

Article

Kindergarten teachers' perspectives on sustainable development practices and observed practices

Yusra Zaki About

The National Centre of Giftedness and Creativity, King Faisal University, Al-Ahsa 31982, Saudi Arabia; yozaki@kfu.edu.sa

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Abstract: Purpose: Kindertartens are an important educational environment for the development of children at an early age, and they also play a crucial role in developing the values of sustainable development. The purpose of this study is to investigate kindergarten teachers' perceptions of observable and sustainable development practices. **Design, methodology, approach:** Semi-structured interviews were conducted with 302 Saudi kindergarten teachers. Additionally, observation cards were utilized to collect data on actual practices of sustainable development in kindertartens. Data were analyzed using Nvivo12, a qualitative data analysis software, and descriptive analysis methods. The main themes were produced first, and then the perspectives were organized around them. **Finding:** The impact of social and cultural factors on the development of values, the lack of resources available to implement educational activities, and teacher awareness and training gaps were found to be the main barriers to the development of sustainable development values in kindertartens. **Originality, value:** To the best of the author's knowledge, this is the first study in Saudi Arabia that has looked into the environmental and social perceptions of early childhood teachers about sustainable development practices, so the study's findings can highlight the importance of reorienting teacher education programs toward sustainability in order to bridge knowledge and practice gaps.

Keywords: kindergarten; sustainable development; environment; observation card; qualitative approach

1. Introduction

Early childhood education (ECE) plays a crucial role in sustainable development (SD) and has been increasingly highlighted in the context of sustainability education. It underscores the significance of providing high-quality education and care during the early stages of a child's development, along with the importance of well-educated staff in ECE environments. The sustainable development of early childhood educators is central to the concept of ECE sustainable development in Saudi Arabia. Adhering to sustainability requirements is a fundamental aspect of kindergarten principles, as outlined in the guidelines set by the Ministry of Education in Article No. 12, which states that "Kindertartens should promote democracy, diversity, mutual respect, equality, sustainable development, life skills, and health" (Al-Ahsa Education Department, 2024).

Previous research has mainly focused on examining the sustainability of educators in ECE by evaluating various aspects of their capabilities in sustainable education, including their perspectives, beliefs, understandings, and skills related to education for sustainable development (ESD) (Ciren et al., 2023; Håberg et al., 2023; Liu et al., 2022; Nordén, 2024). These studies explore how educators perceive ESD and how it can be integrated into ECE practices. On the other hand, little research has

focused on kindergarten teachers' perspectives of sustainable development techniques in kindergartens. Duran's (2022) study looked at kindergarten teachers' viewpoints, as did Al-Dabibi and Al-Dhaif's (2022) study on sustainable development and implementation procedures in the pre-school context. According to their perceptions, there are insufficient resources to foster sustainable development in preschool. Despite their limitations, these studies highlight the importance of reflective and critical strategies for effectively integrating sustainable development principles into early childhood education.

Given the importance of nurturing sustainability in kindergartens for community progress, especially in light of the limited research on sustainable development practices in Saudi Arabia, this study aims to shed light on how kindergarten teachers express their understanding of education for sustainable development, how they put it into practice, and identify the challenges to implementing sustainable development practices in kindergartens.

2. Study problem

Instilling values should undoubtedly commence during childhood, with kindergarten being the optimal setting for this purpose, as values can be more effectively imparted than trying to alter an adult's mindset. A person's character is readily molded in their early years, signifying that children, as the future generation, wield significant influence in shaping the nation's destiny. They assume leadership as older adults phase out, and the knowledge and insights they acquire in their youth will manifest in their future roles as leaders. This pivotal factor will steer the Kingdom towards full-fledged development. Children's engagement with the environment plays a pivotal role in their environmental consciousness. Nordén (2024) argues that solely depending on technological, political, or financial advancements is insufficient to drive tangible changes toward sustainability in kindergarten environments. A profound shift in societal thinking and behavior is imperative. Håberg et al. (2023) stress the necessity of a holistic approach to teaching sustainable development in kindergartens, emphasizing the interconnectedness of various components. They underscore the importance of diverse knowledge types: 1) factual knowledge on sustainable development, 2) empowerment of children for sustainable living, 3) utilizing local surroundings for environmental education, and 4) integrating sustainability practices into daily kindergarten routines. While sharing factual information is straightforward, all four knowledge types are indispensable for fostering profound learning and innovative pedagogical approaches. Nordén (2024) advocates for educators to equip children with a range of competencies, including practical skills and a positive outlook on the future, to nurture sustainable living habits. Regrettably, there is a lack of research in Saudi Arabia assessing children's environmental awareness integration within the current educational framework. Existing studies predominantly focus on environmental issues and natural resource exploitation, like Othman's (2015) investigation into the role of kindergartens in shaping children's experiences towards sustainable development. Surveying 85 kindergarten teachers and 117 parents in the Najran region of Saudi Arabia, the study revealed that kindergarten activities center on children's interactions with adults and

peers, fostering learning experiences derived from the environment.

The field of research is shifting from perceiving sustainability as one-dimensional to being comprised of multiple dimensions regarding children's education in kindergartens (Grindheim et al., 2019; Othman, 2015). Moreover, it involves examining educational perspectives, teachers' comprehension of sustainability, and how this translates into their teaching methodologies. Sageidet (2014) discovered in her research that teachers require enhanced competence in this field to ensure that children can partake in real-life inquiry-based learning experiences. Thus, kindergarten educators necessitate interdisciplinary approaches to offer children experiences and practices linked to sustainable development within the kindergarten environment.

Muhammad et al.'s (2023) study highlighted the limited role of kindergartens in instilling sustainable values (social and environmental) in children as perceived by their teachers and identified hindrances hindering kindergartens from fulfilling their role in fostering sustainable values, such as inadequate curricula, insufficient material resources, and infrastructure. Hedefalk et al.'s (2014) meta-study similarly indicated that few studies explore how teachers integrate sustainability education in kindergartens and primary schools, teachers' teaching methodologies, or the development of sustainability understanding in children. The findings of this descriptive study suggest that education for sustainable development is commonly delivered within a traditional, production-oriented educational framework focusing on normative knowledge.

Educating towards sustainable development in kindergartens goes beyond mere implementation of formal practices like waste sorting or material recycling. To make tangible progress towards sustainable development, these practices must delve deeper to engage young children in critical thinking, raise awareness, employ their values to tackle challenges creatively, deliberate on complex issues, and foster innovation. There is a necessity for research employing educational strategies to explore how enhancing sustainability competency among kindergarten and schoolteachers can support the development of more effective, evidence-based practices. Given this context, it is essential to undertake further research based on teachers' experiences and insights in advancing sustainable development and eco-sustainability.

The questions explored in this study are as follows: 1) what environmental sustainable development practices are applied in your kindergartens? 2) What social sustainable development practices are applied in your kindergartens? 3) What are the obstacles to sustainable development, both environmental and social, in kindergartens?

3. Literature review

3.1. Sustainable development goals (SDGs)

Education for Sustainable Development (ESD) is a crucial approach in achieving a sustainable society, aiming to assist individuals in acquiring the necessary scientific knowledge, values, behaviors, and lifestyles for sustainable development, thus fostering sustainable social, environmental, and economic progress (Cheng, 2023). At the onset of basic education, Early Childhood Education (ECE) stands as a significant element of the lifelong ESD system, playing a vital role in its advancement (Angelaki

et al., 2024). Education policies serve as directives for national endeavors to accomplish the objectives and duties of educational development within a specific timeframe, offering guidance and backing to education professionals (Urata et al., 2022). The United Nations Educational, Scientific and Cultural Organization (UNESCO) has emphasized the full integration of ESD into education policies and sustainable development policies to establish a conducive environment for ESD, ensuring its effective contribution (UNESCO, 2017). In alignment with UNESCO's guidance, numerous governments, including that of Saudi Arabia, have implemented corresponding policies to bolster ESD, taking into consideration their countries' societal context and educational requirements (Hammad, 2021). Saudi Arabia has actively introduced multiple policies to enhance ESD, aligning with the Saudi Vision 2030 (Bhagat, 2021). While current Saudi policies delineate the pathway for education reform towards sustainable development, there is yet to be the issuance of national policies or standards for ECE geared towards sustainable development.

3.2. Sustainable development practices in kindergartens

It is not a new phenomenon for kindergarten teachers to embrace a green sustainability perspective in their teaching methods. The incorporation of contact with nature has been a fundamental aspect of kindergarten teaching approaches since Friedrich Froebel founded the first kindergarten in Germany in 1837 (Håberg et al., 2023). Friedrich Froebel believed that kindergartens should primarily offer diverse opportunities for play and gardening. Children are encouraged to spend time in the garden daily, maintain a clutter-free playground, collect stones, and rake leaves. Emphasizing children's interaction with nature over the tasks themselves is crucial in kindergarten programs, as these practices enrich sensory experiences and foster a strong connection to nature (Heggen et al., 2020). A study by Ciren et al. (2023) emphasized how the kindergarten setting can act as a platform for children to adopt sustainable dietary habits both within the kindergarten environment and beyond. In terms of incorporating sustainability principles into food practices, a study by Ciren et al. (2023) investigated how a Norwegian kindergarten integrated sustainability concepts into food practices, focusing on environmental, economic, and social/cultural sustainability. Utilizing an analytical framework of cognition, emotion, volition, and behavior, Liu et al. (2022) explored strategies to promote the sustainability of care provided by kindergarten teachers, underscoring the significance of activities such as reading, recreation, art, cultural immersion, and mentoring. Furthermore, Crisostomo and Reinertsen (2021) conducted an action research project that involved establishing a wildlife garden in a playgroup to educate children about sustainable practices, offering a practical approach to teaching sustainability. Hajian and Kashani (2021) carried out a study concentrating on implementing and reinforcing efforts to address sustainability issues in four Swedish kindergartens using the OMEP Environmental Evaluation Scale for Sustainable Development in Early Childhood (ERS-SDEC) to enhance teachers' professional growth and encourage reflection on and modification of their practices. These sheds new light on daily activities for ESD in young children. Duran's (2022) study also intended to discover pre-service teachers' views on sustainable development and implementation in Turkey's pre-school years. Pre-

service teachers were interviewed and observed to gather study data. As a result of the pre-service teachers' viewpoints, it was revealed that their awareness increased, and they were informed and happy with the sustainable development implementation process during the preschool years. The majority of previous studies discussed earlier have underscored the significance of sustainable development and the necessity of implementing its principles in early childhood (e.g., Al-Deeb and Bahamdan (2022); Bhagat (2021); Ciren et al. (2023); Duran (2022); Sachs et al. (2023)). Conversely, there exists a plethora of research that does not directly concentrate on sustainable development within kindergartens but rather aims to devise children's programs that promote self-reliant problem-solving skills, enhance their abilities in a manner conducive to environmental harmony, such as the works of Al-Dabibi and Al-Dhaif (2022), Bhagat (2021) and Farago et al. (2019). The most notable studies have validated the early cultivation of environmental consciousness and sustainable practices in early childhood (Bhagat, 2021). They have advocated involving children in activities that heighten their environmental awareness (Duran, 2022), imparting behaviors that instill environmental preservation habits, and educating teachers and parents on strategies for sustainable development (Liu et al., 2022; Nordén, 2024).

What sets the present study apart from its counterparts is that it stands as the sole Saudi research, to the best of the researcher's knowledge, delving into the realm of sustainable social and environmental development practices within Saudi kindergartens (Othman, 2015). Moreover, the current study distinguishes itself by employing an integrated approach to assess sustainable development practices in kindergartens, amalgamating the identification of teachers' perspectives on sustainable practices in kindergartens through structured interviews and observation cards to present a comprehensive view of the field. It further sets itself apart by focusing on two facets of sustainable development: environmental and social. While most studies concentrate solely on environmental development practices, overlooking the importance of social development practices, the current study recognizes the equal importance of both facets in the realm of sustainable development.

4. Method

4.1. Study population and sample

The study population includes the following kindergarten teachers: 378 government teachers, 260 private teachers, and 42 international teachers. The study sample included 302 teachers from 25 government kindergartens, 17 private kindergartens, and 5 international kindergartens. **Table 1** summarizes the characteristics of the teacher sample.

Table 1. Displays the sample characteristics.

Verbal	Government	Private	International	Total	%
Specialization					
Kindergarten	45	22	12	79	26.16
Edu/Psy	35	18	8	61	20.19
Special Education	30	18	11	59	19.54
Arts	33	30	40	103	34.11

Table 1. (Continued).

Verbal	Government	Private	International	Total	%
Qualification					
diploma	12	10	5	27	8.94
Bachelors	130	77	33	240	79.47
Master/Ph.D.	14	9	12	35	11.59
Years of Experience					
Less than 5 years	16	8	12	36	11.92
Between 5–10 years	60	55	43	158	52.32
More than 10 years	50	36	22	108	35.76

4.2. Measures

4.2.1. The observation card was designed to evaluate the practice of sustainable values in kindergartens

The card has 20 statements organized into two categories: the kindergarten’s role in promoting sustainable environmental values (10 statements) and sustainable social values (10 statements). It uses a binary scale to identify the existence or absence of a practice (yes: 1 and no: 0). The development of the observation card involved a review of existing foreign literature and studies on environmentally sustainable development values and challenges faced in kindergartens, including works by Ciren et al. (2023), Håberg et al. (2023), Sayed and Abou-Eid (2022), Liu et al. (2022), and Arabic studies by Al-Dabibi and Al-Hadeef (2022) and Muhammad et al. (2023).

The validation process of the Observation card included two main aspects:

The observation card validity

Content validity: The final version of the Observation card was shared with five experts from the education and psychology fields, who provided feedback that was considered in the refinement of the card.

Internal consistency validity: This aspect was assessed by calculating Pearson correlation coefficients between each statement within the questionnaire’s dimensions and the total score for that dimension, as detailed in **Table 2**. Which presents the internal consistency validity coefficients.

Table 2 Shows that the Pearson correlation coefficients were notably high, positive, and statistically significant at the 0.01 significance level. The values varied from 0.69 to 0.86 for the first factor, and from 0.65 to 0.80 for the second factor. This suggests that the content in each axis aligns well with its overall objective and assesses what it was intended to evaluate.

Table 2. Internal consistency validity coefficients.

Sustainable environmental practices		Sustainable social practices	
Items	<i>r</i>	Items	<i>r</i>
Rationalization of electricity consumption	0.71**	Etiquette of speaking, listening, and accepting others	0.69**
Reduce waste of water and food	0.69**	Tolerance and acceptance of difference	0.72**
Waste sorting	0.73**	Respect the turn and wait in line	0.65**

Table 2. (Continued).

Sustainable environmental practices		Sustainable social practices	
Items	<i>r</i>	Items	<i>r</i>
Paying attention to the cleanliness of the kindergarten	0.81**	Decision-making by (choosing a movie, activity, game...)	0.66**
Interest in agriculture and gardens	0.86**	Taking responsibility by developing the ability to take initiative	0.68**
Awareness programs about the environment	0.76**	Promoting public activities and religious and national events to enhance the values of citizenship	0.70**
Signs and instructions on environmental development	0.78**	Promoting the values of tolerance and apologizing when one makes a mistake	0.73**
Films and illustrated publications about environmental development	0.70**	Donate surplus items	0.75**
Programs—Recycling pillars	0.77**	Volunteering and participating in charitable works	0.68**
Protect kindergarten property from vandalism	0.81**	Arrange toys and tools in place	0.80**

** Correlation coefficient values are significant at 0.01.

The observation card's reliability

Reliability was evaluated using the Kuder Richardson method, suitable for response form 1, 0. The first factor had a reliability coefficient of 0.77, the second factor was 0.81, and the overall reliability coefficient for the observation card was 0.81.

4.2.2. Semi-structured interviews with kindergarten teachers to complement the observation

325 kindergarten teachers participated, answering four open-ended questions. These questions were thoughtfully developed after reviewing various studies, Ministry of Education reports literature on sustainable development in kindergartens, and case studies. Five education and kindergarten experts reviewed and confirmed the questions' effectiveness in addressing the intended topics. The first question focused on environmentally sustainable development practices in kindergartens, while the second asked about sustainable social development practices. The third question aimed to uncover obstacles to practicing sustainable development, both environmentally and socially, from the teachers' viewpoints.

4.3. Data analysis

In this research, a mixed methods approach was utilized to assess the outcomes. The researcher examined semi-structured interview questions related to sustainable development in kindergarten settings. Subsequently, an analytical method was employed to scrutinize observation card data on sustainable development practices shared with kindergarten teachers. Continuous review of primary data was conducted to ensure comprehensive inclusion of information from the interviews. Additional questions were posed by the researcher to extract more details from responses during uncertain or confusing interview moments. Responses were coded and transcribed, with data analysis and processing conducted independently by two coders. Following completion, answer categories and discrepancies were thoroughly discussed, and a third coder, with a general understanding of the research topic, randomly coded selected data after consensus. Cohen's Kappa was calculated to determine inter-rater

reliability, showing a high level of reliability for this study (88%), well surpassing the acceptable threshold of 0.70 (Cohen, 1960). Every participant was carefully monitored and invited to partake in interviews, with a clear explanation of the study's objectives and scope. Upon receiving assurances regarding data privacy and reporting, all participants agreed to engage in the interviews. Dudovskiy's (2016) qualitative data analysis approach was utilized by the researcher to identify recurring themes aligned with the study's objectives. Nvivo version 12 was employed for data analysis, utilizing semi-structured interviews, interviewer notes, and interview notes as data collection tools. A coding process was implemented to establish categories and corresponding codes, with classical content analysis focusing on specific data sections. Similar codes were grouped into clusters to facilitate analysis, ensuring comprehensive code capture, differentiation, and frequency clarification.

5. Study procedures

After receiving approval from the Scientific Research Ethics Committee at King Faisal University and the Al-Ahsa Education Department (2024), data collection involved counting government, private, and international kindergartens, followed by selecting a sample. The researcher filled out an observation card (observation list) in 30 kindergartens (15 Governmental, 10 private, 5 international) to monitor sustainable development practices. Each card required the researcher's presence for a full school day in the kindergarten to identify all observation points inside and outside the classroom. Subsequently, semi-structured interviews were conducted with 302 teachers from the selected kindergartens, who were briefed on the study's purpose and objectives. The data gathered from each interview was organized in the format of semi-structured interviews, with each session lasting 40 to 50 min. Data collection took place from early January to mid-April 2024.

6. Results

6.1. Interview results

The study methodology previously explained the analysis of qualitative data using Nvivo coding version 12 to examine the study data from semi-structured interviews, interviewers' notes, and notes taken during the interview. These were then coded, resulting in the development of categories (themes) and subcategories (subtopics) along with their corresponding codes. The focus was on content analysis and coding specific sections of material to analyze the collected data, followed by grouping similar codes. Through the coding process, all cases were ensured to capture codes, content differentiation between codes was performed, and the frequency of each code (quantitative information) was clarified.

The first question: What environmental sustainable development practices are applied in your kindergartens? The themes and subthemes are presented in **Table 3**.

When answering the question about identifying the environmentally sustainable development practices applied by teachers in the kindergarten where they work, written or recorded responses were gathered, transcribed, and coded. Categories and subcategories were then established, and percentages were calculated for each topic or

subcategory. This process involved determining the frequency of responses for each topic during content analysis, grouping similar codes, and calculating percentages for each subtopic based on teachers’ responses in the study. The analysis resulted in grouping practices into seven basic themes with sub-practices, and the frequency of responses was calculated from the interview data analysis.

Table 3. Themes and sub-themes of environmental sustainable development practices.

Question	Theme	Sub Theme
What environmentally sustainable development practices are applied in your kindergartens?	Sorting garbage and food waste	<ul style="list-style-type: none"> Waste is sorted into designated containers (glass, metal, plastic, paper) (10%). Food waste is utilized (compost making, animal food) (2%).
	Agriculture—experiences in nature	<ul style="list-style-type: none"> Children participate in planting and caring for plants in the kindergarten (5%). Children participate in landscaping, plant care, and agriculture outside the kindergarten (2%). Children participate in cleaning campaigns in parks and public places (1%).
	Wasting water, food, and energy	<ul style="list-style-type: none"> Children are instructed to turn off water taps after using them in sinks and bathrooms (15%). Children learn to ration the use of water (washing hands, ablution...) (20%). Children are trained to turn off the lights when leaving class (33%). Educating children to avoid wasting food and drinks (14%).
	Environmental awareness	<ul style="list-style-type: none"> The presence of educational and educational panels (classroom, courtyards, laundries...) (22%). Showing awareness films about the environment (18%). Providing awareness brochures and stories about the environment (20%). Educating children about taking care of animals and not harming them (30%). Playing environmental awareness games (14%).
	Safety and protection	<ul style="list-style-type: none"> Safety and risk protection tools are available (50%). Children are directed to safety factors during a fire (30%). Children are trained in traffic safety (12%). There is a medical dispensary where first aid is available (50%). Children are trained and given health awareness to avoid infection in kindergarten (45%).
	Recycling	<ul style="list-style-type: none"> There is a recycling corner (5%). Games and recycling activities for objects and waste are played (12%).
	Hygiene and sterilization	<ul style="list-style-type: none"> Availability of sterilization and hygiene materials in bathrooms and bars (40%). Educating children about the importance of constantly cleaning furniture and halls and sterilizing them (12%). Teaching children to keep bathrooms clean and use them correctly (16%). Children’s participation in enforcing hygiene rules inside and outside the kindergarten (17%).

In **Table 2**, concerning environmental sustainability, teachers’ responses showed a lack of emphasis on gardening practices, plant care, and agriculture, despite their significance. Teacher Nora emphasized the importance of children witnessing the entire food growing cycle to foster sustainability and environmental care. Teacher Sarah expressed that teaching sustainability involves children exploring and establishing connections with nature. Teacher Radwa highlighted the value of experiential learning for children in taking care of the environment, such as watering the garden, planting seeds, and participating in harvesting the food, they grow. However, only a small percentage of teachers perceived this connection practice in their kindergartens, despite its importance in helping children understand their role and impact on the environment.

While many teachers recognize the importance of instilling environmental sustainability values in early childhood, there are shortcomings in the implementation of these practices in kindergartens. Teacher Maram stressed the significance of introducing environmental education early on. Teacher Laila shared her approach to teaching sustainability through role modeling and creating a sustainable-focused

environment. Responses regarding waste sorting and recycling were also limited.

When asked if their kindergartens educate children on waste sorting and recycling, only 10% of teachers confirmed this practice. Teacher Sarah mentioned the active involvement of their children in recycling activities. The lack of robust recycling practices may be attributed to the novelty of recycling culture in Saudi society and the absence of recycling facilities for kindergartens to visit for educational purposes on waste management. Some kindergartens do provide waste sorting containers. Teacher Luna stated that the recycling process has been incorporated into their daily routines, making the children aware of the designated waste containers. The same principle applies to participating in cleaning public spaces, parks, and environmental events. When asked about the kindergarten's involvement in beach clean-ups or park maintenance, the teachers responded negatively. However, some mentioned the children helping to clean their classrooms or the kindergarten's courtyards. The feedback on conserving energy, and water, and reducing food waste was more positive. Susan emphasized the importance of setting an example for energy and water conservation, leading the children to understand the significance of these practices. Jayda, a kindergarten teacher, mentioned turning off lights and air conditioners when not in use. She added that they reuse water for activities like water play and gardening. Despite this unique response, it was not commonly mentioned in the interviews. The percentage of educators incorporating sustainability education through books, puzzles, discussions, and activities was below average, ranging from 14% to 30%. In terms of sterilization, hygiene practices, and maintaining cleanliness in the kindergarten, the responses were relatively satisfactory. This could be attributed to the recent focus on hygiene because of the Corona crisis and the regulations in place, influencing the children's daily routines.

The second question: What social sustainable development practices are applied in your kindergartens? The themes and subthemes are presented in **Table 4**.

To address the inquiry identifying applied socially sustainable development practices in the kindergarten setting, where each teacher affirms their implementation, a meticulous process of collecting, transcribing, and coding written or recorded responses was undertaken. Subsequently, categories (themes) and sub-categories (sub-themes) were meticulously crafted based on these responses, followed by the calculation of percentages for each topic or sub-category. The calculation involved determining the frequency of teacher responses related to each topic or sub-category. Upon scrutinizing the percentages reflecting the frequency of responses for the subtopics, it becomes apparent that the assessment of social development practices stands notably high, contrasting with environmental practices. The latter necessitates infrastructural provisions for execution, such as the presence of gardens or conservatories within the kindergarten premises, garbage sorting containers, safety equipment, and informative materials, among others. These requirements entail financial resources that numerous kindergartens, particularly government-operated ones, might struggle to provide adequately.

Table 4. Themes and sub-themes of social sustainable development practices.

Question	Theme	Sub Theme
What social sustainable development practices are applied in your kindergartens?	Accept differences and accept others	<ul style="list-style-type: none"> The kindergarten seeks to enhance children’s acceptance of each other regardless of their nationality or color (70%). Respect for others and dealing with them with kindness is enhanced (65%). Communication skills with others and peers are enhanced (55%). Enhancing listening skills, visual communication, and speaking etiquette (65%).
	Accepting people with special needs and helping them	<ul style="list-style-type: none"> There are special paths, corridors, and special equipment for people with special needs (7%). Promoting children’s acceptance of and assistance to their peers with special needs (33%). There are specialized teachers and counselors to deal with and teach groups with special needs (5%). There are flexible communication channels with children with special needs (5%).
	Confronting bullying	<ul style="list-style-type: none"> The kindergarten enacts strict laws to reduce bullying and sets behavioral rules that children adhere to (36%). Spreading awareness to confront all manifestations of bullying and setting strict penalties for bullies (33%). Supervising all places, including bathrooms, to avoid bullies harming their colleagues (13%). The administration informs parents if verbal or physical bullying occurs (14%). The kindergarten holds awareness programs in which parents participate about bullying and its dangers (8%).
	Social awareness	<ul style="list-style-type: none"> There are educational and cultural panels about the values of tolerance, sacrifice, and goodwill among children (24%). Promoting human values by showing awareness films (44%). Providing brochures and stories of a social and human nature (30%). Promoting children’s positive behaviors and rewarding children who have done good deeds (44%). Playing games that enhance team spirit and positive competition (50%).
	Parents guidance	<ul style="list-style-type: none"> Holding periodic parent meetings to strengthen family ties with the kindergarten (33%). Parents are directed to help the kindergarten administration overcome some of their children’s aggressive or disruptive behaviors (35%). Involving parents in counseling sessions about their children’s problems (22%). Inviting parents to participate in an open day in the kindergarten with their children (24%).
	Promote values	<ul style="list-style-type: none"> Celebrating national and religious occasions to develop citizenship values in children (66%). Instilling positive behaviors in children through simulation and modeling (45%).
	Learning socially sustainable values	<ul style="list-style-type: none"> Focus on giving the child oral assignments in which he talks about specific topics, such as his family or best friend, for example (40%). Assignments to draw humanistic and moral topics (30%). Teaching children self-defense and raising awareness about harassment and how to resist it (60%). Incorporating social rules into the school curriculum (22%).

Regarding practices centered on fostering acceptance of differences among children, irrespective of race or color, they exhibited a notably high frequency of occurrence, indicating a commendable level of implementation. This observation could be attributed to the relatively limited prevalence of racial and ethnic discrimination among children in this developmental stage. Similarly, practices linked to instilling citizenship values through commemorating national events garnered a response rate of approximately 60%. Analysis of the aforementioned data highlights that the least emphasized social practices in kindergarten teachers’ responses pertained to catering to special groups with specific needs, notably individuals with disabilities (people of determination). The responses underscored the scarcity of facilities and services catering to this demographic in many kindergartens. For instance, teacher Rifaa shared an instance, stating, “I have a child with special needs who encounter difficulties accessing the restroom because of its lack of suitability for her condition.” Furthermore, the responses shed light on the absence of a psychological counselor in kindergartens to address special cases or behavioral disorders like aggression,

introversion, speech impediments, and so forth. Notably, the response rates concerning mitigating behavioral issues such as bullying were relatively low, ranging from 8% to 36%, an inadequacy given the significance and prevalence of the issue in society, emphasizing the pressing need for early intervention. Teacher Iman highlighted, “Children feel uneasy bringing meals from home because of fear of being bullied by their peers.” Conversely, social awareness initiatives within kindergartens garnered moderate response rates, albeit weaker beyond the institution’s confines, indicating a relative deficiency in disseminating awareness among parents. The kindergarten’s overall practices aimed at engaging parents, such as open days and training sessions, play a vital role in fostering social development and integrating the kindergarten within the broader societal framework.

The third question: What are the obstacles to sustainable development, both environmental and social, in kindergartens? The themes and subthemes are presented in **Table 5**.

Table 5. Themes and sub-themes of obstacles to environmental and social sustainable development practices.

Question	Theme	Sub Theme
What are the obstacles to sustainable development, both environmental and social, in kindergartens	Lack of resources	<ul style="list-style-type: none"> • There is a lack of material resources to support sustainable development (90%). • Libraries lack graphic resources and stories that promote sustainable development (88%). • There are no greenhouses or places for agriculture in the kindergarten that would increase the value of food production (96%). • Lack of laboratories for children’s experiments (98%).
	Materialism	<ul style="list-style-type: none"> • Poor equipment for people with special needs (89%). • Poorly equipped waste recycling facilities (77%). • Lack of containers for sorting waste and kindergarten waste (76%). • There are no cinemas or exhibition halls to show awareness films about the environment (78%).
	Weak infrastructure and weak resources	<ul style="list-style-type: none"> • There is a lack of training for teachers on how to promote sustainable development (59%). • Weak training of teachers in counseling people with special needs (88%). • The lack of an assistant teacher in most kindergartens creates pressure on the teacher (90%). • Weak training of teachers on activities that promote sustainable development (78%). • Poor preparation of teachers to solve problems and behavioral disorders in children (79%).
	Weak training of teachers on how to promote sustainable development	<ul style="list-style-type: none"> • Leaders have an idea that promoting sustainable development is not appropriate for kindergartens (80%). • Absence of sustainable development values from the kindergarten’s strategy and vision (96%). • Not allocating part of the budget to promote sustainable development (90%). • Kindergarten leaders consider sustainable development a kind of luxury (87%).
	Absence of strategy and future vision for kindergarten programs	<ul style="list-style-type: none"> • There are no activities that promote sustainable development within the kindergarten (78%). • Lack of activities that promote sustainable development outside the kindergarten (89%). • Weak integration of parents into sustainable development activities (90%). • Not celebrating an open day in the kindergarten for sustainable development to which parents are invited (97%). • There are no scientific or entertainment programs to promote the values of sustainable development (88%).
	Management’s lack of interest in activities and programs promoting sustainable development	<ul style="list-style-type: none"> • Kindergartens not participating in environmental awareness and pollution reduction days (95%). • There are no entities or bodies that implement environmental awareness programs targeting kindergarten children (94%).
	Weak community programs	<ul style="list-style-type: none"> • Weak curricula and their lack of content that promotes environmentally sustainable development (77%). • Lack of focus on the values of waste sorting and recycling in kindergarten curricula (78%). • Weakness in project learning methods to promote sustainable development (89%). • Commitment to the school curriculum for the first grade (80%).

To address the inquiry about the identification of barriers hindering environmental and social sustainable development practices in kindergartens, the responses, whether written or recorded, were gathered, transcribed, and categorized. Subsequently, categories (referred to as topics) and sub-categories (also known as sub-topics) were formulated. The percentages for each topic or sub-category were then computed by tallying the frequency of parameter responses associated with that specific topic or subcategory.

Upon scrutinizing the percentages that indicate the frequency of responses calculated for the subtopics, it becomes evident that the obstacles related to environmental and social aspects of sustainable development in kindergartens are relatively prevalent. A comprehensive examination of the table and its subtopics reveals that the primary hindrance, as articulated by educators across all kindergartens, pertains to the absence or insufficient allocation of funds for activities, initiatives, or the enhancement of facilities and infrastructure in kindergartens to advance sustainable development. This issue is substantiated by various points that were emphasized in the subtopics within the aforementioned table, which encompass:

Regard sustainable development as a luxury, deeming it unsuitable for the kindergarten phase but more fitting for higher educational tiers, echoing the sentiments of teacher Nouf who remarked, “I think that sustainable development is better suited for upper primary grades, not for kindergarten children.” Furthermore, some educators contend that the kindergarten budget should be directed towards more pressing concerns instead of fostering sustainable development, such as outfitting facilities, and the library, among other priorities. The subsequent obstacle, following a sequential order as illustrated in the table, is associated with the inadequate training of teachers to instill principles of sustainable development in children.

6.2. Observation results

Results of interviews were carried out with kindergarten teachers to identify the practices aimed at promoting values related to environmental and social sustainable development from their perspective. This research endeavor was complemented by the utilization of an observation card, meticulously completed by the researcher across 30 kindergartens, comprising 15 public, 10 private, and 5 international establishments. The primary objective behind this meticulous process was to effectively monitor and assess the tangible implementation of sustainable development practices within these educational settings. The meticulous task of filling out each observation card necessitated the physical presence of the researcher throughout an entire school day within the specific kindergarten under observation, meticulously scrutinizing all aspects both within and outside the classroom environment. The comprehensive findings derived from the interviews, coupled with the data collected through the observation cards in the field, collectively provided a holistic and authentic portrayal of the sustainable development practices being employed within these kindergartens. Subsequently, the results obtained from the observation cards, focusing on the various facets of environmental and social sustainable development values, are elaborated upon in **Figures 1 and 2**.

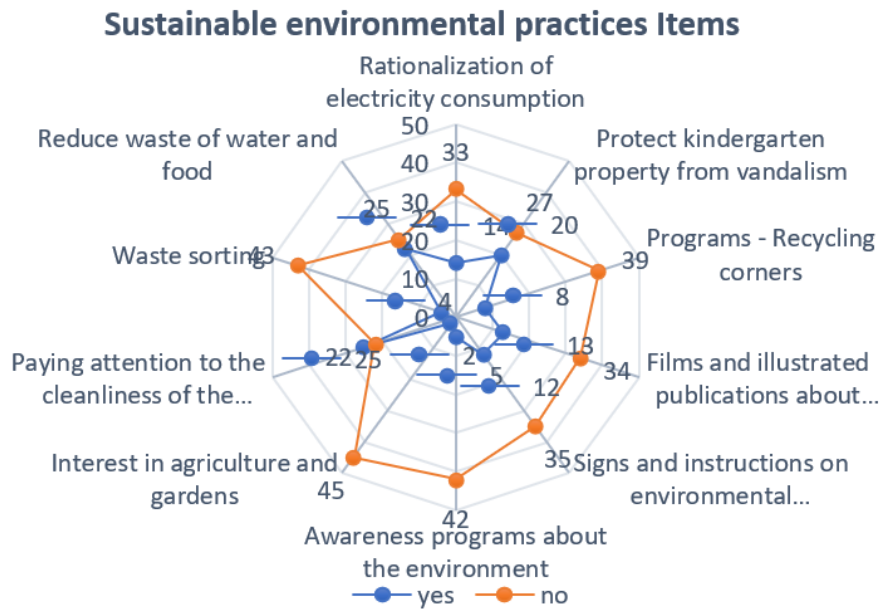


Figure 1. Sustainable environmental practices.



Figure 2. Sustainable social practices.

Figure 1 shows that sustainable environmental practices are less commonly practiced in kindergartens, including an interest in agriculture and gardening, environmental awareness programs, trash sorting programs, recycling corners, incorporating sustainability into food practices, and fostering natural experiences. Several research, including (Angelaki et al., 2024; Ciren et al., 2023; Håberg et al., 2023) have found that these activities are essential for cultivating a sustainable culture from a young age. As shown in **Figure 2**. The most common sustainable environmental practices practiced in the forty-seven kindergartens that were observed by the researcher were: reducing water and food waste; paying attention to the cleanliness of the kindergarten; and protecting kindergarten property from vandalism. Perhaps the reason is that these practices do not depend on financial resources or resources in those gardens much. Comparison with other sustainable environmental

development practices. In this contest, Duran's (2022) study demonstrated that insufficient resources were responsible for not practicing sustainable development techniques such as garbage and waste collection, recycling materials, and so on in Turkish kindergartens.

Figure 2 shows that sustainable social practices are less commonly practiced in kindergartens, including volunteering and participating in charitable works, taking responsibility by developing the ability to take, decision making by (choosing a movie, activity, game...), and etiquette of speaking, listening, and accepting others.

According to **Figure 2**, the most common sustainable social practices observed in the forty-seven kindergartens were: donating surplus items; promoting the values of tolerance and apologizing when one makes a mistake; arranging toys and tools in place; and promoting public activities, religious and national events to enhance citizenship values. Some of these activities were also seen in Duran's (2022) study, which looked at pre-school teachers' perspectives on sustainable development techniques and practice examples.

7. Discussion

As for the first question: What environmental sustainable development practices are applied in your kindergartens? The study's findings revealed shortcomings in certain sustainable environmental development practices, particularly in areas like gardening, plant care, and self-food production in Saudi kindergartens. This deficiency is further supported by observational results. Despite the significance of these practices in children's environmental exploration and connection with nature (Sachs et al., 2023), the researcher attributes the inadequacy to the lack of proper infrastructure and facilities in most kindergartens for agricultural and gardening activities due to limited financial resources or unsuitable climatic conditions in Saudi Arabia, year-round. This outcome is consistent with various studies conducted in Saudi Arabia, including the Al-Deeb and Bahamdan (2022) and Hammad study (2023).

The study also indicated, based on teachers' perceptions, a lack of waste sorting and recycling culture in kindergartens, despite its prevalence in foreign kindergartens as highlighted in studies like Ciren et al. (2023) and Duran's (2023). Even existing practices do not sufficiently instill these behaviors as ingrained habits in children, hindering their transfer outside the kindergarten to their surroundings and families, as noted in the Al-Dubaibi and Al-Hudayf (2022) study. Noteworthy is the presence of certain environmental practices in most kindergartens, such as conserving energy by turning off unnecessary lights, air conditioning, and water taps, supported by the Bhagat (2021) and Hammad (2023) studies. While many studies emphasize the importance of early childhood exposure to sustainable development, few specifically target kindergartens. Regarding the second question: What social sustainable development practices are applied in your kindergartens? In contrast to environmental practices, sustainable social development practices are notably more prevalent in the Kingdom's kindergartens, as evidenced by teacher assessments and observations. This discrepancy may stem from the need for specific infrastructure for environmental practices, such as gardens, greenhouses, waste containers, safety gear, and educational materials in kindergartens. An intriguing aspect of social development practices in

kindergartens, highlighted in teacher interviews, is the occurrence of various forms of bullying (verbal, physical, and social) among children, albeit to a limited extent. This issue is viewed as deserving attention and early intervention by teachers to prevent the normalization of such behaviors, as indicated in a study by Hamed (2021). Another issue in kindergartens that obstructs sustainable social progress is racial discrimination based on race or color among children. This behavior is believed by teachers to be limited in scope. Farago et al. (2019) rationalizes this by stating that children develop an awareness of ethnic and racial variances during late childhood. The existence of behaviors like bullying and racism, which impede sustainable social progress, leads to various issues such as aggression, frustration, and introversion, as indicated in a study (Al-Tuwaiher, 2020), highlighting the necessity of having a psychological and social counselor in each kindergarten. Starting from this standpoint, it becomes evident that many kindergarten teachers are worried about their inability to address these issues adequately due to their lack of qualifications and the absence of a psychological and social counselor in their institutions. The study's findings also reveal that the majority of kindergartens in the sample lack services and amenities for children with special needs within Saudi kindergarten premises, hindering the attainment of sustainable development as perceived by teachers and observation results. This conclusion is supported by various studies carried out in Saudi Arabia, including Hammad's (2023) study and Bhagat's (2023) study.

Concerning the third inquiry: What are the impediments to sustainable development, both environmental and social, in kindergartens? Insights from interviews with teachers indicated that obstacles to sustainable development practices are linked to the inadequate allocation or absence of funds for activities, initiatives, or the improvement of facilities and infrastructure in kindergartens to promote sustainable development. Another obstacle is the perception held by some teachers and administrators that sustainable development is a luxury, not suitable for the kindergarten level but more appropriate for higher educational stages. This finding, akin to Ruggerio (2021), illustrates that those overseeing kindergartens resist incorporating sustainable development methods, deeming them unfit for children of such a young age. Angelaki et al. (2024) challenged this notion in their research, emphasizing that educational institutions serve as arenas for nurturing qualities like empathy, cooperation, and respect for diversity, essential for building a sustainable society that values social, economic, and environmental well-being. Moreover, some teachers engaged in the current study argue that kindergarten funding should prioritize urgent needs over promoting sustainable development, such as upgrading facilities and the library, among other essential areas. Many teachers expressed dissatisfaction with the lack of sufficient training to instill sustainable development values in children.

8. Conclusion

In conclusion, although many studies stress the importance of introducing sustainable development and its practices in early childhood. However, few of these studies targeted sustainable development in kindergartens.

The findings suggested that the current approaches, as evidenced by observation cards and interviews with teachers across various types of early childhood education,

align closely with conventional practices that have been prevalent in kindergartens for years. Furthermore, those responsible for managing kindergartens are resistant to integrating sustainable development techniques, deeming them unsuitable for children of that age. Recent studies challenge these assertions by highlighting that the efficacy of instilling sustainable development principles increases with early exposure to environmental consciousness and responsible civic behavior. Emphasizing the significance of conserving and safeguarding the natural environment through interactive tasks, hands-on experiences, and developmentally appropriate educational plans (Håberg et al., 2023; Sayed and Abou-Eid, 2022) also view this stage as opportune for instilling a sense of environmental responsibility in children and motivating them to make sustainable decisions in their daily routines. By infusing sustainability principles into their instructional strategies, kindergartens equip young learners with the knowledge and competencies essential for contributing actively to shaping a sustainable future.

9. Limitations and future direction

Limitations of sustainable development practices in kindergartens include a lack of in-depth dialogues about sustainability issues among preschool educators, who frequently use direct and prescriptive interactional styles, preventing children from actively participating in discussions about environmental sustainability. Furthermore, obstacles come from the complexity of sustainable development principles, which young children may fail to understand owing to limited life experiences and cognitive capacities. While some kindergartens address sustainability through simple activities such as rubbish sorting, more critical and reflective practices are required to create a deeper awareness of sustainable development among children. Furthermore, the influence of environmental problems, such as urbanization, which limits direct interaction with nature, hinders efforts to include sustainable development into kindergarten curricula. To enhance sustainable development in Kindergarten in Saudi Arabia, the future direction should concentrate on the integration of sustainability education into the curriculum, raising awareness in organizations, and aligning with the goals of Saudi Vision 2030. Studies show the necessity of incorporating sustainable education into academic curricula, highlighting the significance of including sustainability components in educational programs. Furthermore, there is a call for organizations in Saudi Arabia to boost awareness and commitment to sustainability, in line with the country's vision for 2030. Additionally, it is vital to invest in education and training to accomplish Sustainable Development Goals (SDGs) and foster economic growth in Saudi Arabia, underscoring the positive correlation between education, gender equality, and GDP growth. By prioritizing these aspects, Saudi Arabia can pave the way for a more sustainable future in kindergarten education.

10. Conflict of interest statement

Potential conflicts of interest in implementing sustainable development practices in kindergarten can stem from various factors, as teachers often rely on conventional methods that may not fully support children's holistic growth. Furthermore, the intricate nature of sustainability, including social and political dimensions, might

overwhelm young learners, leading to challenges in addressing these issues in kindergarten.

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