Perceptions of the Implementation Approach for Environmental Education Integration through Expectancy-Value Theory

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Abstract
This study investigates teachers' perspectives on the significance of Environmental Education (EE) for preschool children and its comprehensive integration across subjects based on the National Preschool Curriculum (NPSC) in Malaysia. Despite four-decade-long integration of EE at all education levels in Malaysia, yet there still exist inadequacies in implementation of EE in preschools. Although, the Malaysian preschool education system has prioritized literacy and numeracy through the LINUS (Literacy and Numeracy Screening) program which tends to outline environmental concepts but the lack of teachers requisite training and experience to integrate environmental concepts into their teaching practices is now a major challenge that requires urgent solution. Previous research has highlighted a tendency for preschools to prioritize basic literacy and numeracy skills over EE. Drawing upon Expectancy-Value Theory by Jacquelynne Eccles, the current study employed qualitative methods using semi-structured interviews and document analysis guided by Creswell's thematic analysis theory. Data were collected from 16 teachers across five private preschools in Nilai and Bukit Mahkota, supplemented by teachers' notes and workbooks, thereafter thematic analysis was performed using NVivo software. Findings reveal a positive reception among teachers regarding the implementation and holistic integration of EE content across subjects. The study implication underscores the importance of aligning teachers' success expectancies for integrating EE content holistically with their perceived value of environmental education.

Keywords: Environmental Education 1; Teacher Perspectives 2; Holistic Integration 3; Expectancy-Value Theory 4; Implementation Challenges 5

Introduction

The proactive stride Malaysia is taking on environmental issues in recent years has resulted in the establishment of the Department of Environment (DOE) (Oyewale & Johl, 2021). This reflects on the country's unwavering commitment to sustainable development (SD) and improving the quality of life for its citizens (OPM, 2021; Oyewale, 2023, Ali, et al., 2023). Importantly, the country is committed to have a clean, safe, healthy, and productive environment for both current and future generations while preserving Malaysia's culturally and naturally rich heritage (Oyewale & Johl, 2021). In this respect, there is need for inclusion of EE at all educational levels, with a particular focus on early childhood education. This will serve as an ideal starting point for integrating EE and potential drive towards positive influence on children's environmental behavior (Anua, et al., 2022; Ardoin et al., 2023). Additionally, it was emphasized that EE enhances the development of physical, cognitive, language, social, and emotional skills in children, offering them valuable opportunities for effective learning (Ernst & Erickson, 2018). As a result, preschool education becomes a critical phase for fostering a deep and lasting connection between children and the environment capable of fostering sustained economic growth, developing human resources, and protecting the environment (Shayan er al., 2022). Based on this, the current study investigates teachers, perception and views of environmental education and it influences its holistic integration across all subjects.

Expectancy-Value Theory in Environmental Education

Jacquelynne Eccles (1983) and her colleagues developed the expectancy-value theory, which states that people's choices relate to achievement that are influenced by their expectations for success and the subjective value they place on tasks in specific domains (Eccles, et al., 1983; Ball et al., 2016; Lykkegaard & Ulriksen,

2016). For instance, teachers are more inclined to teach a topic if they believe they will excel in it and value its importance. The theory breaks down task value into four components: attainment value (i.e., importance of doing well), intrinsic value (i.e., personal enjoyment), utility value (i.e., perceived usefulness for future goals), and cost (i.e., competition with other goals). According to this model, expectations for success and task value are shaped by various factors, including teachers' competence (abilities, previous experiences, goals, self-concepts, beliefs, expectations, interpretations) and school influences (such as philosophy, facilities, and teaching materials).

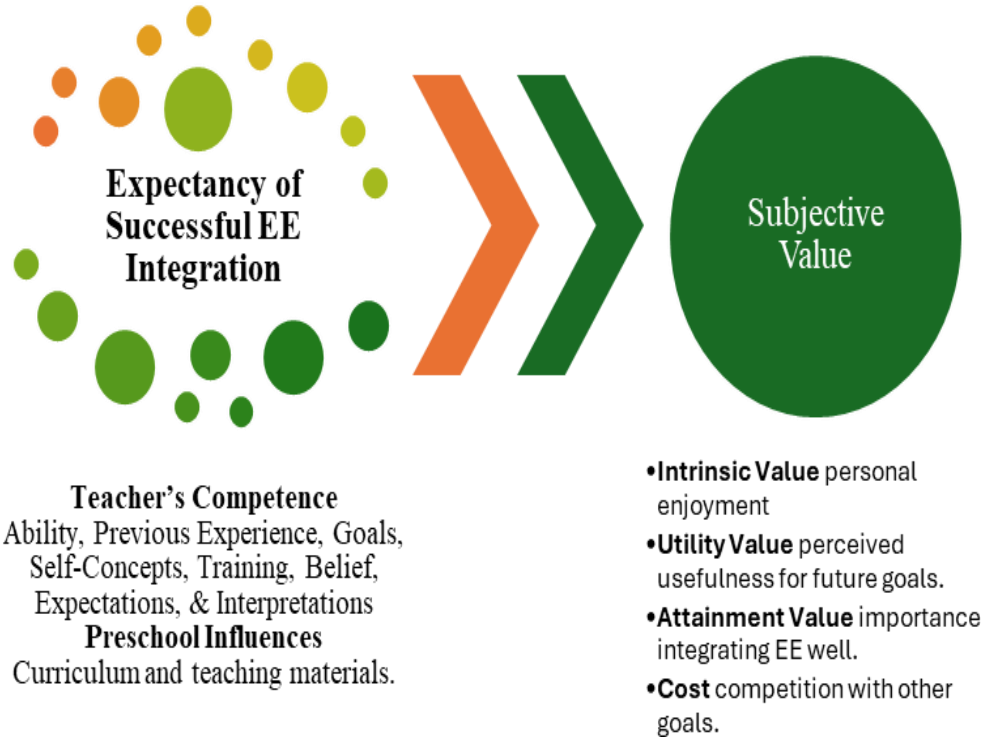

Figure 1. Expectancy-Value Theory Applied in Environmental Education

Research confirms that expectations for success and task value are different but are aligned (Eccles, et al., 1983; Ball et al., 2016; Lykkegaard & Ulriksen, 2016). Teachers' expectations for success tend to predict their later task value; they value domains where they feel competent. Additionally, both factors predict teachers' achievement-related outcomes, with expectations for success being more strongly linked to performance and task values being more closely associated with choices related to achievement. For example, a teacher who believes she understands environmental education is more motivated to integrate its content than one who does not. Likewise, a teacher who values environmental education is more likely to take a step further in integrating EE concepts across all subjects. In essence, expectancy-value theory indicates the significance of both competence-related beliefs and values in explaining teachers' motivation, a premise strongly supported by research (Eccles, et al., 1983; Ball et al., 2016). Therefore, this study would use expectancy-value theory to evaluate teacher's views and perception of EE and its influence on EE holistic integration across all subjects in preschools.

Environmental Education

The significance of Environmental Education (EE) in early childhood development has been widely acknowledged by researchers such as Erhabora & Dona (2016), (Türkoğlu, 2019), and Hadjichambis & Paraskeva-Hadjichambl (2020). They stress the importance of introducing EE at a young age, as children's attitudes toward the environment are often formed early on. Through EE, children can develop a profound understanding of the environment, fostering compassion and responsibility. Studies have shown that engaging children in nature-based activities enhances their cognitive, affective, and psychomotor development, aligning with the perspectives of Velempini (2016) and Kaya & Elster (2019), who emphasize the holistic benefits of integrating environmental learning into early childhood education. This integration not only prepares children for formal schooling but also nurtures their comprehensive development and environmental literacy, as highlighted by (Shaari et al., 2016). Furthermore, researchers such as Barrable & Arvanitis (2019), Mahat &

Idrus (2016), Sawitri (2017) and Wong et al. (2017) emphasize EE's role in shaping children's behavior and addressing environmental challenges. EE is recognized for promoting pro-environmental behavior and fostering a connection with nature from an early age. Additionally, the implementation of EE in schools, according to Cordero et al. (2020) contributes to building environmental awareness within societies. By engaging children in outdoor activities and experiential learning, EE instils environmental consciousness and influences attitudes toward nature (Shaari et al., 2016). Moreover, the positive impact of EE on children's environmental awareness and problem-solving skills is evident in a study by (Galloway-Thoele, 2015).

These findings reinforce the importance of using appropriate methods for early childhood EE, as emphasized by Türkoğlu (2019) and Mahat & Yusri (2016) EE provides children with opportunities to understand environmental issues, shape their beliefs, and develop essential skills for addressing environmental challenges effectively. Thus, integrating EE into early childhood education capitalizes on children's natural curiosity and learning capacity, aligning with the need to examine teachers' perceptions and its influence on EE holistic integration in early childhood education settings. Therefore, the consensus among researchers regarding the significance of EE in early childhood education is clear. EE not only promotes environmental awareness, care, and responsibility but also promotes holistic child development and equips children with the knowledge and skills to address environmental challenges. By integrating EE into early childhood education curriculum and ensuring teachers understand its importance, we can nurture environmentally conscious individuals who can make positive contributions to society and the planet.

Teachers' Perception on Environmental Education

The role of teachers' perceptions and beliefs in shaping Environmental Education (EE) practices has been widely recognized in educational research. Khan et al. (2018) and Barbier et al. (2022) emphasis the significance of understanding teachers' perspectives in advancing education practices. These scholars emphasize that teachers' individual beliefs and values regarding EE significantly influences the integration of EE content in schools, which aligns with Expectancy-Value Theory by Jacquelynne Eccles (1983). Moreover, Husin et al. (2020) found a correlation between teachers' perceptions of environmental care education and their knowledge, attitudes, and involvement in environmental activities within schools, highlighting the intricate relationship between teachers' perceptions and their actions in promoting EE. Furthermore, the impact of external factors such as administrative pressure and the availability of EE facilities and materials were identified by Hosany et al. (2022) as contextual factors that influence teachers' beliefs and subsequent classroom practices. These findings suggest that teachers' experiences, training, and the support they receive from their various preschools significantly contribute to the complexity of understanding the relationship between teachers' perceptions, beliefs, and actions in integrating EE. Moreover, the importance of training programs in enhancing teachers' views, beliefs, and knowledge about EE has been emphasized by Türkoğlu (2019) and Fang et al. (2022). These studies highlight the role of professional development in equipping teachers with the necessary skills and resources to effectively integrate EE content. However, these studies reveal challenges such as the lack of access to EE resources and support from preschool administration and parents persist, complicating efforts to improve EE practices in diverse preschool settings.

Integration of Environmental Education in Preschools Curriculum

In 1998, Malaysia incorporated environmental education (EE) into its education system through the release of the Education Teacher's Guide for primary and secondary schools. Additionally, a preschool guidebook was published in 2005. According to the National Preschool Curriculum (NPSC) was published by the Malaysian Ministry of Education (MOE) in 2010 and subsequently revised in 2017 through the Malaysian Education Development Plan (PPPM) 2013-2025. The NPSC serves as a crucial guide for all preschools in Malaysia. On of the key objectives of the NPSC is to foster children's love and appreciation for the environment. This objective was included into the Humanity Strand, which emphasizes acquiring knowledge of local community practices, the environment, the country, and the world while instilling patriotism and unity NPSC, (2017) (MOE, 2020). The NPSC's content is organized into elements, with Environmental Sustainability as the second (2nd) element and Global Sustainability as the ninth (9th) element out of the ten (10) elements. The objectives of Environmental Sustainability aim to raise awareness and nurture pupils' love for the environment through teaching and learning. However, despite the goal of incorporating environmental knowledge to shape pupils' ethics in appreciating nature, a study by Kamaruddin et al. (2019) revealed that there is no specific subject on EE in the Malaysian school curriculum. Kamaruddin et al. (2019) concluded that the lack of focus on EE has led to poor public awareness, low civic consciousness about environmental preservation and protection, and limited understanding of environmental issues, knowledge, and updated information among teachers.

Kamaruddin et al. (2019) recommended a review of EE to ensure that knowledge on environmental protection should include legislation and policies guiding environmental sustainability in the curriculum.

Global Sustainability elements also aim to instill sustainable thinking in children, encouraging them to apply knowledge, skills, and values to their daily lives. Based on elements like Sustainable Consumption and Production, Global Citizenship, and Solidarity. Mahat et al. (2016) conducted a study indicating that preschool pupils implicitly participated in environmentally sustainable practices but are environmentally aware. However, the study found that children's environmental knowledge did not influence the practice of the 3Rs (Reduce, Reuse, Recycle) among preschool students. This suggested that the teaching of science was not in line with environmental activities like the 3Rs. Mahat et al. (2016) recommended the use of a structured curriculum and resources to educate and promote environmental sustainability among children. Global sustainable elements are crucial in preparing pupils to address current challenges and issues, both locally and globally. In line with Mahat et al. (2016) studies, it is essential to incorporate environmentally sustainable activities in preschools, such as 3R practices. EE activities should not only exist in the curriculum but should also be an integral part of children's preschool experiences. This approach will help raise awareness and foster environmentally responsible citizens for the future. Environmental Sustainability and Global sustainable elements were divided into EE concepts and topics under content standards, learning standards, and topics for age 4 and 5 children that should be integrated across all subjects in the curriculum, as illustrated in Table 1 below.

Table 1. Topics of Environmental Education in the NPSC (2017)

Content Standard	Learning Standard and topics for Age 4	Learning Standard and Topics for Age 5
Understand the beauty of the environment	Talk about the beauty of the environment. (Story telling). Participate in activities to sustain the beauty of the environment.	Describe the beauty of the environment
Understand the relationship between humankind and the environment	Describe the importance of the environment to mankind.	Relate human activities to natural disasters.
Sustain and conserve the environment	Talk about practices to sustain and conserve the environment. Carry out activities to sustain and conserve the environment.	Discuss ways to overcome problems and issues related to the environment. Practice environmental sustainability and conservation.

[1] Each topic was discussed in the NPSC to guide preschool teachers on what EE activities would enhance the teaching and learning of these concepts. Illustrated below in Table 2.

Table 2. Meaning of Environmental Education Terms in the NPSC (2017)

Term	Meaning
Environment	Refers to all living components such as animals and plants and non-living things such as soil, landscape, and the weather.
Natural disasters	The negative effects of the forces of nature such as floods, earthquakes, typhoons, volcanic eruptions and droughts, and human activities.
Environmental problems	Pollution (air, water, and land); the extinction of flora and fauna; disposal of waste and thinning of the ozone layer.
Sustainability and conservation of the environment	Reforestation, gazettement of forest reserves, practice of the 3Rs (Reduce, Reuse & Recycle), cleaning of rivers and seas and law enforcement.
Landmark	An object which is easy to recognize (for example: building, tree, etc.) as a guide to determine the location of a place.

Search and rescue teams	A group of people who protects and saves such as the Fire & Rescue Department, the police, the Department of Civil Defense Malaysia, medical teams etc.
Sustaining the environment	Actions to protect the natural resources of the earth to maintain them in their original state.
Conserving the environment	Actions to protect the natural resources of the earth to maintain them in their original state.

Environmental Education (EE) in preschools is seen as a vital component of early childhood education for nurturing environmental awareness and instilling pro-environmental values (Drake & Reid, 2018). The integration of EE into preschool education was referred to as the 'fusion' or 'infusion model,' emphasizing the incorporation of environmental concepts across the entire subjects in the curriculum (Drake & Reid, 2018). Majority of the Asian countries, including Malaysia, China, Japan, and Indonesia, have adopted this integrated approach to address EE (Errica & Mulyadi, 2022). However, a common problem identified by scholars like Saleh et al. (2018) and Karim, et al. (2022) that EE often remains confined to science-related subjects in preschools, rather than being holistically integrated across the entire curriculum, as recommended by the National Preschool Standard Curriculum in Malaysia. EE is considered holistic due to its complex nature, encompassing natural and built environments, technology, culture, history, morality, and aesthetics according to Tilbury (1995) (Mubita et al., 2022; Ducci, et al., 2024). The interdisciplinary approach to EE is essential because it draws upon specific content from various disciplines, aligning with the emphasis on multiple disciplines by environmentalists like Palmer et al. (2003), Disinger (1993) and Ramsey et al. (1989). Teaching environmental concepts in an interdisciplinary manner helps students connect their learning to real-life situations, which is in line with how young minds often process information (Drake & Reid, 2018). Despite the benefits of the integrated approach, it comes with its set of challenges. Implementing it can be complex, as it may not always be clear how to link EE with other subject contents, making teachers uncomfortable with the approach (Drake & Reid, 2018).

This challenge has also been observed by various researchers who pointed out that teachers often concentrate primarily on science-related subjects due to the lack of clear guidance on integrating EE concepts with other subjects [24, 38]. Additionally, the absence of EE as a standalone subject in the Malaysian curriculum makes it challenging to determine where and how to integrate EE (Kamaruddin et al., 2019). Djoehaeni et al. (2016) added that the lack of clearly defined program, outcome, and objectives related to environmental preservation and protection further hinders the integration of EE concepts across various subjects. Proper planning, curriculum guidelines, teacher preparation, training opportunities, teaching materials, and EE facilities are crucial factors for the effective implementation of EE in Malaysian preschools, as emphasized by Tan et al. (2016) and Wong et al. (2017). These elements are essential for enhancing children's critical thinking skills and their global awareness of environmental issues. Mahat et al. (2016) revealed that the lack of adequate training, guidance, and teaching resources leads to difficulties in the teaching and learning of EE due to the absence of clear direction and resources. Recent research by Biber et al. (2023) demonstrates that children attending nature-centered preschools tend to develop more positive environmental attitudes and awareness. This highlights the importance of providing necessary EE resources such as time, materials, and skilled teachers in EE that can successfully integrate EE into all subjects in preschools.

Holistic Integration of Environmental Education Across all Subjects in Preschools

In examining the research on Environmental Education (EE) in Malaysian preschools, it becomes evident that while there is recognition of the importance of integrating EE across subjects, there are challenges in achieving this holistic approach. Scholars such as Drake et al. (2018) and Errica et al. (2022) emphasize the fusion or infusion model, advocating for the incorporation of environmental concepts throughout the curriculum. However, studies by Saleh et al. (2018) and Karim et al. (2022) reveal that EE often remains confined to science-related subjects, indicating a gap between the intended and actual implementation of a comprehensive integration. Moreover, there is a discrepancy between the emphasis on EE concepts and the practical application of environmental practices. While the National Preschool Curriculum outlines comprehensive EE contents, studies by Mahat et al. (2016) and Marques et al. (2020) indicate unsatisfactory actions toward environmental conservation among preschool pupils. This suggests that simply teaching about environmental topics may not translate into effective environmental practices. Marques et al. (2020) highlight the importance of exposure to both theoretical and practical knowledge of EE, as it influences positive environmental behaviors towards the environment. Thus, there is a need to bridge the gap between content knowledge and practical skills in implementing environmentally sustainable activities. Another significant aspect is the role of teachers

in integrating EE effectively, while proper planning, curriculum guidelines, and training opportunities are crucial for the successful integration of EE (Tan et al., 2016; Mahat & Yusri, 2016).

Mahat et al. (2016) and Marques et al. (2020) suggest that preschool teachers may possess more theoretical knowledge than practical skills. This indicates a need for enhanced teacher training programs that focus on experiential learning and practical application of EE concepts. Furthermore, the curriculum's focusing more on theoretical EE content, rather than practical EE activities, raises concerns about the depth of understanding and engagement with environmental issues. While the NPSC emphasizes knowledge acquisition and actions such as environmental management and adherence to environmental laws, Marques et al. (2020) argues for a more balanced approach that includes actual participation in environmentally sustainable activities. This highlights the importance of incorporating hands-on experiences and EE facilities to foster a deeper understanding of environmental concepts. Additionally, the absence of clear program outcome objectives related to environmental preservation and protection further hinders the integration of EE concepts across various subjects (Tan et al., 2016; Djoehaeni et al., 2016). Without defined objectives, it becomes challenging for teachers to align their teaching with the broader goals of environmental education. Thus, there is a need for clearer guidelines and frameworks that articulate specific outcomes related to environmental awareness and action. Therefore, bridging the gap between theoretical/content knowledge and practical skills by adopting a more balanced approach that includes hands-on experiences and clarifying program outcome objectives are essential steps in achieving a holistic and impactful integration of EE in Malaysian preschools. Addressing these challenges requires an understanding of teacher's view and perception of EE and how it influence EE implementation across subjects in preschool education, to ensure that preschoolers develop a deep understanding of environmental issues and cultivate pro-environmental values from an early age.

Methodology

This study seeks to explore the teacher's perception for the implementation of environmental education in private preschools in Malaysia. Specifically, it examines EE implementation through expectancy-value theory in assessing teachers' perceptions of the importance of environmental education (EE) and its holistic integration across preschool subjects. As such, a qualitative approach within an interpretative paradigm, emphasizing the philosophical underpinnings regarding the nature of reality was employed. The qualitative methodology was used to investigate the value private preschool teachers placed on EE implementation and how it influences their success expectancy in EE integration (Eccles et al., 1983; Hadjichambis & Paraskeva-HadjichambI, 2020). This was done using a case study strategy involving multiple methods of data collection (Yin, 2009a, 2012b; Corbin & Strauss, 2015). The case(s) in this study are bound by a period of 3 months, enabling the researcher to collect detailed information using various data collection procedures such as interviews with teachers and document analysis of teachers' lesson notes and textbooks. The Data collection methods include in-depth interviews and document reviews, chosen for their appropriateness in integrating EE content among private preschool teachers. Rigorous data analysis, incorporating qualitative content analysis with thematic procedures, within case and cross case analysis to ensure reliability and validity in data interpretation and collection (Corbin & Strauss, 2015). The study emphasizes the need for consistent data collection until data saturation is achieved to provide accurate evidence and an honest representation of findings, thereby avoiding compromises to research quality.

Based on this, five private preschools were selected for this study. Private preschool teachers were chosen as the focus of the research due to their common use of English as a medium of communication and their relative accessibility compared to teachers in public preschools, which often have stricter regulations and bureaucratic procedures. Sixteen teachers voluntarily participated in the study after providing informed consent. Data saturation was achieved after the second visit to the preschools. Thereafter, document collection was conducted to complement the data obtained from the interviews during the third visit.

Data Collection: Protocol and Measures

The researcher organized introductory meetings with participants in each private preschool to explain the research interests and procedures, and to distribute materials for the timeline. Upon signing the informed consent, participants were asked questions related to demographics, their position in the school, and educational level. These introductory meetings aimed to establish a relationship with the participants in advance of the interviews. Following the introductory meeting, in-depth interviews were conducted per case. The interviews commenced by inviting participants to share their views and perceptions on EE for preschools. Subsequently, participants were asked to elaborate on their views on whether EE should be implemented as a standalone subject or holistically, and reasons behind their stance. Researchers probed for further details on EE significance and integration strategies when necessary, encouraging participants to lead the discussion.

Overall, the interviews lasted 60 minutes on average, ranging from 40 to 70 minutes. Following the interviews, transcription was undertaken, and the researcher revisited the preschools for member checking, where participants cross-checked the interview transcripts. Teachers' names were represented with T (1-16), while preschools were denoted with coded names Case 1, 2, 3, 4, & 5 to ensure confidentiality.

Data Analysis and Findings

Diverse methods were used to analyze results, tailored to the research question nature which sought to explore perceptions and views on EE among preschools teachers. The studies employ the combination of grounded and thematic analysis approaches to generate and identify primary themes or patterns along with their sub-themes. The grounded theory strategy was chosen because of its capacity to interpret complex phenomena and address social issues, as advocated by Corbin et al. (2015) and Makri et al. (2021). On the other hand, thematic analysis was employed because of its accessibility and theoretical flexibility in analyzing qualitative data (Yin, 2009a, 2012b). Empirical data from respondents supported the themes, with participant names anonymized for ethical reasons and schools represented by codes (Cases 1, 2, 3, 4, & 5) in the transcript. Participant perspective/responses were written with italic fronts which addressed the two research objectives as presented in the following sections A and B.

Section A: Views and Perceptions on the Importance of Environmental Education Among Teachers

Case 1

Teacher 1 emphasized that EE plays a crucial role in enabling children to connect personally with nature and fosters essential growth and learning. The teacher also stressed the significance of creating a social environment where children can effectively interact with peers and teachers while learning proper behaviour. During the interviews, Teacher 1 highlighted the importance of EE, stating, *"EE is highly important for children. Through EE, children can personally connect with nature, which is crucial for their growth and learning. Additionally, children should develop in a social environment where they can interact and communicate effectively with peers and teachers while learning proper behaviour"* (Interview T1 Case 1).

Similarly, Teacher 3 thinks that EE would develop a child's social, intellectual, and physical development. she also believed that scientific skills, particularly higher analytical thinking, are incorporated into the curriculum to address environmental topics. Teacher 3 stated, *"It is crucial to teach EE to students as it influences their behaviour, adaptability, and growth. Science-based learning centres promote higher analytical thinking among our students. We use scientific concepts to encourage critical thinking in relation to environmental topics, such as building height and length. Additionally, we organize visits to gardens, flower parks, and plant parks to facilitate outdoor activities and enable students to connect with the natural environment"* (Interview T3 Case 1). Both teachers emphasize the significance of Environmental Education (EE) for children. Findings reveal that Teacher 1 places a strong emphasis on fostering personal connections with nature and encouraging social interactions. On the other hand, Teacher 3 focuses on the broader developmental benefits of EE and advocates for the integration of scientific skills into the curriculum.

Case 2

In Case 2, all participants acknowledged the importance of instilling environmental education (EE) in preschool. Teacher 4 believed that EE could influence practical life skills related to how students navigate common challenges like shopping. However, Teacher 4's approach seemed to contradict EE principles. According to Teacher 4, *"We teach children to solve numerical problems and apply these skills to money. They learn mathematics through shopping, understanding shopping rules, developing literacy skills through reading shopping lists, actively learning about money usage, calculating expenses, and visiting malls"* (Interview T4 Case 2).

Teacher 5, while emphasizing personal hygiene and virtues like kindness as part of the benefits of EE implementation among preschool children, also agreed with Teacher 4 on EE promoting skills such as shopping and understanding the value of money. Teacher 5 stated, *"I teach children how to wash clothes, maintain personal hygiene, instil qualities like mercy, passion, respect, and kindness. We engage in outdoor learning, including mathematical activities like shopping, to boost confidence in exploring the environment and solving numerical problems related to expenses"* (Interview T5 Case 2). The results of Case 2 reveal a consensus among the participants, including Teacher 4 and Teacher 5, regarding the significance of instilling environmental education (EE) in preschool. However, there is a notable discrepancy in their approaches and perspectives on how to integrate EE principles into the curriculum.

Case 3

In Case 3, participants supported the incorporation of Environmental Education (EE) in preschools, aligning with the perspectives observed in Cases 1 and 2. Teacher 7 (T7) emphasised the significance of EE in fostering a fundamental understanding among students on how to coexist with the world and care for the environment, emphasizing that Earth is their only home. T7 stated during the interview that, *"It's important for the students to understand how to coexist with the world and take care of the environment because it is the place we live in"* (Interview T7 Case 3). Building on this perspective, Teacher 8 (T8) highlighted the role of EE in enabling students to learn about the environment and develop an awareness of the world they inhabit. T8 emphasized the practical application of EE by taking children outside to explore plants in the surrounding area. According to T8, *"Generally, it was important for the students to learn about EE and gain awareness of the world they were living in. Additionally, I took the children outside to show them plants in the surrounding area, thereby exploring the environment"* (Interview T8 Case 3).

Similarly, Teacher 9 (T9) stressed the importance of teaching children about the impact of human activities on the environment. T9 believed that such education would enable students to reflect on both positive and negative human impacts on the Earth. T9 articulated, *"It is crucial for students to understand the positive and negative impacts of their actions on the environment, fostering awareness and care for the land"* (Interview T9 Case 3). Furthermore, Teacher 10 (T10) emphasized the role of EE in instilling an appreciation for the 3Rs (reduce, reuse, recycle) which enhances pro-environmental behaviour among children. T10 advocated for the integration of EE by stating, *"I believe it is important to combine EE because children can learn about planting, recycling, and reducing the use of items like bottles and paper. For example, papers and water can be recycled, and empty bottles can be used as flowerpots"* (Interview T10 Case 3). The results from Case 3 revealed a unanimous support for the integration of Environmental Education (EE) in preschools, supporting findings in Cases 1 and 2. Aligning with the views of participants from case 1 and 2. Case 3 also teachers showed more knowledge in terms of EE content knowledge than Case 1 and 2.

Case 4

Case 4 also supported the implementation of EE concepts in preschools. Teacher 11 (T11) expressed her enthusiasm for the integration of EE in the preschool education system, emphasizing the importance of the 3Rs. T11 thinks that there is need for students to learn about caring for nature and the significance of reusing plastics. Despite not currently incorporating EE topics into her lessons, she stated that, *"EE should be implemented so that students can learn more about taking care of nature and the importance of reusing plastics. Although I would love to teach environmental topics, I am not currently incorporating EE topics into my lessons"* (Interview T11 Case 4). Similarly, Teacher 12 (T12) conveyed her interest in teaching children about the environment through EE, incorporating topics such as planting and recycling in her lessons. However, she expressed concern about the limited availability of EE topics in Jawi and Bahasa workbooks. T12 noted, *"EE is important for children, and I am interested in teaching them about the environment around us. I teach Basa Jawi and incorporate planting seeds and recycling. However, there are not many EE topics available in the Jawi and Bahasa workbooks, therefore I only teach topics available in the workbook"* (Interview T12 Case 4).

Concurrently, Teacher 13 (T13) demonstrated an awareness of recycling, reducing, and reusing, emphasizing the importance of teaching children EE through the proper way of using plastic and encouraged the reuse of plastic instead of discarding it. T13 acknowledged, *"I have heard about recycling, how to properly use plastic, and the importance of reusing plastic instead of throwing it in the trash bin. It is important for children to learn how to reuse plastic through EE"* (Interview T13 Case 4). Result indicated a shared enthusiasm for integrating Environmental Education (EE) into the preschool education system among all the teachers in Case 4. Each teacher recognizes the importance of imparting knowledge about caring for nature and the significance of practices like reusing plastics. The result also revealed that there are variations in their current implementation of EE in the classroom, however all the teachers have EE content knowledge similar to Case 3 teachers.

Case 5

Finally in Case 5, both teachers highlight the importance of incorporating environmental education (EE) into early learning, with a specific emphasis on recycling practices. Their shared conviction emphasises the need for a holistic approach to instilling environmental consciousness in young minds. Teacher 15 shares insightful perspectives on integrating EE principles into teaching, drawing from her own school experiences. She emphasised the significance of recycling and stresses the importance of instilling recycling habits in children early on to foster environmental awareness. *"I learned about EE during my school days and understand the importance of recycling. It's crucial to teach children about recycling habits early on and raise awareness about the environment"* (Interview T15, Case 5). Similarly, Teacher 16 exhibits a pre-existing understanding of EE

and advocates for introducing concepts like recycling from a young age. While she acknowledges familiarity with recycling concepts, she emphasizes the practical aspect of teaching children how to correctly sort recyclables into different containers. *"I believe in educating children about the environment. I'm familiar with recycling concepts, and I think EE should start early. For instance, after using a plastic bottle, we teach children to dispose of it correctly in the recycling bin"* (Interview T16, Case Study 5). Findings revealed that Teacher 15 and Teacher 16 emphasise the importance of integrating Environmental Education (EE) principles into their teaching practices, particularly focusing on the significance of recycling.

Figure 2. Illustrates Word Cloud showing the most frequent words on Teacher's views and Perception on Environmental Education during the interview Generated from NVivo

Across Case Analysis and Findings of the Views and Perceptions on Environmental Education Among Teachers

Across the various cases presented, it is evident that there is a strong consensus among teachers regarding the importance of Environmental Education (EE) in private preschools. Teachers consistently recognize EE as a crucial tool for promoting personal growth, social interaction, and intellectual development among young children. This recognition indicates the belief that EE serves as a foundation for instilling environmental consciousness and promoting proactive behavior towards sustainability. The unanimous support for integrating EE into preschool curricula indicates a shared understanding among teachers of its potential to nurture responsible citizens capable of contributing positively to both personal development and societal progress.

Table 3. Illustrate the percentage on teacher's view on EE importance, benefit, objective, and commitment for EE Generated from NVivo through Matric Coding Query

	A : Importance of EE	B : Benefit of EE	C : Teacher's Commitm...	D : Objective of Teacher
1 : CASE 1	40.43%	36.17%	0%	23.4%
2 : CASE 2	9.85%	30.05%	34.98%	25.12%
3 : CASE 3	50%	21.21%	17.42%	11.36%
4 : CASE 4	56%	16%	14.5%	13.5%
5 : CASE 5	59.38%	23.96%	11.46%	5.21%

However, while there is agreement on the significance of EE, some teachers are not commited to implement EE for instance Case 1 in Table 3 shows 0 % commitment to EE. Variations exist in the approaches and perspectives of teachers across different cases according to their reponses represented in Table 4 below, some teachers emphasize the personal connection with nature through outdoor and EE practical activties as key aspects of EE such as visit to gardens and recycling, highlighting the importance of fostering children's curiosity and understanding of the environment. Others focus on practical methods that are not related to EE such as money management skils, methematics, and literacy to instill social and leadership skills in children. While in Table 4 teachers in Case 2 taught the highest persentage of topics that were not not related to EE concepts. These differences in approach suggest a diverse range of strategies employed by teachers to incorporate EE into their teaching practices and reflect limited knowledge among some teachers.

Table 4. Illustrate teachers' responses method of EE integration among the five cases Generated from NVivo through Matric Coding Query

	A : EE Litracy indoors	B : Outdoor	C : EE Practical Skills a...	D : Not Related to EE
1 : CASE 1	0%	50.7%	49.3%	0%
2 : CASE 2	34.15%	6.1%	0%	59.76%
3 : CASE 3	8.64%	28.4%	41.98%	20.99%
4 : CASE 4	0%	34.43%	65.57%	0%
5 : CASE 5	0%	0%	66.67%	33.33%

Furthermore, disparities also emerge in the level of knowledge and implementation of EE among teachers. While some demonstrate a deep understanding of EE content and actively integrate it into their lessons evident in Case 1, 3, 4, and 5 Table 4, but some teachers face challenges in accessing suitable materials or integrating

EE into existing curricula which relfected in Case 3 and 4, Table 5. Eventhough there were no complains of challenges, Case 2 teachers had limited unterstanding of EE concepts, majority of the teachers intepreted topic that were not related to EE as EE concepts . These variations emphasis the need for ongoing support and professional development opportunities for teachers to enhance their EE knowledge and implementation skills effectively. Overall, the comparison across cases highlights the overarching importance of EE in preschool education while also revealing the need for tailored approaches and continued support for teachers to maximize its impact on young learners.

Table 5. Illustrate teachers' responses on EE topics taught among the five cases Generated from NVivo through Matric Coding Query

	A : Topics taught	B : EE Topic Taught	C : Not related to EE	D : Challenges
1 : CASE 1	3	2	1	0
2 : CASE 2	14	7	7	0
3 : CASE 3	13	8	5	4
4 : CASE 4	9	5	4	3
5 : CASE 5	6	3	3	0

Section B: Views and perceptions on Holistic Integration of Environmental Education

Case 1

In the science workbook and teacher notes of Case 1, various EE-related topics are covered, including drawing, tracing trees, fostering a scientific attitude, instilling values related to environmental cleanliness, practicing observation using the five senses, classifying objects, and effectively communicating results. These topics can be found in the NPSC (pages 98-102, SA1.0, SA2.0, and SA3.0). During an interview in Case 1, Teacher 1 emphasized the integration of science and EE by encouraging a personal connection between students and plants. The teacher believes that incorporating outdoor activities and visits to gardens provides practical experiences that enhance students' understanding of scientific concepts within the context of EE. Teacher 1 stated, *"Since EE is related to science, we teach the kids to develop a personal relationship with plants. We used to bring students to visit gardens and engage in outdoor activities"* (Interview T1 Case 1). Similarly, Teacher 2 advocated for a holistic approach to EE by combining it with various subjects, not limited to science. Teacher 2 recognized the inherent connection between science and EE, highlighting the synergies that arise from integrating these concepts. She believes that this approach not only enriches the learning experience but also emphasizes the interdisciplinary nature of environmental education. Teacher 2 expressed, *"I prefer to combine the environmental subject with other subjects like science because they are highly related to EE"* (Interview T2 Case 1).

In Case 1, an analysis of the science workbook and teacher notes reveals an implicit exploration of EE topics. These encompass activities such as drawing and tracing trees, fostering a scientific attitude, instilling values related to environmental cleanliness, practicing observation using the five senses, classifying objects, and effectively communicating results documented in the National Primary Science Curriculum (NPSC) on pages 98-102, specifically in sections SA1.0, SA2.0, and SA3.0. This findings signifies that the teachers' have some PCK and GPK with a clear dedication to integrating EE into the science curriculum. Furthermore, it was observed that both teachers used interdisciplinary approaches, demonstrating a shared belief in the integration of EE not only within the science but also in other subjects.

Case 2

In Case 2, the science workbook and teacher's lesson note focused on Science and Technology; only four EE topics were identified, encompassing the classification of flowers, trees, air pollution, and flood also found in

the NPSC (p.101-102, SA3.4). Teacher 6 focuses on topics like clothing maintenance for personal environmental well-being and planting to enhance oxygen production, believing that plants play an important role in clean air in our lives. T6 thinks these topics would foster good health, social connection, and emotional well-being. She also believes that through these efforts, the children would aspire to make a positive contribution to the community and the world at large. She explained, *"I am deeply committed to environmental care, particularly through initiatives such as planting to enhance oxygen production. Recognizing the crucial role of clean air in our lives, I am dedicated to educating others on how to contribute to a healthier environment. Additionally, I address the significance of clothing maintenance as it pertains to personal and environmental well-being. By advocating for clean clothing practices, I aim to promote good health, social connection, and emotional well-being. In these ways, I hope to contribute positively to our shared community and the world at large."* (Interview T6 Case 2).

However, T4 plays an important role in narrating stories that resonate with students, such as one about the flu. She thinks it's better to prepare the children for real-life situations, such as how to face floods, how to respond. T4 believes that this will not only impart knowledge but also instill qualities of leadership. In essence, the approach is not merely about conveying subject-specific knowledge but about preparing students for the complexities of real life. Through thoughtful integration of subjects with the environment and a focus on leadership development, which are not aligned with EE concepts. She stated, *"Yeah, indeed, when each subject is connected to the environment, it adds depth to science or any science-related field. This approach is crucial because education thrives on real-life examples and their relevance to the subject matter. For instance, discussing the flu can be intertwined with environmental factors. Teachers play a pivotal role in narrating stories that resonate with students, such as one about the flu. It's not just about the subject; it's about preparing children for real-life situations. In the face of floods, children should learn how to respond - whether through donations, assistance, or participating in cleanup efforts. This not only imparts knowledge but also instills qualities of leadership. Teaching about leadership is vital; it emphasizes that citizens are molded from a young age. By instilling this knowledge, children can envision themselves as future leaders. This is why CIC teachers incorporate public speaking into the curriculum, fostering confidence that enables children to lead their peers and others."* (Interview T4 Case 2).

Both teachers contribute valuable perspectives to EE. T6 focuses on specific environmental topics, while T4 adopts a holistic approach, integrating environmental concepts into various subjects and emphasizing leadership development, though the topics taught were not aligned with the NPSC. Findings revealed that teachers in Case 2 integrated only a fraction of EE concepts intended for preschool children according to the NPSC. Both teachers have some Content Knowledge; however, they faced limitations when it came to interpreting EE content.

Document analysis for Case 3, 4 and 5

The science workbook encompassing Cases 3, 4, and 5 distinguishes itself through a comprehensive exploration of Environmental Education (EE) topics, aligning effectively with the National Primary School Curriculum (NPSC p.100-103, SA3.0, p.117-119 KM5.0-6.0). Notably, the workbook delves into various EE topics, such as recycling, waste management (with specific emphasis on the blue waste bin for paper materials and the red waste bin for toilet cleaning), the water cycle, and practical demonstrations on creating water bubbles. The workbook articulates the significance of waste separation, designating the blue waste bin for paper, books, newspapers, magazines, and paper-based products. Simultaneously, the red waste bin is assigned for waste generated during toilet cleaning activities. The water cycle is elucidated, encompassing the journey of water from absorption into the air, the formation of water droplets in cloudy clouds, the condensation process making the clouds heavier, and the eventual release of water droplets as rain.

Additionally, the workbook provides hands-on guidance on crafting water bubbles and discusses the phenomena of water droplets after rainfall. Within the framework of environmental awareness, the workbook explores the natural habitats of various animals, encompassing domestic, wild, and aquatic species. It extends to cover plant growth, different parts of plants, various stages of tree development, and the developmental phases of chickens. Furthermore, it touches upon the beauty of flowers, the fluttering butterfly, and life in both oceanic and freshwater environments. The changing seasons such as winter, summer, autumn, and spring were also presented as integral components of environmental cycles. Teachers' views on EE topics, integration, and teaching strategies, compared with the suggestions made in their workbook, are discussed in the subsequent sections.

Case 3

Teacher 7 (T7) from Case 3 expressed a commitment to integrating Environmental Education (EE) with subjects like science, particularly in the context of teaching Arabic and Jawi. Jawi, a Malay language utilizing the Arabic script, covers diverse topics such as plants, clouds, and rivers. Despite this initiative, T7 expressed her frustration with challenges stemming from a language barrier that impedes effective comprehension and application of the environmental content by students. T7 stated, *"I advocate for the integration of Environmental Education (EE) with other subjects, particularly science, to broaden the scope of knowledge, but I teach Arabic and Jawi. Jawi is a Malay language that utilizes Arabic script. The curriculum covers diverse topics such as introducing plants, clouds, and rivers. However, I encounter challenges due to a language barrier that hinders students from effectively grasping and practicing the content"* (Interview T7 Case 3).

Conversely, Teacher 8 (T8) adopts a strict focus on teaching mathematics, with minimal incorporation of EE concepts into the curriculum. The teacher adheres strictly to prescribed textbooks, where environmental elements are noticeably absent. T8 emphasized fundamental counting principles, reflecting a less integrative approach to environmental education within the mathematics curriculum. She stated, *"I solely focus on teaching mathematics, with minimal incorporation of EE concepts into the subject. I strictly adhere to the prescribed textbooks, where such elements are absent, and the emphasis remains on fundamental counting principles"* (Interview T8 Case 3).

On the other hand, Teacher 9 (T9) argues against the need to separate EE from science. Teaching both Bahasa Melayu and science, T9 integrates environmental concepts into these subjects. Topics such as recycling, understanding recycling bin colors, recycling rainwater, maintaining a healthy balanced diet, and exploring the five senses are covered both indoors and outdoors. However, T9 expressed concerns regarding challenges primarily arising from limited knowledge and the constraints of conducting activities outside the classroom. *"There is no need to separate EE from science because it is still in its early stages, so it's all about the basics. No need for changes; I teach both Bahasa Melayu and science. I taught recycling, understanding the different colors of the recycle bin, recycling rainwater, maintaining a healthy balanced diet, and exploring the five senses such as smell, touch, taste, and feel. Both indoor and outdoor learning are incorporated. There aren't many difficulties since science is about the environment itself, making it enjoyable for students. They do face some challenges, mainly due to limited knowledge, as we cannot always conduct activities outside the classroom"* (Interview T9 Case 3).

In a similar vein, Teacher 10 (T10) emphasizes a comprehensive approach by incorporating environmental topics across various subjects. With a project centered on aquatic animals in subjects like language, math, English, Arabic, and science. The math component explores topics such as the depth of the sea and types of fishes, employing architectural concepts to measure and apply them creatively. T10 believes this multidisciplinary approach exemplifies a commitment to fostering environmental education through diverse subject integration. *"There is much more to the science topics in the project that incorporates various subjects. For example, there's a project focusing on aquatic animals, which integrates subjects like language, math, English, Arabic, and science. In the math component, students explore topics like the depth of the sea and types of fish. The project involves implementing environmental expertise across different subjects, such as using architectural concepts in math to measure and apply them in creative and other activities"* (Interview T10 Case 3).

The findings revealed that not all the subjects covered in the workbook were effectively taught by the teachers, suggesting challenges in terms of interpretation constraints in conducting outdoor activities, and language barriers hindering the seamless integration of Environmental Education (EE) content. Despite the alignment of topics in the science workbook with EE content in the National Professional Standards for Teachers (NPSC) guidelines, the findings suggested a comprehensive and engaging curriculum. Additionally, the results indicated that teachers used diverse approaches to integrate EE into their teaching practices in Case 3, ranging from strict subject-focused teaching to more comprehensive multidisciplinary approaches. This diversity highlighted variations in interpretations among teachers.

Case 4

In the interviews conducted with teachers (T11, T12, T13, and T14) from Case 4, it is evident that there is a shared recognition of the importance of EE in fostering a sense of responsibility towards nature among students. Note Case 4 uses the same workbook as Case 3. Despite the absence of a dedicated handbook for EE, teachers are integrating environmental concepts into existing subjects. Teacher 11, responsible for science and social studies, acknowledges the limited coverage of EE in the curriculum. However, T11 believes EE can be promoted by integrating topics such as waste reduction through recycling and reuse. T11 feels the approach

should be associated specific colors with types of recyclable materials, making the learning experience more tangible for students. She said, *"I don't have a handbook specifically for Environmental Education (EE); instead, we only have some topics in the science and social studies textbooks and workbooks. The science and social studies curriculum have limited coverage of EE. Teaching children about EE is crucial as it helps them learn how to reduce waste, such as recycling paper and reusing water bottles as flowerpots. I cover science and social topics, emphasizing reuse and recycling. For example, I teach that green is for glass, blue is for paper, and brown is for aluminum. I believe it's important to integrate environmental education because it allows children to explore activities like planting and recycling that are closely related to EE"* (Interview T11 Case 4). Similarly, Teacher 12, handling mathematics and Bahasa Malaysia, emphasized the importance of linking EE with other subjects. The emphasis is on imparting a comprehensive understanding of environmental issues, particularly the significance of recycling plastic. T12 expressed her interest in teaching EE in the future. She said, *"I teach mathematics and Bahasa Malaysia, and I believe it's important for students to take care of nature, especially understanding the importance of recycling plastic. Environmental Education (EE) should be connected to other subjects, providing students with a broader understanding, and enabling them to apply concepts from science to other areas. In the future, I aspire to teach children more about the environment"* (Interview T12 Case 4). In the aspect of Basa Jawi, Teacher 13 expresses enthusiasm for EE but notes a perceived gap between theoretical knowledge and practical implementation. T13 thinks that it is better to adapt a hands-on approach in teaching children about the environment, moving beyond only seed planting and recycling practices to practical application of this knowledge in their everyday lives. She said, *"I teach Basa Jawi, and I strongly believe Environmental Education (EE) is crucial for children. While they are introduced to it, it often feels like we're only planting seeds and practicing recycling without much practical implementation of EE. I am enthusiastic about teaching children more about the environment that surrounds us"* (Interview T13 Case 4).

A newcomer to the teaching profession, Teacher 14, responsible for basic subjects like ABC, numbers, colors, and animals, she thinks plastic usage and recycling should be taught to children. T14 believes that there is a need for a practical approach to EE through outdoor activities, aiming to make the learning experience enjoyable for young students. *"I teach basic ABC, numbers, colors, and animals. Although I am still new here, I have heard about Environmental Education (EE), covering topics such as recycling and proper plastic usage, including using plastic for shopping. It is important for kids to learn how to recycle plastic rather than just throwing it in the dustbin, as they often tend to litter. I would like to teach children about EE through outdoor activities, making the learning experience more enjoyable for them"* (Interview T14 Case 4). The findings reveal a common belief among teachers that incorporating EE into various subjects enhances students' comprehension of EE concepts. EE topics were integrated into subjects such as Science, Social Studies, Mathematics, and Basa Jawi. This integration focuses on topics like waste reduction through recycling and reuse, as well as the identification of recyclable materials. These findings indicate that the practical implementation of EE is more limited compared to theoretical knowledge, which implies that some teachers possess more content knowledge than their ability to interpret EE content in their notebooks.

Case 5

In an interview excerpt from Case 5, it reveals that two teachers express their commitment to integrating EE into their respective subjects: mathematics and language instruction. The first teacher, T15, a mathematics teacher, sees recycling as a practical avenue for teaching mathematical principles. T15 recognizes the significance of incorporating environmental awareness into her teaching methodology. By engaging students in counting objects during recycling activities, she provides a hands-on approach that enables students to grasp mathematical concepts while actively contributing to environmental conservation. T15 states, *"I teach mathematics, and I have come across the concept of Environmental Education (EE). Since my early academic years, I have recognized the significance of recycling. During recycling activities, we integrate mathematical principles by engaging students in tasks such as counting objects. This approach provides a practical and hands-on way for students to grasp mathematical concepts while actively contributing to environmental conservation. I am keen on expanding my students' understanding of environmental issues"* (Interview T15 Case 5).

On the other hand, the second teacher, T16, specializes in Bahasa English (BI) and Bahasa Arabic (BA). She acknowledges the influence of recycling experiences from her college days and has taken the initiative to implement practical lessons. T16's approach involves having students dispose of plastic bottles into designated sections of the recycling bin after consumption. She firmly believes that such hands-on experiences play a crucial role in fostering an awareness of environmental responsibility among students. T16 explains, *"I teach*

Bahasa English (BI) and Bahasa Arabic (BA) subjects in both English and Arabic. As a relatively new instructor in language instruction, during my college days, topics like recycling were introduced to me. Moving forward, I have initiated practical lessons where students, after consuming bottled water, learn to dispose of the plastics into designated sections of the recycling bin. I believe this hands-on experience is crucial for fostering an awareness of environmental responsibility among students" (Interview T16 Case 5).

The findings indicate that both teachers acknowledge the importance of incorporating EE into their respective subjects. Teacher T15 incorporates mathematical principles into recycling activities, highlighting the practical application of math in real-world scenarios. On the other hand, Teacher T16 integrates practical lessons into language instruction, establishing a connection between language learning and environmental responsibility. These examples represent a fraction of the EE concepts outlined in the National Professional Standards for Teachers (NPSC). Furthermore, the findings reveal that both teachers, T15 and T16, employ a hands-on approach to teaching environmental awareness which demonstrates a certain level of Content Knowledge EE content comprehension among the teachers. This approach also indicates the potential for interdisciplinary connections in practical experiences, ultimately enhancing learning and retention.

Figure 3. Illustrate Word Cloud showing the most frequent words on Teacher's views and Perception on Environmental Education Holistic Integration during the interview Generated from NVivo

Across Case Analysis and Findings on the Holistic Integration of Environmental Education

Across the cases presented in Table 6 below, there is a spectrum of approaches to integrating Environmental Education (EE) into teaching practices. In Case 1, teachers emphasize the connection between science and EE, incorporating outdoor activities and visits to gardens to enhance students' understanding of environmental concepts. This holistic approach recognizes the interdisciplinary nature of EE and aims to foster a personal connection between students and their environment. Similarly, in Case 3, teachers integrate EE into various subjects, such as science, mathematics, and language instruction, providing students with a comprehensive understanding of environmental issues. While Case 2, 4, and 5 advocated holistic integration across all subjects. By linking EE with existing subjects, teachers in these cases demonstrate a commitment to nurturing environmental awareness across different domains of learning.

Table 6. Illustrate teachers' responses on holistic integration of EE across Subjects among the five cases Generated from NVivo through Matric Coding Query

	A : Holistic Integration	B : Science based Teac...	C : Integrate EE in other...
1 : CASE 1	4	4	0
2 : CASE 2	1	0	1
3 : CASE 3	9	3	6
4 : CASE 4	3	0	3
5 : CASE 5	2	0	2

In contrast, Table 4 and 5 showcase instances where EE integration is less comprehensive across all the cases, while some cases focused on integrating EE topics in science related subjects, others adopt a holistic approach that integrates concepts into various subjects, even some topics described as EE by some teachers does not align with EE concepts, see Table 4 and 5. Case 3 and 4 teachers express the awareness of EE, but faced challenges in terms of limited practical implementation of EE compared to theoretical knowledge. These cases highlight variations in interpretations and implementation of EE among teachers, indicating differing levels of content knowledge and pedagogical approaches.

Figure 4. Illustrate Word Cloud showing the most frequent 100 words with minimum length 5 on EE topics across workbook of the five cases the interview Generated from NVivo

Figure 4 reveals EE topics that were in the workbooks used by the 5 cases, even though not all the topics were implemented according to the interview responses in Section 8.2, its implementation was not implicit according to the topics in their various workbooks nor the National Preschool Standard Curriculum. Below in Table 7 are the number of EE topics presented in the workbooks compared to number of EE topics in the NPSC.

Table 7. Illustrate EE topics across workbooks and the NPSC Generated from NVivo through Matric Coding Query

	A : Case 1 Workbook	B : Case 2 Workbook	C : Case 3,4,5 Workbook	D : NPSC Curriculum
1 : Workbookt Case 1	5	0	0	0
2 : Workbook Case 2	0	4	0	0
3 : Workbook Case 3,4, 5	0	0	19	0
4 : NPSC Curriculum	0	0	0	65

Table 7 illustrates the number of environmental education (EE) topics present in the workbook used across cases compared with the topics in the National Primary Science Curriculum (NPSC). It reveals and confirms the challenges faced by some teachers concerning the absence of EE topics and the availability of teaching materials designed for environmental education. Therefore, this study illustrates the importance of holistically integrating EE to match teachers' perceived value of EE with its actual implementation and a well-rounded understanding of environmental issues. While some teachers effectively incorporate EE into their teaching practices by linking it with existing subjects and providing hands-on experiences, others face challenges in practical implementation due to constraints such as language barriers or limited knowledge. Moving forward, efforts to enhance the actual implementation of EE can be determined by teacher training and the provision of EE teaching resources, which could help promote a more holistic approach to environmental education across educational contexts.

Discussion and Conclusion

There is a unanimous consensus among teachers on the significance of Environmental Education (EE) and its holistic integration across all subjects in preschool, aligning with the expectancy component of Eccles's theory. Teachers who recognize the importance of EE are more inclined to anticipate positive outcomes from its integration into their lessons, such as nurturing environmental awareness and responsibility in young children. Several studies have emphasised the importance of incorporating EE at an early age to foster environmental consciousness and responsibility (Erhabora & Dona, 2016; Lamanauskas & Makarskaitė-Petkevičienė, 2023). This anticipation of positive outcomes can serve as motivation for teachers to prioritize EE integration despite potential challenges. According to Eccles's Expectancy-value theory (1983), individuals' motivation to engage in a particular task or behaviour is influenced by their expectations of success and the subjective value they attach to the task or behaviour (Wang & Xue, 2022). Therefore, regarding EE integration in preschool settings, Eccles's theory suggests that teachers' perceptions of the importance of EE and their confidence in their ability to effectively integrate it across subjects play a crucial role in determining their actual practices. However, the study identified disparities in teachers' EE content knowledge, highlighting variations in their familiarity and understanding of EE concepts.

According to the value component of Eccles's theory, teachers who possess comprehensive understanding and enthusiasm for EE likely place a higher subjective value on integrating it into their lessons, in line with Wang et al. (2022) research on English language education. Conversely, teachers who express concerns or limitations may perceive EE as less valuable or relevant to their teaching practice, based on the value component of Eccles's theory (Shang et al., 2023). Therefore, providing professional development opportunities that enhance teachers' knowledge and skills in EE can increase the perceived value of EE integration, consequently motivating teachers to engage more actively in incorporating EE across subjects (Otitoju et al., 2022b; Erhabora & Dona, 2016; Mahat & Yusri, 2016). Moreover, the challenges faced by teachers in effectively integrating EE, such as limited teaching materials and curriculum constraints, resonate with previous research highlighting barriers to EE implementation in early childhood settings. For instance,

Mahat et al. (2016), Otitoju et al. (2022a & 2022b), and Ramesh et al. (2023) identified factors such as insufficient resources and competing priorities as common obstacles faced by teachers in incorporating EE into the curriculum. The challenges faced by teachers in effectively integrating EE can impact both success expectancy and the value placed on EE (Marques & Xavier, 2020). Teachers who perceive these challenges as insurmountable barriers may have lower expectations of success in implementing EE and may devalue its importance in their teaching practice. Addressing these challenges through tailored support and resources can help increase teachers' expectancy of success and enhance the perceived value of EE integration. Similarly, Otitoju et al. (2022a & 2022b) emphasized the importance of providing teachers with adequate training and support to overcome these challenges. Therefore, there is a need for tailored support and resources to address the barriers to EE integration.

The study also reveals a gap between EE integration and teachers' perception of its importance, highlighting a disconnect between expectancy and value in Eccles's theory. Even though teachers recognize the importance of EE, their lack of confidence or knowledge in effectively integrating it across subjects may reduce their motivation to do so. Targeted professional development and support that addresses both the knowledge gaps and the practical skills needed for EE integration can increase teachers' expectancy of success and enhance the perceived value of EE, thereby bridging the gap between their knowledge and practices (Ramesh et al., 2023; Havea & Mohanty, 2020).

Theoretical Implication

The theoretical implications of Expectancy-value theory in assessing teachers' perceptions of the importance of environmental education (EE) and its holistic integration across preschool subjects provide a framework for understanding the multifaceted dynamics at play. This is represented in the Figure 2 below. According to Eccles's Expectancy-value theory (1983), individuals' beliefs about their capability to perform a task (expectancy) and the subjective value they place on that task influence their motivation and behaviour. In the context of EE integration in preschool subjects, teachers' expectancy of success in integrating EE holistically is influenced by their perceived competence in EE content knowledge, skills, and training, as well as the support they receive from their educational institutions as shown in figure 2 (Eccles, et al., 1983; Drake & Reid, 2018).

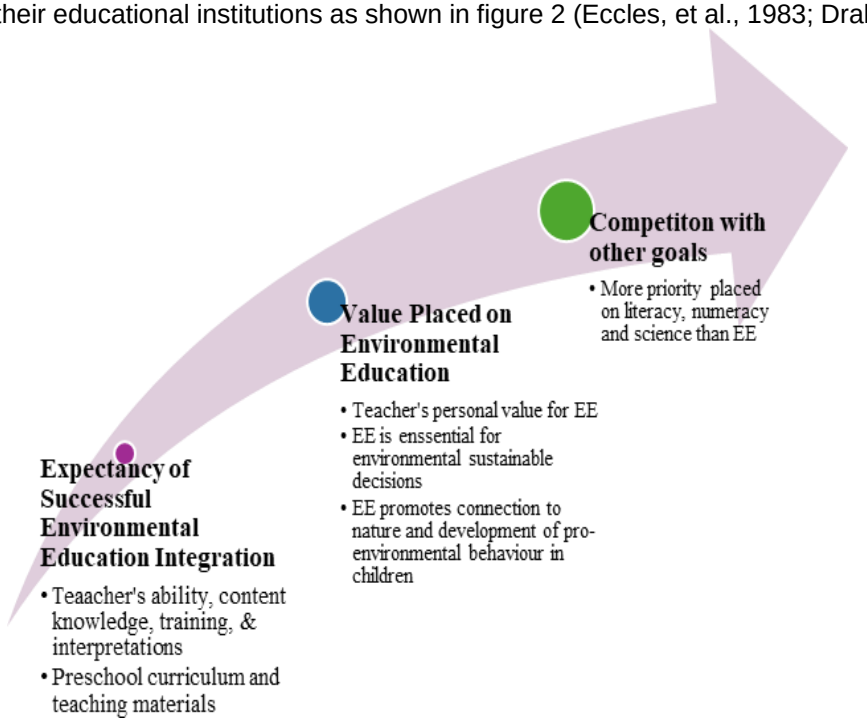

Figure A2. Framework on Expectancy-Value for Environmental Education Integration

Furthermore, teachers' subjective value of EE is shaped by their personal beliefs about environmental stewardship and the recognition of EE's benefits for children's development, such as fostering a sense of responsibility towards nature and nurturing pro-environmental behaviors (Eccles, et al., 1983; Shang et al., 2023). This subjective value drives teachers' motivation to integrate EE across preschool subjects. However, the study reveals that competing priorities, such as the emphasis on literacy, numeracy, and science, may

undermine teachers' willingness to integrate EE holistically, highlighting the complex interplay between intrinsic and extrinsic values in educational decision-making (Eccles, et al., 1983; Loh, 2019). Moreover, the theoretical lens of Expectancy-value theory sheds light on the role of preschools in supporting teachers' efforts to integrate EE effectively. Preschools play a crucial role in providing comprehensive curricula, teaching materials, and professional development opportunities that enhance teachers' competence and confidence in incorporating EE content across subjects (Eccles, et al., 1983, Kiatkawsin & Han, 2017). Thus, the integration of EE is not solely dependent on teachers' personal beliefs and motivations but also on institutional support and resources available to them.

Therefore, the study also reveals gaps between teachers' positive perceptions of EE and its actual implementation across preschool subjects, suggesting a disconnect between intention and practice. This dissonance highlights the need for interventions that bridge this gap by addressing barriers such as inadequate training, limited resources, and competing priorities (Eccles, et al., 1983; Leng et al., 2021). Overall, the theoretical implications of Expectancy-value theory provide a valuable framework for understanding the complex interplay between teachers' perceptions, institutional support, and the integration of EE in preschool education, offering insights for future research and educational policy development. In conclusion, expectancy-value theory provides a useful framework for understanding teachers' views and perceptions regarding the importance of environmental education and its holistic integration across all subjects in the selected preschools. Even though teachers have positive perception towards EE in preschools there is a disconnect with the actual holistic integration of EE across all subjects in these preschools. Therefore, by addressing teachers' expectations through training and support and highlighting the value of environmental education for children's development, preschool teachers can effectively integrate EE content to foster a culture of environmental stewardship and sustainability in early childhood education.

Limitations and Recommendation for Future Study

While the theoretical framework of Expectancy-value theory provides valuable insights into understanding teachers' perceptions and motivations regarding the integration of environmental education (EE) across preschool subjects, there are several limitations to consider in this study. Firstly, the study primarily relies on self-reported perceptions of teachers, which may not accurately reflect their actual practices or the challenges they face in integrating EE holistically. There is a potential for social desirability bias, where teachers may overstate their support for EE due to its perceived importance in contemporary educational discourse. Future research could employ mixed methods approaches, including classroom observations and interviews, to provide a more comprehensive understanding of the factors influencing the integration of EE in preschool settings. Secondly, the study predominantly focuses on individual-level factors such as teachers' beliefs and perceptions, as well as institutional support, in shaping the integration of EE. While these factors are undoubtedly important, there is a need to consider broader contextual influences such as policy frameworks, societal attitudes towards environmental issues, and cultural norms. Future studies could adopt a socio-ecological approach to examine how macro-level factors interact with micro-level dynamics to influence the integration of EE across preschool subjects. Additionally, longitudinal studies could track the implementation of EE initiatives over time to assess their sustainability and long-term impact on children's environmental literacy and attitudes towards nature. By addressing these limitations and adopting a more holistic approach, future research can provide actionable insights for enhancing the integration of EE in early childhood education settings.

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