their lessons (Cutter-Mackenzie & Smith, 2003). (Ernst, 2010) found that teachers are also concerned about their ability or readiness to conduct lessons in outdoor settings, as they lack awareness of the benefit of using the environment around them as a source of natural-world learning experiences (Simmons, 1998). In addition, according to Powers (2004), teachers' attitudes toward the environment also influence EE implementation in their teaching practices. Therefore, personal views regarding the importance of EE lead to teachers' perspective that EE is not appropriate for their instructional setting or not a compelling topic for teaching.

Regarding logistical issues, García et al. (2015) recognised insufficient preparation in EE as a drawback in teaching EE programmes. As teachers perceive EE as a single subject to teach rather than

combining into other subjects, teachers require specific teaching time allocation in conducting EE lessons (Ham & Sewing, 1988). Powers (2004) described the time required to incorporate EE into an already overburdened teacher preparation curriculum, cultural attitudes, and instructors' propensity to teach science-specific disciplinary knowledge. Similarly, Moseley et al. (2002) found that while teachers can promote EE, they are unable to teach it due to the time required for preparation. Previous research found that similar EE teaching issues emerged and were experienced by teachers who have undergone some EE training and those who have not (Moseley et al., 2002). The finding contrasts with the findings of Ham and Sewing (1988), who discovered that a lack of conceptual expertise in EE led to an unsuccessful implementation.

3.2.2 Accessibility Issues in Teaching Environmental Education

Challenges regarding the access to the logistical resources hinder the implementation of EE to SEN students. The most significant obstacle for teachers at the school level is the need for instructional resources. Most EE instructional resources are written for a general population and must be adapted to meet specific demands in the classroom curriculum for SEN students (Bialeschki, 1981; Peffer & Bodzin, 2010). The condition requires the teachers to approach such resources with the ability to modify the materials, which can pose a considerable time and attitude barrier (Ham & Sewing, 1988). Given that the OE curriculum is an ideal addition to EE, most of this learning can and should occur in the classroom and outdoor settings (Ham & Sewing, 1988). Melber & Brown (2008) found that visiting museums also became the medium of teaching EE. However, they discovered that many children with disabilities may not have the same opportunities for museum-going experiences as their peers due to transportation challenges, limited family budgets, or therapy schedules.

Moreover, Peffer & Bodzin (2010) discovered that equipment availability is an additional logistical barrier. As a result, some science teacher educators may underestimate the potential benefits of EE inclusion because they believe it does not belong in the preparation programme. Similarly, Benetti & Marcelo de Carvalho (2002) found that additional funding concerns included a lack of support for EE materials such as activity books, textbooks, videos, laboratory equipment and tools for exploration like magnifying glasses, binoculars and microscopes. Another logistical barrier is limited funding for conducting field trips (Benetti & Marcelo de Carvalho, 2002). In a study conducted by Mayeno (2000), teachers expressed their eagerness to conduct field trips (outdoor environmental programs) if the funding was available, particularly in terms of transportation and program costs.

3.3 In Summary

The literature review has highlighted the integration of EE and SEN students, including the practice or strategies, benefits, barriers, and perceptions concerning integration over the years. Using different approaches to apply to EE may be a potential method for assisting SEN students in developing skills and environmental awareness. This study provides a deeper understanding of how teachers perceive forms when pursuing integration by addressing the major research topic. Understanding these factors is critical, according to studies that focus on the complexities of factors that determine teachers' capacity to EE (Sosu et al., 2008). Furthermore, although the research populations in the literature review primarily focus on public schools and do not adequately include SEN populations, the studies' results (both quantitative and qualitative) are comparable to studies conducted with a variety of SEN groups. The literature study identified many research gaps that could improve the implementation of EE in SEN settings, including the long-term consequences of teaching EE in indoor settings and the assessment procedure. As part of the ongoing examination, this study may address the gap. Furthermore, investigating barriers at more minor aspects is crucial because obstacles vary depending on various contextual factors that function at different scales to influence teachers' experiences. Furthermore, the presented study on the common barriers in EE; conceptual, logistical, educational, and attitudinal (Ham & Sewing 1988), can be implemented as a starting point for this study's investigation of the barriers in teaching EE to SEN students.

4 Methodological Framework

This chapter will examine the general research approach, techniques, procedures, and rationale. This chapter describes the data gathering methods, participants, samples, sampling procedures, and data processing. The chapter also analyses and focuses on the role of the researcher in a qualitative investigation, such as ethical considerations, trustworthiness, the limit of the study, and how the study links to and contributes to sustainability goals.

4.1 Qualitative research approach

This research employed the qualitative method in collecting and analysing the data. Creswell (2009) defines qualitative research as developing emerging questions and procedures, collecting data in the participant's setting, building and generating themes to analyse the data, and using the researcher's interpretations to interpret the data. By applying a qualitative approach, this research depended on the story of participants' experiences. In other words, qualitative study aims to understand a particular aspect of social life with the help of methods that generate words, rather than numbers, as data for analysis (Yin, 2015). As the researcher planned to explore how teachers perceive integrating EE into the SEN setting, an exploratory interview-based study helped to disclose the research aim. The focus here is on the meanings people give to their lives and the processes that work in specific social circumstances (Valentine, 2013). Thus, the SEN teachers' perception of teaching EE to SEN students is valuable in depicting the strategies and challenges of integrating EE.

4.2 Participants and Sampling Technique

To attain a rigid description of the research aim, the researcher needs to find the most suitable and competent participants to illuminate the desired phenomenon. Purposive sampling is a valuable technique for finding participants with specific experiences in a specific social context. As Teddlie & Yu (2007) mentioned, purposive sampling can be useful to attain representativeness, make comparisons possible, concentrate on particular, exceptional problems or situations, and produce theory by gradually accumulating data from various sources. Besides, this study also used the convenience sampling technique to find the participants who meet the criteria. The primary disadvantage of convenience sampling is that the sample's bias makes study findings less generalizable (Emerson, 2021). The inclusion criteria for this study are participants who have experience teaching EE to SEN students for at least two years. Most importantly, the participants are willing and available to be interviewed since they have insights regarding the investigated research questions (Creswell, 2015). The type of participants who contributed to this study was a homogenous group, which aimed to emphasise the common characteristics, have fewer variations, and simplify the analysis (Miles & Huberman, 1994).

The participants were the SEN teachers who teach EE to SEN students in an inclusive school. In one inclusive school in Bali, there are special classes with SEN students as they have more additional learning support than those in the mainstream classes. There are four classes from age 4 to 17 years old. However, the students learn in an inclusive educational setting and spend some of their time with mainstream students. Even in the broader context, they are in an inclusive community. The participants only taught classes with SEN students, which they call TI or Towards Independent. In this type of class, they will have a maximum of five students with two teachers. The researcher believes that the teachers will be the most pertinent informants in explaining the experience of integrating EE into special educational settings. One of the primary selection criteria for SEN teachers is that they must work with students with particular learning challenges and experience teaching materials related to EE, both outdoor and indoor activities. The researcher interviewed five teachers who have performed the work

as SEN teachers for at least two years of experience. Besides those categories, the participants were chosen regardless of the teacher's educational background, work experience, age, or sex.

The study comprises five diverse participants, each bringing a unique blend of academic background and teaching experience to the research. Their varying academic backgrounds and pedagogical experiences add various perspectives and insights to the study. Here the information of participants who is involved to the study:

Table 1. Participants' Background

Identifier	Gender	Age	Educational Background	SEN Teaching Experiences
Participant 1	Male	20 - 30 years old	Bachelor of English Language Education	2,5 years
Participant 2	Female	30 - 40 years old	Bachelor of English Literature	15 years
Participant 3	Female	30 - 40 years old	Master of Clinical Psychology	5 years
Participant 4	Female	20 - 30 years old	Master of Science	2,5 years
Participant 5	Male	20 - 30 years old	Bachelor of English language education	2,5 years

This study's research site was in one inclusive school in Bali, Indonesia. This school is a private school which uses the international curriculum and special program for SEN students. The classes were called 'Towards Independent' or 'TI'. There are four TI classes: TI 1 for the ages of 4 to 8, TI 2 for 9 to 12 years old, TI 3 for 13 to 15 years old, and TI 4 for 16 to 18 years old. TI classes are exclusively for SEN students, and all students have spectrums of emotional behaviour disorder (EBD). However, the school also has mainstream classes in which the students also socialise with SEN students.

4.3 Data Collection

The semi-structured interviews are required to gain in-depth information to explore the teachers' experiences and challenges. The interview will allow the participants to freely express their opinions by using some previous questions from which the researcher was interested in acquiring information (Creswell & Poth, 2018). This research used data from interviews with SEN teachers who have experience teaching EE. The questions focused on the challenges and strategies of teachers in conducting EE in special educational settings. The interview also included the general ideas of concepts that the researcher intended to investigate in order to ensure that participants have the exact understanding of the concepts. Using interviews as the data collection method, the researcher obtained a clear picture of how teachers teach SEN students about EE. One of the other advantages of this strategy is that it permits respondents to suggest concerns that the interviewer may not have anticipated (Silverman, 1993). Moreover, the interview involves a one-on-one conversation between a researcher and a participant about the research study.

In conducting the interview, the researcher created an interview question form that articulated the aims of this research. The questions covered the actions, difficulties, and strategies that were perceived by the teachers when they taught EE to SEN students. There were four categories for the interview questions such as the teachers' background in teaching SEN students, the

SEN students' class, the concept of EE and how they teach it, and last but not least, the challenges they faced. The researcher first communicated with the school leaders by email, providing information about the study's parameters, participation requirements, advantages and disadvantages, and permission to documentation. After contacting and obtaining consent from school leaders and the teachers, the interview was conducted through an online meeting at the decided time by both the researcher and the participants. The pilot study was conducted to test the data-gathering instruments, and all the data from the pilot study were included. During the interview, the researcher recorded the online meeting, and used the recording as the primary source of data analysis. Then the interview was transcribed then ready to be coded, analysed and interpreted.

4.3.1 The Interview

The interview was conducted virtually using "WhatsApp-Video Call"- an online messaging app. The agreement on meeting was confirmed through the WhatsApp Messenger, and informed consent was also sent to the WhatsApp Messenger. The consent letter provided information about the researcher, study objectives, and interview questions. The interview started by checking the audio from both researcher and participant and re-confirming the agreement of recording the conversation from the participant. After the recorder is ready, the researcher explains the aim of the study she conducted to the participants. To begin the interview, the researcher started by asking for background information from the participants. The initial questions helped the researcher build a more comfortable environment with the participants so the interview would run well. The interview used Bahasa Indonesia as the mother tongue of both researchers and the participants. By using the mother tongue, the response from the participants was more naturally delivered. The interview lasted approximately 40 minutes, and it took two weeks to finish the interview.

4.4 Ethical Consideration

Ethical issues are always relevant in every research that involves people as the participants. The ethical consideration is not merely about how the researcher protects the participants' confidentiality after the research is published, but also how the researcher can build and maintain good relationships with participants. Based on Creswell & Poth (2018), there are three principles guiding ethical issues in research. First, respect for a person by protecting the privacy, confidentiality, and consent of the participants. Second, related to the participants' welfare as research will not harm the participants and increase mutuality. Third is concern with justice, such as the balanced power relationship between the researcher and participants. For this research, there will be several anticipated and emergent ethical issues. As the study will be conducted as a master thesis, a review from the university ethics committee is necessary.

The first ethical issue of this research will be the protection of participants' confidentiality that researcher plans to interview. The participants might be reluctant to let the researcher show their personal information, although some will be okay to share it. However, showing the participants that they are entitled to have their personal information covered is essential. The researcher will figure this out by communicating adequately with the participants, explaining the research, and giving informed consent. Regardless of how informed consent has been distributed and approved to all participants and how anonymity has been applied, the issue of participants' recognition will easily occur in the community once the research is published. To deal with this, the researcher needs to give understanding to the participants of the possibility. Afterwards, participants will decide whether to participate in the research. Participants can consider the possible recognition and the benefits that participants will receive after publication. The benefits that participants may accept will be related to a research problem that the researcher addressed (Creswell & Poth, 2018). The research problem might apply to their teaching, and the research result may improve their knowledge of how EE has been conducted.

The second ethical consideration will be a possible ethical issue that participants might inform private facts of the institution, which will unfavourably affect the institution itself. As Creswell & Poth (2018) called "backyard", the researcher felt it was convenient to contact the participants as the school was the place where the researcher had worked. Studying one's own "backyard" is frequently

convenient and removes many barriers to data collection (Creswell & Poth, 2018, p. 243). However, the researcher may put the published research at risk if the report reveals negative results or if participants disclose personal information that could have a detrimental impact on the company or workplace. Moreover, Creswell & Poth (2018) suggested that using multiple validation strategies can help to ensure the account is accurate and insightful when studying one's own workplace or organisation.

Just as important are the complexities that arise from the inclusion of SEN students in the study, including power imbalances, exclusion, inequality, and values. Students with special needs may encounter obstacles in their pursuit for a high-quality education, and they may also feel excluded in an inclusive learning environment. It addresses the problems of exclusion and inequality in educational systems. Therefore, researchers need to ensure that their work aims to address and mitigate these inequalities rather than perpetuate or elevate them. Besides, regardless of a participant's abilities or difficulties, researchers are required to uphold the ideal of treating all participants with respect and dignity. This entails not stigmatising the experiences of SEN students and appreciating special skills and contributions. The power dynamics that exist in the interactions among researchers, teachers, and students with special education also needs to be carefully considered. In order to prevent participant exploitation or coercion, researchers must recognise the underlying power imbalance and take appropriate action. Furthermore, scholars ought to acknowledge the impact that educators and administrators have on the experiences of students with special education needs and endeavour to engage in fair and inclusive collaboration with them. Because of this, researchers need to handle these complications with sensitivity and care, making sure that the study process is respectful, inclusive, and compliant with moral standards related to social justice and human rights.

4.5 The Role of a Researcher

The primary instrument of data collection and analysis in a qualitative study is the researcher itself. Researchers frequently play an essential role in the gathering, interpretation, and analysis of qualitative data. As mentioned by Creswell and Poth (2018), the qualitative researcher is the primary agent of data gathering and the actor who bridges the gap between the instrument and the data. Billups (2021) explicated the gap mentioned by Creswell and Poth; that statement corresponds to qualitative research's concept of the researcher as an instrument. Regardless of any data collection methods a researcher uses, it is necessary to develop a close and personal relationship between the researcher and the participants. This intimacy enables qualitative researchers to get more significant insights into participants' experiences, viewpoints, and emotions. It implies that the researcher must be emotionally involved, physically present, and intellectually aware of the intricacies of the research situation in order to collect rich and meaningful data. Unlike quantitative research, which relies heavily on standardised equipment or methods, qualitative researchers usually collect data through their own impressions, interactions, and interpretations.

During this study, the researcher was a student of International Master in Educational Research at the University of Gothenburg. In addition, the researcher was also a former teacher in the school where the participants taught EE to SEN students. Consequently, the researcher had access to the school and the participants and more or less understood the circumstances of the participants. This condition created a more comfortable environment during the interview as the researcher and interviewee knew each other, and the conversation flowed naturally. Building a comfortable atmosphere is also related to the researcher's role in building a collaborative relationship with the participants to attain meaningful data for the analysis (Billups, 2021).

In qualitative research, the lived experiences of people are valuable and this creates the vulnerability of being bias of both researchers and participants. Lincoln & Guba (1985) stated that insightful qualitative research is internally consistent and rigorous and helps us answer essential questions about people and their lives. To ensure transparency in the data gathering process, researchers position themselves to identify their history, interest in and experience with the research issues, and acknowledge their relationship (Denzin, 2001). The question should be whether the researcher has been transparent and reflexive (i.e., critically self-reflective about their preconceptions, interpersonal

dynamics, and analytic focus regarding the methods used to gather, analyse, and present data (Polit & Beck, 2010). As a former teacher at the research site, the researcher consciously understood the position, interest, and previous experience within the research topic and the participants. The researcher carefully listened to the participants' stories and explore deeper to obtain rich data to let the perspectives of the participants dominated the view of the research topic. The researcher also tried to be transparent and reflexive and reflect only on the interview results.

4.6 Data Analysis

According to Creswell (2015), six steps are required in data analysis and interpretation for qualitative study. The steps are preparation and organisation of the data analysis, exploring and coding, coding to build descriptions and themes, representing and reporting qualitative findings, interpreting the findings, and validating the accuracy of the findings. The data will be analysed thematically, which will entail inductive engagement. As Patton (1980) noted, "inductive analysis means that the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis" (p. 306). The inductive analysis means that the broader interpretation of data is derived from the more specific cases.

As an exploratory interview-based study, the interview questions are an important tool to investigate the aim of this research. The interview questions are formulated to answer the research questions in more detail to explore the participants' point of view. After forming the interview question list, there is a pilot study to test whether the questions have successfully comprised the data that this study intends to investigate while checking if the questions are understandable to participants or not. Thereafter, the process of preparation and organisation happened by transcribing the interview manually and storing the interview under the university's online storage.

The next step is exploring and coding the data. This happened by going through the database, identifying text segments and then giving the segments code labels in accordance with the meaning the researcher interprets from the text segment (Creswell, 2015). The descriptions and themes were based on the research questions and other emerging themes. The researcher's findings represent the data using a thorough explanation of the themes derived from this analysis. The research elaborated the findings into broader interpretation using the conceptual framework in the representation.

4.7 Trustworthiness

A notion coined by Lincoln and Guba (1985), trustworthiness is regarded as the necessary foundation for evaluating qualitative research, particularly for those who are primarily focused on quantitative approaches, and this concept needs to be more attention from most researchers. There are four elements in the original trustworthiness framework: credibility (truth), dependability (consistency), transferability (applicability), and confirmability (neutrality) (Billups, 2021). Furthermore, Billups (2021) added another element based on Polit & Beck (2017), which is authenticity because some qualitative researchers acknowledge the original discussion as an equally essential evaluating factor.

Related to the study's credibility, the researcher has done the prolonged engagement by spending considerable time to figure out the participants' perspectives and to counterbalance the researcher's own bias. As Wallendorf & Belk (1989) asserted, the nature of the study will specify how long the researcher needs to spend. The researcher has spent considerable time approaching and understanding the participants' perspectives. In addition, as the researcher was a former teacher at the research site, the researcher, in a certain sense, understood the context in which the participants were involved. This may lead to the researcher's bias, however, the in-depth interview helped the researcher to grasp the participants' standing points. Another strategy to ensure the study's credibility is peer debriefing when the researcher discusses with a supervisor who is experienced in this type of study. This strategy entails receiving feedback from peers, addressing bias, factual errors, competing interpretations, convergence between data and phenomena, and emerging themes (Billups, 2021).

The following criteria are dependability, which is explained by Nowell et al. (2017) as a method to guarantee that the approach is richly documented, logical, traceable, and repeatable. The researcher

reviewed the existing literature with related topics to see the discussed topic's familiarity and limitation, which is EE into SEN students. Besides, the data collection method, such as the interview question, was tested in the pilot study to ensure the portrayal of the participants' experience. The criteria of transferability can be done through the concept of proximal similarities (Trochim, 2006). As Billups (2021) explained, thick description refers to a researcher's field notes to capture conversations, observations, and interpretations during data collection. Thick description enables the researcher to more quickly assess how the same set of people, location, and phenomena could be applied in a similar environment, under similar conditions, and with similar participation (Billups, 2021). The researcher had the recordings of all interview answers and had been transcribed to be analysed.

The confirmability element is shown in this study by presenting the findings in line with the interviews and interpreting them using the theory and existing literature. This element requires the researcher to establish that the findings and interpretations were generated from the data (Nowell et al., 2017). Last but not least, the element of authenticity is the technique that focuses on the study's contextual goal or the research's intended value. The researcher explained the intention of this study is to understand the perception of SEN teachers in teaching EE to SEN students. This study focuses on the strategies and challenges teachers have experienced before.

4.8 Limitations

In order to attain in-depth understanding, more resources need to be added to this study. The resource of time and funding would have been needed to research how teachers in several schools in Bali perceive teaching EE in an SEN setting. If the study had been conducted with more participants over a longer time length, more perspectives could have been gained to get richer data and perspectives. The time length would also help the data analysis process, as it will have immense data. The findings can be unique and more applicable to inclusive schools in Bali. Besides, incorporating direct observation of teaching approaches in a classroom context could be beneficial for future research. By combining observational data with self-reported data, researchers could obtain a more comprehensive picture of how EE is taught to SEN children, including the precise instructional strategies used, student engagement, and various pedagogical approaches. Furthermore, classroom observations may offer additional context for evaluating our study's results and provide the elements that go into successfully implementing the EE curriculum for SEN students.

4.9 Statement of Sustainability

As stated in the Sustainable Development Goals by the UN, goal number four, which is quality education, explains that we need to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The goal has emphasised the ideas of inclusive and equitable, which means that education needs to be accessible and managed fairly for every single human being. SDG 4 also affirms the idea of lifelong learning so that education can sustain its existence and usefulness for now, tomorrow, and in the future, for all ages. This study will contribute to developing a more equitable and sustainable future by ensuring that all students, regardless of their abilities, have access to EE, especially SEN students, in an inclusive school.

Regarding EE, the UN Sustainable Development Goals number 13 is about climate action, number 14 is about life below water, and number 15 is about life on land, which is very relevant to the aim of EE. It seeks to promote concern for sustainable development and increase knowledge, awareness, attitudes, behaviours, and responsibilities toward managing the natural environment (Prasetyo et al., 2020). Moreover, EPACK as the research framework is relatable and should be discussed, particularly among teachers. Thus, teachers and educators interested in democratic perspectives on education for young students, pedagogical discussions, and empowering learning processes may find value in these elements of sustainable education (Hägström & Schmidt, 2020).

In addition, both concepts of special educational settings in inclusive education and EE also contribute to sustainability. As Clark et al. (2016) mentioned, decision-making processes need to involve people with SEN as we move toward a more sustainable vision for our planet. Thus, the study

contributes to the discussion on developing inclusive teaching strategies, curricular adaptations, and teacher training programs in EE for SEN students.

5 Presentation of Research Result

This chapter demonstrates the data analysis of the qualitative methodology, according to interviews conducted with SEN teachers regarding their perspectives on teaching environment education (EE) to special educational needs (SEN) students. Three distinctive themes emerged from the data. Those reflect both the participants' perspectives and the research objectives presented at the beginning of the study. Each theme is further divided into sub-themes, which are then elaborated using excerpts from various interviews.

Three significant themes from the data were categorised based on the research objects. The first theme is 'teachers' perspectives of EE in the SEN setting. Three sub-categories will explain this theme: 'the concept of EE', 'the value of teaching EE for SEN students', and 'the impact of teaching EE to SEN students. The teachers shared their understanding of EE and their experiences dealing with SEN students. The term 'environmental education' seemed unfamiliar to all the participants. On the other hand, all teachers indicated a positive feeling while teaching SEN students, especially when teaching EE. The participants agreed that teaching EE is prominent to SEN students, although the SEN students understand several basic concepts of it, and it has benefited the SEN students in several ways. The second theme is 'the strategy of teaching EE to SEN students. This theme is divided into five sub-categories: 'the approach of EE in SEN setting', 'the teaching resources and lesson preparation', 'the teaching methods', 'the assessment' and 'the support for a better EE teaching'. Findings show that using visuals to deliver teaching content to SEN students seemed to be one of the significant tools used by the teachers. However, the assessment method will be based on the students' needs, and the teachers need to adapt. Last but not least, the third theme is the challenges, which will be divided into three sub-categories. 'Needs of differentiation', 'maintaining students' focus', and 'anticipating the challenges' emerged as the participant's concerns.

5.1 Teachers' Perspectives of EE in SEN Setting

Three different questions help to articulate the perspective of teachers about EE: their familiarity and understanding of EE, value in teaching EE to SEN students, and how they perceive the impact of EE on their SEN students. According to the findings of the study, the teachers have shown a positive perception towards teaching EE to SEN students. Although the term of EE is unfamiliar for the teachers, they have taught and valued EE as an essential topic to be integrated into their teaching. Teachers agreed that teaching EE benefits SEN students by building their awareness and providing concrete examples. In daily teaching, EE has not only been one of the topics for the lesson but also as the medium to teach the SEN students.

5.1.1 Term and Concept of EE

All participants had similar responses regarding their familiarity with the term of EE. When the researcher asked about EE, all participants were not familiar the term 'Environmental Education', and they admitted that it was their first time hearing the term during the interview. The participant expressed,

I have never heard about EE, previously. Hearing about EE is even my first time. (Participant 5)

Another assumption about of what kind of lesson which is included in EE was,

I have never heard about EE, is it included in Science lesson? (Participant 4)

The questions then continued to the lessons that can be included in EE, based on the teachers' perceptions. There were various answers in this regard, but all answers were related to EE. For instance,

All lessons can be included in EE, because they can relate to each other, so it depends on the topic. Maths, Science, and English can be included in EE, I believe. (Participant 1)

Three teachers showed similar opinions when they answered about EE lesson. They assumed that EE is about the environment around us. They referred to the use of the environment in the learning process. An answer expressed a general idea of EE by pointing out,

I think EE is how the environment can affect the learning process. (Participant 3)

Meanwhile, a participant emphasised how teachers utilise the environment, such as different areas in school to teach the SEN students.

It's like teaching SEN students from the environment surrounding them, for example at school, there are several places, so we choose to learn at the playground or on the front pitch area. (Participant 5)

In short, all participants have identical responses regarding the term EE. They are all unfamiliar with the term EE. Although the term EE is unheard of by all participants, all responses regarding lessons for EE are still related to EE. Answers varied among the participants, including EE as a science subject, EE as the place to learn in different areas of school other than classes and how it affects the learning process, and EE as a topic integrated into all subjects.

5.1.2 Value of Teaching EE for SEN Students

Teachers have presented EE-related activities as the lesson and the teaching methods in class. Not only in Science, the teachers have been implementing EE as the teaching media in other lessons. To comprehensively understand teachers' value of teaching EE to SEN students, the questions referred to how often they taught EE, the goals, and the importance of teaching EE and its worthiness of the teaching process. The answers were similar regarding the frequency of teaching EE, as all participants showed that they taught EE to SEN students frequently in each term. Two participants showed that EE was taught regularly.

In my class, we taught EE through Science four times a week. (Participant 1)

Another participant, mentioned,

Once in two weeks, we will have an outdoor activity with them (SEN students). (Participant 5)

However, there was a different frequency than other teachers by saying,

I always try to apply EE. Let's say 40% of my teaching is EE-related, such as taking them for outdoor activities, and of course, whenever possible, I will try to use EE as my teaching media with SEN students. (Participant 4)

One teacher mentioned the frequency of teaching EE by explaining the program that the school uses. The teacher believed that the program had many topics that focused on environmental issues.

In this school, we use the Award Scheme Development and Accreditation Network (ASDAN) vocational program. I think ASDAN is pretty good at this. They even have several modules on

environment and adventure, so they encourage students to learn about the environment. There is also ASDAN for SEN students, but the level is easier. (Participant 2)

Two significant goals emerged related to the teachers' goal of teaching EE to SEN students. The first is about teaching SEN students' practical skills, and the second one is about helping the SEN students to think from abstract to concrete. Four participants answered the concept of practical skill. Two participants answered similarly by saying the goal is to introduce SEN students to the real world around them so they know how to behave and what they can contribute to their surroundings.

Let these children know more about the world around them. The world is not just about you, there are many other things you don't know yet. They can also be more independent and build connections, for example, they can tell their parents about what they see. (Participant 4)

One participant explained the intention of teaching EE to train the SEN students to have simple life skills such as gardening as the participant said,

They can understand certain simple science activities, such as growing plants. They understand and can practise it at home. For example, when parents want to plant flowers, they can be involved in that activity, such as taking pots, adding soil, placing plants, and watering plants. So, the activity can be applied at home, in daily activities and useful for others too. (Participant 1)

One important finding of the teachers' goal is to help the SEN students in their thinking process.

It is very difficult for them to think of an abstract concept, so involving the environment makes them see things more realistically. For example, when making pizza, these are real ingredients, using an apron, and listening to instructions. That is what we want, how SEN students will know that the learning they receive at school will relate to their lives. So, it is useful for their future life. (Participant 3)

The value of teaching EE was also seen in how important EE is and how it is worth teaching to SEN students. All teachers agreed that EE is essential for SEN students. Two points of view appeared from the teachers' responses. Three teachers emphasised the importance of EE from SEN students' point of view. They pointed out that SEN students are part of the environment, so they need skills and awareness of EE.

It is important, even though they are a special needs group of people in society, of course, they also need to take part in a community that cares about the environment. Also, SEN students can be more aware of their surrounding environment through EE. (Participant 3)

On the other hand, one teacher explained the importance of EE in the lesson, which covers many important aspects of our life.

It is very important because science, for example, is one of the lessons for EE, and it is a broad subject related to the technological environment, animals, biology, and physics. It is important because many things can be learned in Science, and the topics are close to everyday activities. (Participant 1)

When discussing how the teachers value the EE teaching process, most believed it was worth the result for SEN students.

It is really worth it. It does not mean that when they are special needs students, they do not need to know about it. However, they also need to be taught about that. Because, after all,

they are part of the community, too. So, it would be better for them to know the rules for taking care of the environment and how they are involved. Even though they are special, they are also humans, and they also need to be educated. (Participant 3)

However, one participant expressed a contrasting idea that teaching EE was not always worth the process to SEN students.

Sometimes it is worth it, but sometimes it is not. Because sometimes, the SEN students do not grasp what the teachers are trying to explain. Moreover, they also needed a longer time to understand it. (Participant 5)

In essence, teaching EE to all participants is crucial for SEN students. All participants agreed that they teach EE to SEN students regularly as the teaching method and as part of the vocational program they use. The goal of teaching EE from four participants is to teach SEN students practical skills, while one participant believes that helping them to think concretely is a prominent objective. Four participants agreed that the importance of teaching EE to SEN students is to take part in a society regarding the limitations that SEN students have. One participant emphasised the importance of the lesson on EE as it contains valuable topics for SEN students' lives. Last but not least, four participants believed that teaching EE to SEN students is worth the process, while one thought it was not always worth the process of teaching EE to SEN students.

5.1.3 Benefit of Teaching EE to SEN Students from Teachers' Perspectives

The final inquiry of the theme of SEN teachers' perspectives of EE concerned the advantages for SEN students, since all teachers have a positive attitude when teaching EE to the students with special needs in their classes. Two ideas have emerged explaining how teaching EE to SEN students positively affects the classroom. The first benefit is that the SEN students' engagement increased, resulting in more willingness for them to be involved in the EE lesson. The second idea of benefit is that the awareness about EE from the SEN students has also increased, and they have become less ignorant of their surroundings.

The teachers believe that teaching EE to the SEN students has actually helped the students to be more engaged in the lesson. Having real objects in the environment made the SEN students train their motor skills and increase their excitement in learning new things. Besides, the practical activities make the SEN students more enthusiastic to learn. Although with hesitation one participant described,

For example, planting trees, now they understand, they want to take care of plants, do not uproot them. The approach is like a much younger child. We are trying to give them understanding, but in a language, they can understand. I haven't noticed the specific impact yet. However, when they cleaned up the rubbish, they were very enthusiastic. (Participant 2)

Another teacher then explained how the SEN students can have a good memory on the topic they have done previously.

They are more excited when studying outdoors. If they study in class, watching videos may help, but when they see what they see in the video in real life, they are more excited, and what I feel is that they remember it longer, and their long-term memory is better. For example, when there is a cooking activity, we invite them to make pizza at the restaurant. One day, the child passed by again without the teachers, and the child mentioned that he or she had made pizza with the teachers, so the student had a memory there. The memory of making pizza stayed with the student throughout the term. So, we also have songs so that students' memory lasts longer, we look for songs with a pizza theme, which relates to that theme, so they will remember it. (Participant 3)

And one participant with similar opinion also mentioned,

They have a better engagement. Because the more sensory you stimulate, the more it will affect your memory. (Participant 4)

Regarding the SEN students' awareness of the environment, teachers confirmed that they witnessed the SEN students have been more aware of their surroundings. Teachers emphasised that although the SEN students have limited capability to grasp a difficult concept in EE, at the very least, they are aware of a basic concept about the environment.

The SEN students become more aware of their surroundings. Not really aware. They can understand the concepts presented. They are aware of rocks, plants; this is a rock, aware of the concept of living and non-living things. (Participant 5)

This awareness has improved the students' engagement as they understand what they need to do for the environment. They know that they have a role and can contribute to keeping the environment clean.

For example, trash, they already have the initiative to throw it away. Their awareness is already high, they become more engaged. (Participant 2)

Briefly, three participants perceived a better engagement of SEN students when they learned EE. The engagement is related to increased excitement and better involvement in learning. On the other hand, two participants believed that SEN students have a more vital awareness of their environment as the benefit of learning EE.

5.2 Teachers' Strategies in Teaching EE to SEN Students

This theme will be elaborated comprehensively by using four distinctive teaching concepts based on the teaching approach, teaching resources and lesson plan, teaching methods, teaching assessment, and teachers' support to a better EE teaching. The strategies of EE by teachers have been mostly affected by the curriculum and the program they implement. Teachers mentioned that the curriculum and program support EE teaching to SEN students. Even so, teachers demonstrated a need to adjust the EE lesson or topic to meet the needs of SEN students. Teachers mentioned the support they need to improve their EE teaching, especially for SEN students.

5.2.1 Teaching Approach of EE in the SEN Setting

The approach of teaching EE to SEN students to the participants was generally more or less comparable. According to the participants' responses, EE was neither a standalone nor a compulsory lesson. The participants mentioned the program that was specifically implemented for SEN students that the school uses, which was called Award Scheme Development and Accreditation Network (ASDAN). This program focused more on the vocational lesson and was divided into several topics with EE materials. Besides, the school uses one of the international curriculums to enable the teachers to integrate the curriculum, the program and teaching modules into SEN settings. Since the teachers' understanding of EE is limited, the teachers demonstrated a distinguished approach to teaching EE. One participant focused on Science teaching in an outdoor setting when explaining EE lessons in the class to SEN students.

Previously, I taught it once because the lesson was about living and non-living things. It just depended on their level of academic acceptance. I once took them out to see the types of trees, ants, worms, that could move to differentiate between living and non-living things. (Participant 4)

Two other participants expressed their approach to teaching EE by emphasising experiential-based learning, such as cleaning the classroom, beach cleaning, and using recycled bottles for the craft.

Yes, I did, when I was teaching using ASDAN, the title of the book New Horizons. We discussed how to protect the environment, we also did gardening in front of the class, we planted plants there, we went to the beach to clean. Last year we went there. We have an environmental topic like growing plants, picking up rubbish, and making Balinese crafts from recycled bottles. (Participant 2)

The rest of the responses emphasised the idea of using EE as the learning medium, which can also be applied in other lessons. The teachers will use the environment as the learning medium to deliver the lesson to SEN students. The environment at school was often used to help the SEN students grasp the lesson, and the teachers believed it was more fun for the SEN students.

The curriculum must be integrated into the ASDAN program, for example, the theme of the garden; in Math, we would take the SEN students to the garden to see how many flowers had fallen and train fine motor skills by making numbers on a hot surface using a brush and water. We often use this method, using objects around us and utilising the surroundings as a learning medium. In art, we also took the children outside to collect dry leaves and make a collage. So, utilising the environment as a learning medium was quite often. Because they could not just be told, videos were sometimes helpful, but it would be better for them to touch and see directly what was being discussed. (Participant 3)

Based on the findings, one participant approached EE mostly through science. Two participants emphasised the EE approach to real-world experiences, while two used EE as the teaching medium integrated into other lessons.

5.2.2 Teaching Resources and Lesson Preparation

The teaching resources from the participants were completely similar. All teachers agreed that when it comes to the teaching resources, besides the modules, they will all find the video from online platforms, such as YouTube. This resource has helped them find the visual and audio material suitable for the modules of the EE topic.

The reference was from the modules we have, we then looked for resources from various sources that were possible and suitable for the SEN students, especially their way of learning whether it was a video from YouTube, whether a worksheet, or an image. Whichever supported and made it easy for the SEN students to learn and understand the topic. (Participant 1)

One participant explained one alternative resource that was often used, which was the audio, such as a song that was related to the topic.

Sometimes, I used the real item directly, but to start the lesson, I prepared the song because they would remember it better. Apart from the song, there was also a video, so after that, we would introduce the SEN students to the real thing. (Participant 4)

Regarding the lesson plan, most of the teachers prepared it weekly. The teachers also explained how they adjusted the lesson plan to be applicable to SEN students. Three ideas appeared from all teachers on ensuring that the lesson plan would be suitable for the SEN students. One participant mentioned that the lesson plan was prepared at the beginning of the term while also preparing for plan B as they might need to adjust to the class situation.

Every term, we have our term planner at the beginning of the term, so we use that term planner as the guidance towards our daily activities, weekly activities, with special needs. So, we prepare at the beginning of the term, if there are some changes here and there, that is okay we can just always adjust. And we always have plan B so that when plan A doesn't work,

we can always go to plan B, and apply that in the classroom. We prepare that at the beginning of the term or of the week. If it is a short term, we will discuss it weekly. (Participant 2)

Other teachers also adapt the lesson plan by preparing the visuals, adjusting to the student's cognitive level and providing repeated reminders about what they are going to learn.

Initially, I will introduce the topic by demonstrating pictures or videos, visuals, or drawings on the board in front of the class while the children are seated. If there is a task of glueing, matching pictures or labelling pictures, we help them while sitting, tracing or drawing. (Participant 1)

Two other teachers stated that to adjust the lesson plan for the SEN students, they need to know the level of cognitive ability of all of the students in their class.

Their cognitive level or thinking capability is different. So, for SEN students, we will start from the very basics. For example, if we want to teach them the steps of a butterfly from a cocoon. We cannot do this straight away, you know, these steps. With them, we started by introducing what a butterfly is, we even started from a real form, like a song, then went back and forth, now the butterfly is from here. Moreover, it requires quite frequent repetitions. (Participant 3)

Last but not least, one participant mentioned the idea of giving repeated reminders to the SEN students to make them aware of what they will learn. The teacher also added that preparing the real item is important for SEN students to have experimented with.

We will give repeated reminders. For example, next week, we want to have an outdoor activity, and then a week beforehand, we will tell them what we want to do during carpet time. We focus on giving understanding to them so they will not be surprised when we ask them out. In terms of science material, for instance, in learning magnets, a little explanation, mostly practice, like I brought a real magnet, then show them the poles, give them little by little concept, not so many concepts at once. (Participant 5)

In short, teachers adapted their lesson plan to the vocational program and the curriculum, and all of the participants used the online platforms to find related videos and songs. Participants prepare the lesson plans weekly and focus on using visuals, SEN students' cognitive level and repeated reminders.

5.2.3 Teaching Methods

The teaching method of teachers in teaching EE to SEN students mostly emphasised the introduction of the topic by using visuals, such as pictures or videos. Another teacher mentioned that using social stories helped begin a new topic with the SEN students.

I usually start with the introduction, but SEN students do not go straight into the field. We usually learn first in class through videos, playing games, photos, or hands-on activities. Next, we go to the topic of the environment we are discussing. ASDAN programs have outdoor programs for SEN students, such as zoo visits. Before going to the zoo, we learn about the animals, such as the categories of animals based on their food. Then, when we are at the zoo, we show them which category. For instance, in the last term, we learnt to look at works of art, we went to museums for prehistoric relics. (Participant 3)

One participant explained how the teacher used the social story by stating,

We will make a social story first. If someone is littering is okay or not, or happens if we do this. (Participant 2)

Besides discussing the introduction using visuals, other participants also mentioned giving hands-on activities, which required interactive learning for SEN students.

The hands-on comes from the worksheet. Even if there are worksheets, we try to ensure that they do not just sit and study passively, they can stand up, we can ask them to work in pairs, taking turns doing the work. The more physical movements are better. It is more about interactive learning, such as using pictures, perhaps using games or matching games. Collecting pictures. That is actually the worksheet that we apply to make it more interactive, not passive or just sitting around. (Participant 1)

In addition, one teacher explained that the learning process needed to emphasise how SEN students can be involved in the activities as much as possible. The teachers need to introduce and explain, as well as show examples. However, the teacher will encourage the SEN students to practise by getting involved in their learning activities.

... In the next meeting, we will use the steps for them to actually apply that in the garden, maybe starting with buying the seeds or bringing the tomatoes, eating and throwing them into the garden. So, it is about them getting involved as much as possible, and it is more of them taking part instead of the teacher. (Participant 2)

During the teaching process to the SEN students, teachers usually used many types of supported mediums to demonstrate the EE topic besides videos and pictures. Two teachers agreed that manipulatives are special tools for teaching EE to SEN students.

Using hands-on activities, manipulatives, objects such as fruit, animals. As if counting fruit, we learn Maths using the manipulatives. (Participant 3)

On the other hand, two teachers agreed that using real material to explain the topic is preferable. Using real material helps SEN students who struggle to think of an abstract concept. The real objects will be very helpful for them to gain a better understanding.

It is better to use real or live objects so you know what it is like in real life. If you use real objects, it will be better to convey the material to SEN students because they will come into direct contact with these things. So, you do not need to think, what is a magnet like? If it is manipulative, sometimes it does not match the real object. It is almost similar to the real one, so let us bring the real object, just bring the real item. (Participant 5)

One teacher gave a different example of a special tool to assist SEN students in teaching EE. Related to building a sentence, a participant mentioned the use of colour semantic cards as an example.

I used colour semantics cards to help them build a sentence. So, nouns, verbs, and adverbs will have different colours. (Participant 2)

Teachers need to help students foster their curiosity and learn new things in the teaching process. This will assist the students to reach their maximum capability to understand the lesson. For the SEN students, teachers have explained how they fostered curiosity, especially when learning about EE. Two teachers agreed that discussing the topic or issues in the class by connecting it to their daily life is very helpful.

It is a bit difficult, they are not really aware, we always start with simple things, how do we keep the environment clean, like do not litter, like daily activities. It is just like their daily lives, when they can do this, so they see the importance of taking care of the environment by reminding them

continuously. After this, what do you have to do, and where do you throw the rubbish? Remind them of their daily routine. (Participant 3)

The rest of the teachers mentioned that showing the real object of the discussed topic can increase their desire to learn. For instance, taking the SEN students to an environment such as the playground at school can be a good start for increasing their curiosity about a new topic.

For example, the topic is about the plant in the environment, maybe we will invite them to play outside, in the playground, not specifically playing with plants, the important thing is that they see the space and see the school environment, oh the school environment does not just have toys, it does not just have books, oh it turns out there is a green space, there is this garden, there are these plants, there are flowers, oh I can see insects on the flowers. However, we do not explain, we just show, to show, if they ask then we tell them in a light context while playing or having a snack. (Participant 1)

One teacher showed a different opinion in fostering the SEN students' curiosity. The teacher stressed the point that giving repeated reminders about what they have learnt is the way to help SEN students have a better desire to learn new materials.

We will keep telling them about what we will learn or are learning. Sometimes, they cannot show their emotions. Oh, I've been to a café, if I've been to a café and the student is really excited when he/she leaves, his energy is over the top. (Participant 5)

Collaboration with other actors will help the teachers ensure that SEN students attain the best experience. The collaboration may happen with other teachers or staff at school and parents. Answers showed that most of the teachers collaborated with other school teachers or staff and the parents. One participant explained that collaborating with other teachers was possible and helpful.

We have done it once. We offer some events to other classes, so if those in the mainstream class want to participate, they could join together. Usually, it is a whole school event. But often, it was our own class event. However, it is possible to discuss this with other teachers; it is possible at this school. Several times, we have collaborated with mainstream teachers as well. (Participant 1)

One teacher delivered an example when the teachers collaborated with other staff in the school.

When we were studying community helpers, we were studying the types of jobs, I went to the school staff, which one was a gardener, which one was a security guard, I gave them a photo first, introduced them in class, then met the person directly. The response was uninterested, but they knew this was a gardener. Students become more aware, like when they see the driver, okay, let's go to see the school bus. However, not all children can do that. For those whose social interaction is good, they will always remember. But, if it is not so that you know, the teacher keeps repeating it. (Participant 4)

However, two teachers have yet to involve other school teachers or staff in teaching EE to SEN students.

So far, we have not collaborated with other teachers or staff. We will get the most help from the host of the activity. For example, at a café, the waitress will help. We informed them that these were SEN students. So before coming, we first explain the condition of our students so they will not be surprised by tantrums. (Participant 5)

When the teachers collaborated with parents, answers showed that most teachers involved the parents in teaching EE to the SEN students. The role of parents was varied, for instance, they helped the SEN students prepare the craft material, which was recycled bottles, sent the video of the SEN students practising the topic that they had learnt at school to the teachers, told the social story, and gain the consent for joining the outdoor activities. A participant explained that the teacher would ask the parents to help prepare the materials for the craft by saying,

It is like used bottles, we ask parents to help collect used bottles, and they just help us get them from home. The parents are also always informed about the ongoing activities. Or when we want to ask parents to help give social stories to the children at home. So that it is not surprising, it is not so new that they will be shocked, and then they will get angry too. (Participant 2)

The teacher sometimes would ask parents to send a video of their children applying the activities they learnt at school.

We involve parents, so at home, we ask parents to send photos or videos of their children doing things we teach at school to my email, ensuring they learn at home, too. However, not all of them are the same. They are just several topics, for example, community, going to the beach, the supermarket, and personal hygiene. (Participant 4)

Lastly, one teacher emphasised that gaining the SEN students' consent before doing an outdoor activity is important. The teachers need to ensure that the parents of the SEN students are permitted to let their children go outside under the teachers' supervision.

If it is from the parents, we will just ask for a consent form. If the child needs to visit places outside school, most of the time, the parents will allow their child to go, they will definitely allow their child to come out with the teachers. (Participant 5)

In contrast, one teacher mentioned that while teaching EE to SEN students, the teacher did not involve the parents.

Never. It was just the interaction between teachers and students during teaching EE. (Participant 1)

In essence, all participants emphasised on the lesson introduction which uses not only visuals, but also social story, and hands-on activity. Participants also use the manipulatives, real objects and colour semantic cards as their special tools. To foster their curiosity in EE, participants discuss and connect to SEN students' daily life, demonstrating the real objects and giving repeated reminders. Most of the participants have involved other teachers, school staff and parents.

5.2.4 Assessment

When it comes to the assessment, all teachers confirmed that they do not use exams as a tool. Teachers also asserted that the assessment would be based on SEN students' academic level. In order to assess the SEN students, teachers will use tools based on the needs of each SEN student and their level in academic matters. In addition, the assessment was conducted in a simplified and repeated way.

Assessments for SEN students are tricky. Not everyone can be asked questions and answers questions like those with speech delays. So, we used several media for the assessment. Some use paper and pencil, for example, like the life cycle of butterflies, if someone can ask and answer, we ask directly, then they answer, we can find out if they understand. For non-verbal students, we use pictures. There are pictures, and then we match them so we know how good their understanding is. Based on their needs for the assessment. (Participant 3)

A participant described how the assessment will be based on their academic level by saying,

The assessment for the SEN students does not use grade or score. Honestly, as far as I know, if they understand, they will mention sentences or words related to the topic. Because every child is different, one child can do many things, and one student can just mention one word, some children can ask questions back, like Student A, oh this is mercury, oh that dinosaur ate this, lived like this, so each child's assessment is different because their levels are different. (Participant 1)

Moreover, one response was about the practical method of assessing SEN students, especially in administrative matter.

At the end of the topic, I ask again, for example, when we watch the video for the second time. I ask again what you have been taught. Usually, we need proof at ASDAN, such as photos, videos, or written reports, that the children have completed this challenge. This evidence is in the written report, where we write that this child already understands the teacher's testimony and the witness's statement. Teachers can write anything that proves that the children understand. (Participant 2)

Based on the findings, all participants agreed that there is no exam as an assessment tool for SEN students in learning EE. Participants emphasised adjustments to the needs of each SEN student and the academic level. One participant also stressed that the point witness statement is needed to prove the learning progress of SEN students administratively.

5.2.5 Support to a Better EE Teaching

Regarding the support teachers need, four teachers mentioned that they need professional development training in the matter of content knowledge and pedagogical knowledge. One teacher stated that obtaining permission is one of the most important supports for accessing places outside the classroom, especially public places. Content and pedagogical knowledge are needed to improve the teachers' confidence in delivering the material regarding EE. The teachers mentioned the training is to enhance their understanding of EE.

Support will always be needed. More to anything related to SEN. For EE, it is more like a speaker, in the past, there were people from Bali Bersih (Clean Bali) to sort waste. They used to come here to talk about recycled waste and organic waste. I think that kind of training will be beneficial for us. Anything that can help teachers have confidence in teaching to have better skills, so the graduates here will be better. Especially EE, which focuses on SEN students. (Participant 2)

Moreover, teachers also mentioned adding various resources and effective methods to teach EE to SEN students.

The support that can increase the readiness to teach is appropriate media and an adequate environment. Readiness is related to training and more resources. Because I am not a professional SEN teacher, so it has been a trial and error with the SEN children. It is different from other teachers who have psychology as their educational background, for example, children did something because they have not yet developed their sensory skills; I do not know that kind of thing. It is also necessary to introduce methods and existing ways to teach SEN children. (Participant 4)

Lastly, one teacher stated that giving SEN students better and easier access to learning is important. The teacher explained that permission from the head of the school is challenging and limits the SEN students from accessing several public places.

Getting permission. The expected permits, for example, facilitate access for teachers if they require learning outside of school. Alternatively, the school collaborates with several parties related to the theme being taught. For example, collaborating with farms, playgrounds, and zoos. Permits from the school, from the head of school. (Participant 3)

In short, four participants believed that professional development training for teachers is needed to improve EE teaching to SEN students. Three participants emphasised the need for pedagogical knowledge in teaching SEN students, while one believed that content knowledge of EE needs to be improved. One participant perceived that EE teaching would be more successful if the head of the school granted them easier access to public places.

5.3 Constraints to Teaching EE in the SEN Setting

All teachers have experienced challenges in teaching EE to the SEN students. After the interview, the teachers faced two main challenges. The first challenge is about how to maintain the SEN students' focus. SEN students have a short focus that demands repeated reminders from the teachers to make them aware that they are in a learning situation. One teacher explained that having proper instruction will help the SEN students to have better focus. The second challenge is the different needs of the SEN students. This challenge will be related to the SEN students' medical history, tantrums, and moods.

5.3.1 Maintaining Students' Focus

Maintaining the focus of the SEN students is always challenging for the teachers. As the SEN students have short attention span, the teachers must be able to find method and tools in teaching to help them extend their focus, even just for a little longer.

Their focus is a challenge, and they are very easily distracted. For example, during an outdoor activity in a large space, their desires are also uncontrolled. When we want them to focus, they cannot always focus, that's the toughest challenge. They also do not feel comfortable under the sunshine, they get cranky easily. (Participant 3)

Another participant added the same idea as the teacher said,

Their awareness, sometimes I bring students outside the classroom, but the students were not aware, they do not have that focus. Because to learn effectively, students have to know that we are learning in the present time. (Participant 4)

One teacher also explained the focus of SEN students that can be assisted by simple instruction.

Most of all, we are looking for instructions, so proper instructions that apply to all children, especially Science is a complex lesson, with teaching media and supporting media that are suitable for them and easy for them to understand or just for them to focus or are interested, that is what we are still looking for. Something that suits them. (Participant 1)

Most of the participants mentioned the challenge of maintaining SEN students' focus. Besides the limitation of SEN students, one participant believed that giving brief yet effective instruction can help them focus better while learning EE.

5.3.2 The Needs of Differentiation

In a class, there are three to five children with two teachers. The ratio of teachers and students in SEN class is actually great, so the teachers can focus on each student. However, when teaching EE, the ratio still cannot help avoid the challenge. Once the SEN students have a tantrum in an unexpected situation, the learning process is distracted, which will also affect other students.

If there is a relapse of epilepsy in a public place, they will not listen. Moreover, when something does not go according to plan, the autistic person will be angry with the change. So, if things change, the student can get angry. (Participant 2)

One teacher mentioned that the SEN students' moods could not be predicted, making the EE teaching process challenging.

Their mood. Sometimes, we know, so we give them a lure, and if we can, we return to class. Awarding system. The award system works quite well for them. (Participant 5)

Participants also explained the challenge of adjusting the teaching to every SEN student. Each student has different needs and limitations that might hamper achieving the best EE learning for them. The medical condition and the student's mood are crucial to consider when teaching EE, especially when learning EE outdoors.

5.3.3 Teachers' Anticipation to the Challenge of EE Teaching

Teachers are very sensible actors when it comes to ensuring the learning process for the students. The challenges of teaching EE to SEN students frequently happen. In order to reduce the possibility of challenges occurring in the class, teachers have explained their preparation for the constraints. All the teachers have demonstrated different ideas on anticipating the challenge in their class. A participant mentioned that the challenge of their recurrent medical issue is significant and can hamper the continuation of EE learning. When EE learning takes place outside the classroom, the teachers will prepare the risk assessment form, which will be assigned by the head of the school.

We must be able to anticipate things which are out of plan. If you come here, what are the risks, how do we minimise that risk. There is no need for a SEN coordinator, just between teachers. Teachers can judge for themselves. Fill out the risk assessment with the photo, what might happen there, how do you minimise the risk, if you have signed with the head of school, you can go. (Participant 2)

In relation to the SEN students' focus, the rest of the teachers have varied answers. There are three different ways of anticipation by the teachers: implementing the one-on-one method, explaining the rewards, and giving them an attractive introduction to visuals. A participant mentioned that the one-on-one method could help SEN students to stay focused by pointing out,

We can invite them one by one. One-on-one learning method. One teacher, one student. (Participant 3)

One participant emphasised how visuals can grab the students' focus to discuss a new topic of EE.

Personally, so far, I have tried to increase their focus by getting their attention first. For example, I give a picture of a river full of rubbish (we are learning to pick up litter to take better care of our environment) or give another related picture and then ask it with the question "what do you see?" "what will happen?" So, I will ask an open-ended question. Even though the responses will vary, at least they learn to think, we as a teacher will guide them through. (Participant 4)

Last but not least, the teacher also mentioned that giving rewards and motivation at the beginning of the classes will assist the SEN students in staying focused.

I will explain the rewards at the beginning so they are more enthusiastic about learning. (Participant 5)

All participants illustrated the anticipation, such as doing one-on-one teaching, using visuals in the lesson introduction, and using a reward system to maintain SEN students' focus. To help anticipate medical issues during the class, one participant emphasised filling out the risk assessment form, especially when they were learning EE outdoors.

5.4 In Summary

According to the overall data analysis, three themes emerged, and participants expressed positive perceptions about teaching EE to SEN students. For the theme of teachers' perspectives on EE, although every participant indicated that they were unfamiliar with the term EE, there was a significant variation in their reactions regarding its application. While some stressed EE's integration into real-world situations or across subjects, others approached it through a scientific lens. One of the insightful findings is that teachers' assumptions about EE lessons in the classroom were surprisingly related to how they approached EE teaching to SEN students. Findings show that teachers approach EE teaching as a science lesson, a real-world experience or hands-on experience, and a learning medium that possibly integrates to other lessons. Based on the findings, teachers have valued EE teaching positively as they frequently teach EE to SEN students. Besides, teachers believe that their goals in teaching EE to SEN students are to teach useful skills for their daily lives and process ideas into concrete matters. The result also emphasised that all teachers believe in the importance of EE teaching to be part of the students' community and that the lesson contains many useful topics for SEN students. Most of the participants perceived that EE teaching was worth the process as teachers witnessed the benefits for SEN students. Remarkably, agreement was reached over EE's beneficial effects on SEN pupils, which include increased awareness, excitement, and involvement.

Related to the theme of the strategy of EE teaching to SEN students, findings focus on targeted support and frequent reminders, as well as customised teachers' methods by utilising visual aids, internet resources, and hands-on activities. Online platforms are still the most used resources as teachers need to prepare videos and songs. Manipulatives and aid tools are teachers' special tools in teaching EE to SEN students. Besides, teachers also use real objects to teach EE, foster SEN students' curiosity, and discuss their daily lives. Findings also demonstrate that most teachers have participated with other school staff, teachers and also parents to improve the quality of teaching EE. Moreover, an assessment has been conducted based on the needs of each SEN student without any exam. Administratively, teachers will fill the witness statement to describe SEN student's progress in learning EE. Furthermore, findings show that most teachers need professional development training, especially in teaching SEN students. Other support will be training to improve the knowledge of environmental topics and easier access to public places from the head school.

Nonetheless, obstacles like staying focused and meeting various demands continued to arise, highlighting the need for continued administrative assistance and different learning methods, such as one-on-one teaching, visuals in introducing the lessons and a reward system. The united goal of inclusive and effective education drove the clear determination to improve EE instruction for SEN students despite these challenges.

6 Discussion

This chapter presents the discussion and examinations of findings on environmental education (EE) teaching in special educational needs (SEN) settings at a school in Bali, Indonesia. The discussions are framed by the research questions and interpreted in relation to the current literature and conceptual framework. The study aims to understand how teachers perceive EE teaching to SEN students and both strategies and challenges they encounter during the teaching process. The aims of the study will be explained in three main categories. First, teacher's perspectives on teaching EE to SEN students. Second, the teachers' strategies in teaching EE to SEN students. Lastly, the third is the teachers' challenges in teaching EE to SEN students.

To answer the first research question, 'What are SEN teachers' perspectives of EE in SEN settings?' This question will be addressed by analysing the familiarity and understanding of term and concept of EE (knowledge-based), the value of teaching EE and the benefits teachers perceive to the students, including preserving or improving the environment. The analysis will also be highlighted through the lens of EK and ECK from EPACK by Zhou (2015). The second research question is 'What are SEN teachers' strategies in teaching EE in SEN settings?' To clarify the second research question, there will be five concepts: teaching approach, teaching resources and lesson preparation, teaching methods in indoor and outdoor settings, assessment, and support for better EE teaching. ECK and EPK in the EPACK framework will assist in elaborating the analysis. Lastly, the third research question is 'What are SEN teachers' challenges in teaching EE in SEN settings?' The challenges will be emphasised on the SEN students' focus and their different needs while the discussion will also touch upon how teachers anticipate the perceived challenges. The component of EPACK will help to address the challenges that the teachers have experienced.

6.1 SEN Teachers' Perspective of EE in SEN Settings

The data analysis provides insights into teachers' perspectives on EE implementation in SEN classrooms, especially how teachers understand the term and the concept, how they value EE teaching in the SEN setting and how it is beneficial to their SEN students. Initially, the EE term is frequently unfamiliar to all participants. This unfamiliarity of EE term leads to different presumptions of lessons that EE teaching incorporates. Despite this, teachers have applied EE to their teaching approaches to SEN students, viewing it as both the content of a lesson and a teaching medium. Participants' understanding of EE differed, with some identifying it with science lessons and others considering it encompassing every subject. Teachers also frequently incorporate EE-related activities into their teaching routines, such as outdoor activities and real-world applications like gardening. Furthermore, EE is conducted every term as both a lesson and a teaching medium. The application of EE proves that the school has considered EE for SEN students' learning process.

To extend the SEN teachers' perspectives of EE in SEN settings, teachers' value in integrating EE is notable and should be explored. SEN teachers underlined how crucial it is to teach EE to students with special educational needs, pointing out that it helps them develop real-world skills and a concrete comprehension of abstract ideas. They believe EE is crucial for helping SEN students navigate their environment and prepare for independent living. Teachers also emphasised the value of EE in encouraging pupils to interact with their environment and develop a feeling of environmental responsibility, as SEN students are also part of society. Moreover, SEN teachers believe that the EE teaching process to SEN students is valuable compared to the benefit the teachers witness. Although not all agreed upon the worthiness of teaching EE, SEN teachers generally noticed a better development of SEN students during EE teaching.

Correspondingly, the study found that teachers believe teaching EE benefits SEN students. First, SEN teachers notice increased student participation in EE classes, which they attribute to practical exercises and sensory stimulation. Hands-on experiences, such as planting trees and participating in outdoor clean-up activities, elicit enthusiasm in SEN students, resulting in increased engagement and memory retention. Teachers report that real-life experiences significantly impact long-term memory, with activities such as cooking and singing songs about EE themes increasing student engagement and retention. Second, teachers report that EE teaching has increased SEN students' environmental awareness. While SEN students may struggle with complex concepts, they exhibit fundamental knowledge and awareness of their surroundings. This increased knowledge manifests through acts such as proper waste disposal, suggesting a greater responsibility for environmental conservation. Teachers feel that teaching EE is critical for SEN students to acquire life skills, independence, and connections to their environment. This supports the idea that teaching EE to students with special needs improves their independence. The findings also emphasise the importance of teaching EE to SEN students, with participants emphasising its relevance to the students' lives and future societal responsibilities.

According to previous studies, Rooyen (1998) explained that because of the lack of EE introductory courses at pre-service and in-service levels, the nature and objectives of EE seem to be an ambiguous concept to teachers, school administrators, supervisors, community leaders, or even EE teachers themselves (Rooyen, 1998). This shows that the ambiguity of the EE concept is pertinent in many schools' contexts, and it is aligned with the result of this study. It is also emphasised by Dominguez and Schilling (2001) that in order to teach EE effectively, it is essential to investigate the most critical knowledge gaps and misconceptions. However, earlier studies also emphasised that teachers feel that teaching EE is critical for SEN students to acquire life skills, independence, and connections to their environment. This supports the idea that teaching EE to students with special needs improves their independence (Villanueva et al., 2012). Thus, the goal of teaching EE from Villanueva et al. (2012) supports this study's discussion on teachers' expectations of SEN students in learning EE. Additionally, teachers observed that integrating EE into SEN through outdoor recreation positively contributes to students' attitudes towards the environment (Dominguez & Schilling, 2001). However, these perspectives revealed teachers' limitations in thinking across disciplines and challenging traditional notions of subject and assessment methods, indicating the lack of Pedagogical and Content Knowledge (PCK) (Chang & Ow, 2023).

The discussion on teachers' understanding of EE is part of the domain of environmental knowledge (EK) and environmental content knowledge (ECK). It depicts that teachers' Environmental Knowledge (EK) is sufficient and the teachers conducted the lesson based on understanding the SEN students, such as the fundamental and practical concept of littering or planting seeds. The analysis shows that teachers' objectives and perceived benefits from the teachers have demonstrated the domain of environmental pedagogical content knowledge (EPACK), although they have limited knowledge of EE.

6.2 SEN Teachers' Strategies in Teaching EE to SEN Students

The data analysis investigates teachers' strategies for teaching EE to SEN students, emphasising the teaching approach, teaching resources, lesson preparation, teaching methods, assessment, and teachers' required support for effective EE teaching. Since EE is not a standalone lesson, the teacher delivers the EE content based on the modules and topic and through methods. Besides integrating EE in Science lessons, teachers use a variety of approaches to EE in SEN contexts, including integrating EE into the school curriculum and specific vocational programs for SEN students. In order to teach SEN students to participate in society, they need to learn more about life skills than academic materials. The school is currently using the Award Scheme Development and Accreditation Network (ASDAN) program, which focuses more on practical skills for the students. Therefore, practical life skills such as cleaning, recycling, and outdoor activities are stressed to properly engage SEN students.

In terms of teaching resources and lesson preparation, teachers universally rely on digital platforms such as YouTube for visual and audio content appropriate for students with special needs. Visual and audio materials are essential to introduce the EE topic to SEN students. Lesson plans are

revised weekly or at the beginning of each term. One participant emphasised the preparation of alternative plans for teaching to adjust to the SEN class dynamic. All participants again emphasised utilising visuals. In addition, teachers always consider SEN students' cognitive levels and offer frequent reminders regarding class topics.

Regarding the teaching methods that the teachers use to teach EE for SEN students, teachers will introduce ideas through visuals, for instance, video, printed pictures, and social stories. The learning process will be followed by hands-on activities to promote participatory learning and engage physical movement. Participants also stressed the idea of giving more possibilities to SEN students to be involved in actual activities. The use of manipulatives and real objects are preferable for comprehension. One teacher gave the example of using the colour semantic cards to help SEN students build sentences. Participants also emphasised the strategies for fostering the SEN students' curiosity. The tools mentioned above have helped SEN students to be more interested in learning new topics, such as social stories, while referring to SEN students' daily lives, showing the actual objects, and repeating reminders. Collaboration and participation of other teachers and school staffs have helped most teachers to teach EE, although two teachers have not done this collaboration. Other teachers and school staff were the discussion partners, giving assistance and examples to show to SEN students. Moreover, the majority of participants also involve parents in preparing the EE teaching materials, sending videos of SEN students at home doing EE-related activities, continuing the social story of the EE topic, and lastly filling out the consent form when teachers need to have EE teaching outdoors. Thus, collaboration with other teachers and parents is essential for good EE teaching, providing extra support and resources.

Regarding the assessment methods, all participants confirmed no examination for SEN students. The assessment approaches depend on students' academic levels and the needs, using verbal questioning, picture matching, and written reports to demonstrate understanding. Generally, teachers will assess the students based on the basic ideas they have learned and adjust them to their academic level. Besides, the assessment tools will vary based on their needs. These adjustments demonstrate that teachers need to be flexible in understanding SEN students on EE topics. Administratively, teachers will report the SEN students' learning process by filling in the 'witness statement', which contains a description of the learning progress, along with pictures and worksheets of SEN students.

In spite of the fact that teachers have effective strategies for delivering EE topics to SEN students, teachers are aware that they still need extra support to develop their teaching skills. Teachers believe professional development training is pivotal to better EE teaching SEN students. Three participants stressed the idea of professional development training, which focuses on teaching SEN students. In contrast, one participant perceived that improving the skill on the EE content will be beneficial for SEN teachers. As importantly, one participant mentioned that the easy access to gain permission for SEN students to have EE-related teaching outside the school will increase the effectiveness of EE teaching to SEN students.

Several studies have researched the experience of teachers in teaching EE to SEN students. A study by Kim & Fortner (2006) mentioned that since environmental issues are multi-dimensional, teachers integrate them based on the topic and lesson they teach in the classroom. This also applied to the current study's findings that EE is not a standalone lesson at school. In relation to the benefits, research by Faber Taylor & Kuo (2011) also investigated the benefits of green spaces for EBD students and discovered that when students with ADHD participated in routine play in green spaces, their attention spans improved. The teachers have implemented the strategies through a connection to their lives and society, which can make learning more relevant, useful, and engaging for them (Strife, 2010).

The teachers' strategies in integrating EE into the SEN setting have demonstrated the domain of EPACK that the teachers applied in the classroom with SEN students. The teachers have equipped themselves to answer what-, why-, how-, and when questions in teaching EE to SEN students. The teachers have always stressed understanding the students' academic level and different needs. The way teachers integrate EE with the international curriculum they implement and the vocational program for SEN students shows the domain of environmental content knowledge (ECK). The strategies have also shown that teachers attempted to be as close as possible in relating the environmental issues they addressed with the SEN students' daily practical lives. In environmental pedagogical knowledge (EPK),

the teachers adequately understand efficient pedagogy for EE. Even so, teachers believe they still need a professional development program, especially in improving their pedagogical strategies to teach SEN students. Pedagogical knowledge seems to be more needed and crucial for SEN teachers. The aims of integrating EE into the SEN setting have been shown rationally, and the SEN students' academic capability has been adjusted. Although prior research has demonstrated that teacher content knowledge affects the choice and application of instructional techniques, PCK-CK, but that link does not imply directionality (Gess-Newsome et al., 2019).

6.3 Teachers' Challenges and Anticipation in Teaching EE to SEN Students

The data analysis sheds light on the obstacles teachers experience when incorporating EE into SEN settings, emphasising two significant constraints: **sustaining their interest throughout EE teaching and differentiating needs across SEN students**. Maintaining the SEN students' focus has been a major challenge, and one participant expressed this is related to the brief and clear instruction that the teachers use for EE teaching. On the other hand, the differentiation of SEN students' needs is related to their medical issues and mood. The teachers had anticipated the challenges that would happen. The anticipations of challenges teachers applied are implementing one-on-one teaching, using visuals and applying the rewarding system to SEN students. Besides, filling out the risk assessment form, especially when SEN students are learning outside the school, will help teachers anticipate the medical issues of SEN students.

Maintaining SEN students' interest is a significant difficulty for teachers, given SEN students' short attention spans. Teachers must use various strategies and tools to engage students and extend their attention, even temporarily. Outdoor activities pose unique challenges due to sensory overload and discomfort in specific circumstances. Moreover, simplifying instructions and utilising appropriate teaching and support materials are critical methods for increasing focus and enthusiasm in learning. The challenges the teachers mentioned were related to the condition of SEN students as they have a short focus span and their medical history.

Regarding differentiation, teachers must deal with various medical issues, tantrums, and unpredictable mood swings among SEN students. Furthermore, maintaining students' interest is another considerable difficulty for teachers, given SEN students' short attention spans. Teachers must use various strategies and tools to engage students and extend their attention, even temporarily. Outdoor activities pose unique challenges due to sensory overload and discomfort in specific circumstances. Moreover, simplifying instructions and utilising appropriate teaching and support materials have been identified as critical methods for increasing focus and enthusiasm in learning. The challenges the teachers mentioned were related to the condition of SEN students as they have a short focus span and their medical history. Despite the advantageous teacher-to-student ratio in SEN classrooms, unforeseen circumstances such as epileptic episodes or changes in routine might disrupt the learning process. Thus, risk assessment strategies are highlighted, and award systems are set up to regulate mood changes in the classroom.

As the challenges might hamper the EE learning process for SEN students, teachers play a significant role in anticipating the challenge. Although the challenges happen frequently, teachers must be prepared to reduce the effect of challenges on EE learning. Teachers use various techniques, such as applying different teaching techniques catered to the needs of SEN students and understanding the practical challenges, such as SEN students' health conditions. In relation to the medical issues of SEN students, teachers mitigate the issue using administrative arrangements. SEN teachers take on this problem head-on by being well-prepared, which includes filling out risk assessment forms that the head of the school has approved. Teachers work to create a safe and supportive learning environment for students with special education needs by proactively recognising potential dangers and putting preventive measures in place.

Teachers employ various pedagogical methods to improve SEN students' focus and involvement during EE education. One-on-one instruction is an effective method for providing customised learning experiences and sustaining student attention. Teachers strive to enhance learning outcomes and create a supportive learning environment by adjusting the instruction, for instance, the

visuals, to meet the unique requirements of every SEN student. Visuals are notable in grabbing students' interest in EE subjects and holding their attention. Teachers can encourage critical thinking and stimulate SEN students' attention by using visually stimulating materials like pictures of environmental issues. Teachers promote active engagement and support meaningful learning experiences using open-ended questions and guided discussions. Lastly, the reward system can be a valuable method to motivate SEN students to have better focus. Teachers can foster a pleasant learning environment where students are inspired to actively participate and explore EE concepts by setting clear objectives and providing awards or other incentives.

The types of challenges faced by students with impairments and special educational requirements contribute to the difficulties in understanding complex concepts and have become the most significant factors that can hinder the application of EE (Pujaningsih et al., 2021). Although EE can potentially enhance student learning, the lack of teachers' training in the subject becomes the biggest obstacle to effectively integrating it into the curriculum (Ernst, 2007). Pre-service and in-service teacher training programs should incorporate the methods or instructional strategies recommended to teachers for teaching environmental education in classrooms (Abdullah & Halim, 2012). Limited preparation of prospective teachers with the pedagogical content knowledge (PCK) to effectively teach EE in primary schools (Kennelly et al., 2008) will lead to teacher deficiencies in both content and pedagogical knowledge for EE. In connection with barriers to teaching EE (Ham & Sewing 1988), the salient features of the findings show that educational barriers and logistical challenges in terms of the need to differentiate learning resources hinder the effectiveness of teaching EE. In addition, maintaining students' focus is also a factor that impacts the teaching process.

The domain of EPACK also emphasises how teachers can adjust their teaching based on the learners' capabilities and needs. However, the participants have expressed concerns about implementing environmental education (EE), including overcoming barriers. Most teachers mentioned that professional development is needed to improve their skills in teaching EE to SEN students. To improve EE teaching, educators must indicate a desire for professional development training in topic and pedagogical knowledge and access to varied resources and permissions for learning outside the classroom.

7 Conclusion and Recommendation

This chapter will investigate the conclusion of this study, the implications for the research and practice, and recommendations for future research. The research findings suggest that the teachers of special educational needs (SEN) students demonstrate a positive perception of teaching environmental education (EE) in their inclusive community classroom. Overall, the data highlights teachers' efforts to integrate EE into SEN education despite the constraints during the teaching process. Besides, it has shown how teaching EE has impacted SEN students in a worthwhile way. It underlines the perceived relevance of EE in providing SEN students with practical skills and awareness of their surroundings while simultaneously recognising the necessity for personalised approaches to meet specific learning requirements. In addition, practical activities and sensory stimulation enhance student participation and memory retention. At the same time, a basic understanding of environmental concepts fosters a sense of responsibility and contribution towards environmental conservation among SEN students. Issues such as restricted transdisciplinary thinking and conventional evaluation techniques highlight the need for improved PCK.

The implementation of the environment as a learning tool and incorporating EE into ASDAN vocational programs are two of the many ways that teachers incorporate EE into SEN settings. They use visual digital sources, modify lesson plans based on student's cognitive abilities, and use interactive activities to encourage student participation. Effective EE teaching requires specialised assessment techniques and parent and teacher collaboration. The analysis also emphasises the complexities of teaching EE in SEN contexts, emphasising the importance of proactive management of varied demands and innovative techniques to maintain student involvement and focus in the face of inherent hurdles. Lastly, the analysis demonstrates a multidimensional strategy for teaching EE to SEN students, focusing on practical experiences, specialised materials, and collaborative efforts to ensure inclusive and effective instruction. Enhancing PCK in EE is necessary as concerns arise about teachers' preparedness to adopt EE, especially concerning professional development.

The study concludes that to improve EE instruction in SEN contexts, it is critical to comprehend teachers' viewpoints, implement practical techniques, and overcome obstacles. In the end, it helps SEN pupils and fosters a closer bond with their surroundings by highlighting the importance of continual professional development and support for teachers in order to provide them with the information and abilities needed for effective EE instruction.

The recommendations for further research will comprise the areas of teachers' comprehension of EE, an effective pedagogical strategy, constraints in engagement and differentiation, the need for teacher professional development, and the impact of teaching EE on SEN students' learning outcomes. By focusing on these research topics, academics may improve our understanding of EE pedagogy for children with special education needs, influence practice and policy, and eventually improve this vulnerable population's educational experiences and results. Future investigations might be conducted to learn more about the reasons behind teachers' frequent inability to understand EE principles, particularly in SEN contexts. Examining their past experiences, exposure to EE pedagogy, and perceived comprehension gaps could provide useful strategies for improving teachers' expertise and preparedness to use EE. Identifying and assessing educational strategies for successfully integrating EE into SEN settings may also be the main focus of future research. This can entail looking into cutting-edge teaching strategies, evaluating the value of practical experience, and determining how well multidisciplinary approaches might improve EE comprehension in SEN students.

Further investigations can look into particular difficulties teachers have maintaining SEN students' interest in EE and differentiating their instruction. The creation of focused interventions and support plans could be influenced by knowledge about the underlying causes of these difficulties,

such as students' cognitive limitations and medical backgrounds. The examination on how prepared teachers implement EE in unique education settings and pinpoint areas where their instructional strategies and PCK are lacking is needed. To better inform the creation of specialised professional development initiatives, research should be done on how well pre-service and in-service teacher training programs prepare teachers for EE instruction. Lastly, evaluation of the effects of EE instruction on the academic performance, environmental consciousness, and development of life skills of SEN students could be other subjects of future study. The effectiveness of EE in SEN settings may be better understood through longitudinal research that monitors students' development and evaluates how well EE learning results transfer to real-world situations.

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DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

9 Appendices

9.1 Consent Letter

Dear Participant,

My name is Dwi Juni Ardianti and I am Master's student at the University of Gothenburg, Sweden. Kindly read this consent document carefully before you decide to participate in this study.

Title: Teachers' Strategies and Challenges in Integrating Environmental Education into Special Educational Needs Setting

Introduction: You are being invited to partake in a research study titled "Teachers' Strategies and Challenges in Integrating Environmental Education into Special Educational Needs Setting". The research will explore teachers' perspectives towards teaching environment education for special educational needs students. This research will be done by interviewing the participants. This letter explains why the researcher is conducting the study and how the research will be carried out.

Purpose of the Study: This study is being carried out as my Master thesis to understand how Environmental education is being taught and also to illuminate ways in which teachers can address the strategies and challenges to improve teaching environmental education to special educational needs students.

Procedures: The research data will be collected through semi-structured interviews. This is to gain insight into participants' perspectives on the teaching of environmental education to special educational needs students. The interviews will last for approximately thirty (45) minutes via 'Zoom' or 'WhatsApp' and the session will be recorded.

Compensation: In spite of the fact that we cannot compensate you for your time, your participation will be greatly appreciated in filling the knowledge gap in this area and will provide valuable information to the university community and educational stakeholders.

Confidentiality: Your identity will be kept confidential. Pseudonyms will be used to replace your names in the report. Interview recordings will also be stored in a safe place free from disclosure, and, when the study is completed and data has been analysed, the recordings will be deleted.

Voluntary Participation: Your participation in this study is completely voluntary. There is no penalty for not participating. You may also refuse to answer any of the questions, I ask you.

Right to withdraw from the study: You have the right to withdraw from the study at any time without consequence.

Whom to contact if you have any questions about the study: Dwi Juni Ardianti, (gusarddw@student.gu.se) and supervisor Adrianna Nizinska, adrianna.nizinska@gu.se

Agreement: I have read the procedure described above. I voluntarily agree to participate in the study and I have received a copy of this description and interview questions attached. Thank you.

Participant: _____

Date: _____

Researcher: _____

Date: _____

9.2 Interview Guide

Interview questions for the teachers' experiences in teaching EE to SEN students

No.	Topic	Main Question	Following-Up Question
1.	Background information	a. What was your previous educational background? b. What subject do you currently teach? c. Which class/ year do you teach? d. How many years have you been teaching?	
	a. General information		
	a. Information on teaching for SEN students	a. How many years have you worked as TI (Towards Independent or SEN students) teachers at this school? b. Have you ever worked with SEN students before? c. Have you done any training in teaching SEN students?	
2.	Experience with SEN students	a. Can you tell me about the TI (Towards Independent) class you teach? b. What is it like to teach in TI class? / How do you feel when you are teaching SEN students? c. What are the challenges you have been facing so far?	<ul style="list-style-type: none"> - How many students are there? - What are their needs? - How many hours do they spend in their class? - What are the compulsory lessons?
3.	Knowledge about EE	a. Have you ever heard about EE?	<ul style="list-style-type: none"> - If yes, what kind of lesson is that? - In your opinion, what lessons/ activities that can be considered as EE?

4.	Experience with teaching EE into SEN setting (Strategi, method, tools and assessment)	<p>b. Have you taught any EE-related activities in your class?</p> <p>c. How do you teach EE to your students?</p> <p>d. What methods did you use in teaching EE in your class?</p>	<ul style="list-style-type: none"> - How do you apply EE-related activities in your class? - If yes, how often do you have the activities in your class? - Is it a separate subject in your classroom? - Is it a compulsory subject? - What resources did you use to assist teaching EE in SEN class? - How do you think it was adjusted? - How do you prepare the lesson plan to adapt with SEN students in your class? - How do you use your method in the classroom? - Did you use any special tools in your teaching? - How do you foster a sense of curiosity and motivation among SEN students in the realm of environmental education? - How do you collaborate with other educators, support staff, and specialists to enhance the delivery of environmental education for SEN students? - How do you involve parents and the community in supporting the environmental education of SEN
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		<p>c. How do you assess and evaluate EE lesson that you have taught?</p> <p>d. As a teacher, what kind of support do you need to develop your teaching EE?</p>	<p>students?</p> <ul style="list-style-type: none"> - Have you received any specialized training or professional development to better support your teaching of environmental education to SEN students?
5.	The impact of teaching EE	How does teaching EE impact your students?	<ul style="list-style-type: none"> - What goals do you have for teaching EE in your class? - How do you value the process of teaching EE in your class? - Is the benefit worth the process? How do you think so? - In your experience, how teaching EE affected student engagement?
6	Challenges in integrating EE into SEN setting	Have you encountered any challenges or limitations?	<ul style="list-style-type: none"> - How did you anticipate the challenges?