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# THE ROLE OF ECO-FRIENDLY PRACTICES ADOPTED BY LOWER PRIMARY TEACHERS IN ENHANCING ENVIRONMENTAL SUSTAINABILITY

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## ABSTRACT

*The study aimed to examine the role of environmentally friendly practices adopted by teachers of the first three grades in promoting environmental sustainability from their own perspectives. The descriptive research method was employed, and a questionnaire was administered to a sample of (343) male and female teachers working in public schools to the Directorate of Education of Wadi Al-Seer District in Amman. The results indicated that the level of environmentally friendly practices implemented by teachers of the first three grades—across the domains of school waste management, rationalization of resource consumption, implementation of green educational activities, and environmental awareness and the fostering of positive environmental behaviors among students—was high. The study also revealed statistically significant differences attributable to the educational qualification variable, in favor of teachers holding a master's degree, while no statistically significant differences were found attributable to gender or years of teaching experience. Accordingly, the study recommended expanding the use of educational practices aimed at enhancing environmental sustainability concepts among students of the first three grades.*

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**KEYWORDS:** Environmentally Friendly Practices, Environmental sustainability.

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## INTRODUCTION

It is the case that the twenty first century has experienced a significant escalation of the environmental issues and the subsequent grave challenges to the sustainability of the human living on earth. The hot topics of climate change, water pollution, biodiversity degradation, natural resources depletion, have become pressing coordinated global issues. As a reaction, the global community came up with the 2030 Agenda of Sustainable Development that comprises seventeen global goals which compose a complete system of attaining balanced environmental, social and economic development (United Nations, 2015).

In this regard, the environmentally friendly practices become a powerful tool of promoting the awareness of the environment and the development of personal and communal responsibility towards natural resources. The implementation of everyday practices, however insignificant they might seem, like eliminating the use of plastics, implementing effective waste management, and rationalizing the use of water and energy resources, will help to incorporate and enforce the idea of sustainability into the long-term behavior of individuals (Kibert, ). UNESCO has pointed out that inculcation of environmental practices at an early age in education is a cornerstone pillar towards developing an environmentally conscious generation capable of taking on its future roles (UNEP, 2021).

When sustainability ideas are introduced into the educational process of children via real-life and interactive activities, it will increase their environmental awareness and encourage them to embrace sustainable practices in their day-to-day lives (UNESCO, 2020). In one study, conducted by Borg, Winberg, Gericke, and Borg (2025), the authors have shown that the need to introduce the concept of sustainability at the very early stages of education leads to the formation of positive attitudes towards nature in children and the enhancement of their ability to make responsible decisions regarding nature.

Education is also one of the major pillars of sustainability and it is crucial towards the building of environmental awareness of students and the entrenching of values that guide the behavior of students towards environmental protection. The significance of introducing environmental education to school curricula and practices is thus emphasized because educators will play a central role in forming the behavioral pattern of students and strengthening their adherence to environmental friendly practices

(UNESCO, 2020).

In the process of early education, children start gaining environmental knowledge, positive environmental attitudes, skills and behaviors. At this point, an environmental awareness is built and therefore, individuals will be able to learn more about environmental concerns and take positive steps towards environmental protection, which will eventually endorse sustainable living on our planet (Lee, 2023). The environmental awareness has four main components, namely, cognitive knowledge, skills, attitudes, and behaviors (Hasanah & Smita, 2025).

Practical and interactive exercise is an efficient method of cementing the environmental awareness rates among the students since they offer chances to directly witness how their actions affect the surrounding environment and help them to translate practical knowledge into the everyday sustaining practices. Engagement in group environmental initiatives also enhances the cooperation abilities and sense of shared responsibility in the students, as well as their affiliation to local and global environmental problems, and helps to form an environmentally conscious generation that can make responsible environmental choices (Al-Jaafari, 2021). The present study will examine the views of grade one to three teachers on the importance of environmentally sustainable practices in ensuring environmental sustainability.

### *The Problem of the Study and its Question*

The issue of the current research arose due to the increased problem of environmental challenges facing societies within the past few years that provide a major burden on educational institutions to instill environmentally conscious attitudes and behaviors since early childhood. The implementation of the stated policies and initiatives including such ones like Green Education and Green School has been instituted in the Jordanian Ministry of Education and integrated in school plans and curricula but still, the actualized actions of these policies remain shallow unless these policies are translated into practical, day to day environmentally friendly activities in classroom and school environments especially among the teachers teaching the first three grades since they are the main role models as well as role players to their students.

The value of teachers in the first three grades has been noted as critical by the international studies. To give an example, the importance of environmental education in early childhood was highlighted by Borg et al. (2025) in Sweden and Ginsburg and

Audley (2020) in the United States; nevertheless, it is doubtful that their results can be generalized to the Arab-Jordanian context. In terms of Arab studies, the literature review shows that most of them have concentrated on secondary school, including the works of Ezz al-Din (2024), or higher education, including the works of Al-Balshi (2023), or have been focused on the role of the school administration in advancing the ideas of sustainability (Sharman and Al-Fursan, 2020). Relatively, little has been given to the study of environmental practices used by teachers in the first three grades in enhancing environmental sustainability.

Accordingly, the researcher undertook this study to address this research gap by focusing on the role of environmentally friendly practices adopted by teachers of the first three grades in promoting environmental sustainability. It is anticipated that the findings will provide a clear and comprehensive understanding of the nature of actual environmental practices within classrooms and schools.

### *Study Questions*

The study sought to answer the following questions:

**Question 1:** What is the role of eco-friendly practices implemented by teachers of the first three grades in promoting environmental sustainability in schools within the Wadi Al-Seer District?

**Question 2:** Are there statistically significant differences at the level of significance ( $\alpha = 0.05$ ) in teachers' responses regarding the role of eco-friendly practices in supporting environmental sustainability attributable to the variables of gender and years of experience?

### *Objectives of the Study*

This study aimed to determine the impact of eco-friendly practices implemented by teachers of the first three grades in promoting environmental sustainability from their perspectives. It also sought to examine whether statistically significant differences exist at the level of significance ( $\alpha = 0.05$ ) in teachers' responses concerning the role of eco-friendly practices in supporting environmental sustainability attributable to the variables of gender, educational qualification, and years of experience.

### *Significance of the Study*

The significance of the present study is reflected in both its theoretical and practical dimensions. Theoretically, it contributes to enriching knowledge by examining the relationship between environmental practices implemented by teachers of

the first three grades and environmental sustainability, thereby expanding the conceptual understanding of how teachers' daily environmental behaviors influence sustainability within schools. Practically, the findings are expected to inform the policies of the Ministry of Education and educational decision-makers by encouraging the structured and effective adoption of environmentally friendly practices in the first three grades. The study may also support the development of practical school initiatives and projects that enhance environmental sustainability through teachers' daily activities. Furthermore, it provides practical measurement tools that can be utilized in future scientific research to assess environmental practices and sustainability within schools, thereby enabling researchers to conduct subsequent studies across different educational stages.

### *Study Terms and Procedural Definitions*

The study includes the following conceptual and operational definitions:

- **Eco-friendly practices** are defined as "activities and behaviors that reduce negative environmental impacts and promote the sustainable use of resources" (UNEP, 2021).

Operationally, they are defined as the extent to which teachers adopt practical environmental behaviors and practices within the school environment that reflect environmental concern. They are measured through the research instrument developed by the researcher.

- **Environmental sustainability** is defined as "the management of environmental resources in a manner that ensures meeting present needs without compromising the ability of future generations to meet their own needs, while preserving ecosystems and biodiversity" (WCED, 1987).

Operationally, it is defined as the degree to which teachers are aware of the impact of environmental practices—across their dimensions (environmental awareness, sustainable practices, and community participation)—in promoting environmental sustainability.

- **Teachers' perspective** is defined as "the perceptions, impressions, and beliefs that teachers hold toward a particular educational phenomenon, influenced by their personal experiences and diverse educational contexts, and reflected in their classroom decisions and instructional practices" (Pajares, 1992).

Operationally, it is defined as the degree to which teachers of the first three grades express their views and attitudes regarding the impact of eco-friendly practices in schools on promoting environmental

sustainability. This is measured through the study instrument.

### *Study Limitations and Delimitations*

The study is subject to the following limitations:

**Objective limitation:** The study is confined to examining the role of eco-friendly practices implemented by teachers of the first three grades in promoting environmental sustainability.

**Human and spatial limitation:** The study is limited to a sample of male and female teachers of the first three grades in public and private schools affiliated with the Directorate of Education of the Wadi Al-Seer District.

**Temporal limitation:** The study was conducted during the first semester of the academic year 2025/2026.

The findings of this study are limited to the research instrument employed and to the availability of acceptable standards of validity and reliability within it. The generalizability of the results is confined to populations similar to the study population, in accordance with the representativeness of the sample to its original population.

## THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

### *First: Theoretical Framework*

The environmentally friendly practices are the main pillar to a sustainable development as they offer a systematized approach that helps to orient human activity towards the best utilization of natural resources and the reduction of the negative effects which appear as a consequence of human activity on the ecosystems. Ever since the onset of the twenty first century, the issue of sustainability has turned out to be a pressing need in diverse spheres, and it has permeated every facet of life. The concept of sustainability is explained as the combination of three scales, which are interdependent and include social responsibility, environmental regulation, and economic welfare, having the desire to find the balance between the application of the present needs and the protection of the rights of the future generations (Al-Otaibi, 2025).

Environmentally friendly investments have become an avenue through which many countries have sought to improve the environment in an effort to develop sustainable development, especially with the rising levels of environmental problems, including climate change and pollution. This tendency has been embodied in implementation of clean economy approaches by use of renewable

energy and encouragement of green investments in an approach that emphasizes on environmental conservation. World Green Economy Council (WGECO) states that such a strategy is a subset of the larger sustainability model and uses multiple types of investment tools, such as stocks, exchange-traded funds, and mutual funds. Through these mechanisms, the firms are able to undertake environmental operations in addition to their main operations and the aim is to enhance the quality of the environment and to safeguard the natural resources (ben Yousef & Dahmani, 2024).

Social responsibility practices are environmentally friendly, and this strategy covers a variety of healthy behaviors embraced by people, including daily practices geared towards resource preservation and environmental awareness. These practices are recycling, waste minimization, using sustainable transport, relying on renewable energy, responsible consumption, and charitable giving which help to strengthen positive behaviors and environmental goals (Khreisat, 2023). Sustainability is a recent scholarly definition proposed by Smith and Rudolf (2025) as a multidimensional framework that seeks to protect the human capacities and ensure the environmental impacts are controlled within safe boundaries to promote both intergenerational and intragenerational justice. It can also be described as attitudes and activities constituting the day-to-day organizational practices that help promote environmental sustainability and rational utilization of the available resources, including water conservation, shutting down of lights and electrical appliances during periods of inactivity, and decreasing the use of papers, which also promote environmental protection and pro-environmental workplace behavior (Hassan and Mohammed, 2022).

Green practices are important in promoting the environmental sustainability. They are no longer left to individual voluntary initiatives but are now a necessity to address challenges of the contemporary world environment. Their importance is especially strong in the educational setting, when developing environmental awareness and introducing positive values to students is one of the long-term investments into the creation of generations of people who would be able to responsibly and consciously use natural resources. Such practices when integrated into everyday and community life help in the development of a culture of sustainability, which is taken to be a sign of maturity in society and serves to facilitate the realization of balanced and inclusive development (Ezzedine, 2024).

Although there is the growing drive towards

environmental friendly practices, there is still a cumulative challenge in the implementation of this practice, which is attributed to overlapping organizational, behavioral, and institutional aspects. Recent reports, especially in the construction industry, show that insufficient motivational factors and institutional frameworks, along with deficient infrastructure, are some of the greatest obstacles to the implementation of the principles of a sustainable economy (AlJaber, Martinez-Vazquez, & Baniotopoulos, 2023).

The introduction of the environmental concerns in the educational process has become one of the main pillars of modern educational tendencies. Green practices are not options or an addition to what is done anymore but have now become structural elements in building the awareness of learners and the shaping of behavioral patterns that would facilitate sustainability. Green educational practices are a set of in-school and after-school learning opportunities that enhance learners knowledge and skills in environmental and climatic issues and empower them to take an active part in the construction of a sustainable future (UNESCO, 2020). OECD has underlined that education is the cornerstone to bringing citizens ready to face climate change because it instills in them systems-thinking skills, collaborative competencies, and ethical responsibility (OECD, 2022).

The teacher will be central in the process of environmental education activation both as a leader and facilitator of the learning process. The teacher, with the application of interactive instructional methods based on the active involvement, i.e., inquiry-based learning and learning in relation to the surrounding environment, helps to entrench the positive values and attitudes of students in relation to the environment. According to the recent educational literature, the extent of teacher professional training and teaching skills is one of the most important factors that define whether learners can develop environmental awareness, or not (Springer Nature). Evaluation in the assessment field cannot be reduced to traditional tests, but it can include portfolios, and even has indicators of environmental impact, including the amount of paper or energy saved due to classroom and extracurricular activities (OECD, 2023).

Environmental sustainability is one of the burning global issues that require a conscious pedagogical focus and especially at the initial level of education when the value systems and attitudes of children to the environment and nature are developed. The responsibilities of teachers of the first three grades

are not restricted to building the basic academic skills, but also supplying children with the sense of the environmental responsibility and the encouragement of some simple everyday activities that will help children understand the significance of natural resources preservation. The concept of environmental education is considered one of the most effective methods to reach a sustainable development because it helps to protect the natural resources, teach people about the environmental issues, direct their behavior in the favor of the positive changes, and make them respond to the environmental problems consciously and responsibly (Al-Shehri and Al-Jambi, 2024).

The ability to maintain ecosystems and natural resources by responsibly using the available resources in such a manner that the current generation can fulfill their needs without affecting the future generation to fulfill their needs is defined as environmental sustainability (Abu Tabel, Al-Khouli, and Youssef, 2025).

It also means the introduction of activities that curb exploitation or deterioration of natural resources and ensure the sustainability and conservation of ecosystems in the long term. The propagation of such a strategy is part of the needs of the present generation without violating the rights of the future generations due to the reasonable use of natural resources considering their regenerative capacity and guaranteeing the continuation of their benefits and environmental equilibrium (Mahmoud, 2024). In addition, it is characterized as increasing the capacity of the ecosystems to retain the structural and functional aspects when the ecosystems are subjected to internal or external factors. To have environmental sustainability, the products must be designed, developed and delivered as per the environmental requirements (Boumerfek & Zallaq, 2023).

Environmental sustainability can also refer to the provision of services and resources of the current and future generations without affecting the well-being of the ecosystems in which these resources are found and polluting them (Ali, 2021).

The objective of environmental sustainability aims to achieve diverse goals that include the utilization of resources and manufacture of goods and services in such a manner as to meet the demands of the current generation without exploiting the rights of future generations. It is done by rationalization of patterns of consumption, maintenance of biodiversity, dependence on environmentally friendly sources of energy and raw materials, and observing the natural regeneration capacity of ecosystems. It also encompasses the

minimization of the used non-renewable resources, reusing and recycling, and controlling the level of waste and emission to ensure the sustainability of the environmental services and the preservation of the ecological balance in the long-term (Al-Abed, 2024).

The environmental sustainability strategy will involve a plan that seeks to fulfill the present human needs in a way that protects the environment and improves on the conservation of the natural resources to be used by the other generations to come. Boumerefek and Zallaq (2023) described that the environmental sustainability is based on a combination of practices aimed at lessening pollution and increasing the environmental performance of economic processes and products through minimalizing the emissions and the negative impacts of the production processes. Having products under a thorough control at any point of the production process is a core entry point to guaranteeing the safety of the raw materials utilized in the production process, as well as benefiting the research and development processes to find more environmentally friendly solutions.

The preparation of future generations to face environmental and climate issues on national and international levels can be performed at a fundamental level through the provision of education, so that the future generation will be able to adjust to the ongoing changes and react to emergency events. It is the most effective approach to establishing the abilities of generations to be responsible, save resources, and make society self-sufficient in the long term amid the effects of climate and environmental disasters on schools and universities and the number of funds to invest in the educational sector (Kroufek & Nepras, 2023).

Education for Sustainable Development is an educational practice that revolves around the concepts and ideals of sustainability and which is practiced at all levels/ situations of learning. This strategy will facilitate the concept of social learning and multi-stakeholder involvement, which will help the communities and citizens become empowered to deal with both environmental and social issues. It focuses on human rights, reduction of poverty, sustainable livelihoods, gender equality and environmental education. Climate change education also supports the activities of Education for Sustainable Development, which includes education and training, increasing people's awareness, enhancing access to information, and promoting collective and international engagement and cooperation, which increases the ability of individuals and institutions to adapt to climate

change and endure its outcomes (Al-Jamal, 2022).

The inclusion of environmental topics within educational curricula is of considerable importance. Teaching environmental subjects enhances students' environmental awareness by enabling them to understand environmental issues and recognize the importance of conserving natural resources. This, in turn, heightens their environmental sensitivity, contributes to the development of fundamental skills such as critical thinking and analysis, and positively influences individuals' behavior toward sustainable practices (Ali, 2025).

### *Previous Studies*

According to Petkou et al. (2025), the authors aimed to determine the perceptions and expectations of early childhood educators concerning the role of the sustainable school in developing the environmental awareness and behavior of children and the role of the school in environmental education. This research was carried out in East Macedonia and Thrace of Greece, through the survey methodology. The results showed that a majority of teachers gave their knowledge about the concept of sustainability as moderate and good, and only approximately half of them showed clear knowledge about the concept of a sustainable school. The findings also highlighted that culture, justice, natural resource management, and human rights should be promoted by the sustainable schools.

The objective of Borg et al. (2025) was to investigate the role of kindergarten principals in promoting sustainability comparing the views and sustainability-related practices of 50 kindergarten principals in 25 environmentally certified kindergartens and 25 non-certified kindergartens. The mixed-methods design was used in the study, and a random sample of 25 municipalities among 290 municipalities in Sweden was used. The data were gathered using a semi-structured questionnaire that was given to the kindergarten principals. The researchers concluded that leaders of sustainably-oriented preschools that are environmentally accredited exhibited more complicated and multifaceted sustainability vision in their leadership practices.

Habib (2025) sought to determine how to integrate eco-friendly practices in the management of primary schools in Pakistan, how they influence the formation of environmental awareness and attitudes in students, and how they may lead to the creation of sustainable processes. The research used a qualitative methodology where focus group discussion was carried out on 24 students between grade six and

eight in four primary schools in urban and peri-urban schools. Narrative research was utilized in the analysis of data. The findings have shown that students were more aware on environmental issues, were more interested in environmental practices and that peer interaction helped in strengthening positive environmental behaviors.

Al-Qadi (2024) aimed to confirm the efficacy of a proposed program in creating environmentally apt practices in hearing-impaired kindergarten children in the context of the Prepare for Green initiative. The study design adopted by the researcher was a quasi-experimental one group design. The research instruments were John Raven Intelligence Scale among Children, pictorial/verbal scale among hearing impaired kindergarten children about environmental friendly practices that were formulated by the researcher, as well as observation checklist. The results revealed the efficiency and success of the program, its positive effect in the formation of environmentally friendly procedure in the hearing-impaired kindergarten children in the context of the program. The findings were in support of a significant impact in the promotion of positive environmental practices and behaviour.

Ezzeddine (2024) has performed a study to determine the significance of green organizational culture in influencing the practices that are environment-friendly in technical and industrial secondary schools in the Governorate of Menoufia. The research touched upon the conceptual framework of green organizational culture and theoretical premises of environmentally friendly practices in such schools. The methodology of the research was descriptive and involved the use of the questionnaire that was given to a sample of 347 principals, deputies, teachers and department supervisors out of the total population of 3,596 people. Its findings revealed that the provision of the green organizational culture dimensions in technical and industrial secondary schools at Menoufia Governorate was moderate. The research paper hypothesized a series of processes that would justify the impact of green organizational culture in enhancing practices that are environmentally friendly in technical secondary education schools.

Al-Ajmi and Al-Zahrani (2024) attempted to identify the extent of how green education skills are expressed through the instructional activities of primary science teaching female teachers and to develop a proposed framework aimed at enhancing the level of awareness. The researchers based on the descriptive-analytical approach are able to design a questionnaire which included four fundamental

green education skills: social, economic, environmental and life skills. The questionnaire had 24 items with five-point Likert scale and was taken electronically to 55 women teachers. The results showed that the level of relative importance was very high in all the questionnaire items in the four domains with weighted means being between 4.2 and 5.0. The research suggested the implementation of the suggested framework in order to make the teachers more aware of green education skills in teaching.

Al-Balshi (2023) used the current research to determine the most important sustainable green school practice in the public secondary schools, the most suitable lean production tool that can be used in the schools, as well as to come up with a proposed framework of the role of school leadership in executing sustainable green school practice based on the lean production strategy. The questionnaire used in the study had 33 questions spread out into four areas and was given to 86 principals and vice principals of public secondary schools as a sample. This proposed study provided a body of leadership mechanisms that would help in adopting and implementing green school practices in line with the zero-waste approach.

Vikane and Høydalsvik (2023) examined how Education for Sustainability (EfS) can help children to have the knowledge, skills, values, and attitudes needed to solve global environmental problems in a manner that complies with the principles of sustainability. The research involved conceptual knowledge and pedagogical implementation of teachers of early childhood education in Norway concerning sustainability. Using a mixed-methods design, data were gathered by use of reflection notes, surveys and educational development projects. The results indicated a disjointed concept of sustainability, whose definition was mainly based on action-centered, fact-based and normative levels. The research has identified the necessity of teacher education and institutional reinforcement to enhance sustainability education in the early childhood setting.

### *Commentary on Previous Studies*

Past research shows that there has been a variety of research works that address the role of schools and teachers in facilitating environmental practices and sustainability in both early childhood, primary, secondary and even higher education settings. Research works like Petkou et al. (2025), Vikane and Høydalsvik (2023) focused on the perceptions of teachers and their functions as providers of

environmental learning and the need to prepare teachers with enough knowledge about sustainability and environmental phenomena. There are other research works such as Borg et al. (2025) and Habib (2025), which pointed out that school leadership and interactive school-based practice is a significant factor in strengthening positive environmental behavior in children and that community and family involvement are vital.

Al-Ajmi and Al-Zahrani (2024) and Al-Nashar and Abu Al-Nour (2023) identified in their studies at the primary education level the importance of incorporating teaching practices with green education and sustainability skills in the teaching environment. Simultaneously, Al-Qadi (2024) and Ezzeddine (2024) tested the efficacy of environmental programs and green organizational culture to promote environmental friendly behaviors and practices in students. Even though these studies were useful in offering information on educational, administrative, and technological models that can be applied to facilitate sustainability, majority of them covered secondary school or preschool settings with little consideration of the first three grades of primary education.

The study under discussion attempts to fill this gap by paying direct attention to the first three grades, which is a basic period in helping to shape an environmental awareness and instill sustainable behaviors. It also contrasts with previous studies by exploring the perceptions of teachers about their everyday practices in terms of environmental friendliness and exploring the effect of their own practices on the encouragement of environmental sustainability in their own perspective instead of focusing on the institutional programs or policy frameworks. Moreover, it provides a practical

contribution by putting into the context of everyday instructional practices, environmental and educational outcomes, making an alternative realistic model of scalable and replicable schools application to similar settings.

The study is likely to provide a new viable outlook in applying environmental sustainability in early primary school. It gives a clear point of reference to habits that teachers can embrace to improve the environmental awareness and behaviors of the students thus creating a good base on sustainable environmental education at the early levels of learning. Its results can also be used in local educational policies as it will help to reinforce the environmental programs in schools and empower the capabilities of teachers to effectively and repeatedly apply green practices in their everyday work.

## METHODOLOGY

The present study followed the descriptive-analytical approach to suit the purposes of the present study.

### *Study population*

The study population consisted of all the teachers of the first three grades in the Wadi Al-Sir district, numbering (1083), for the academic year (2025/2026), according to the statistics of the records of the Queen Rania Center for Technology.

### *Study Sample*

The study sample consisted of (343) individuals, including (44) teachers, and (299) female teachers, and they were randomly selected. Table (1) shows the psychometric characteristics of the study sample.

*Table (1) Frequencies and percentages of study variables.*

Variable	Classification	Repetition	Percentage
Gender	Male	44	12.8
	Female	299	87.2
	Total	343	100.0
Years of Service	Less than 5 years	66	19.2
	From 5 years to less than 10 years	69	20.1
	More than 10 years	208	60.6
	Total	343	100.0
Education Level	Bachelor	207	60.3
	Higher diploma	58	16.9
	Master	37	10.8
	PhD	41	12.0
	Total	343	100.0

### *Study Instrument*

To achieve the objectives of the study, a questionnaire was developed to measure the role of

environmentally friendly practices implemented by teachers of the first three grades in promoting environmental sustainability. The instrument consisted of (23) items distributed under the axis of

the role of environmentally friendly practices and encompassed four main domains:

- The first domain: school waste management, comprising (6) items.
- The second domain: rationalization of resource consumption, comprising (6) items.
- The third domain: green educational activities, comprising (5) items.
- The fourth domain: environmental awareness and the reinforcement of behaviors, comprising (6) items.

### Face Validity (Judges' Validity)

The instrument was presented to a panel of (13) specialized referees drawn from faculty members at Jordanian universities to ensure its validity and to obtain their views regarding the appropriateness of the questionnaire items, their alignment with the domains to which they were assigned, the clarity and accuracy of their linguistic formulation, and their overall suitability. Modifications were made in light of the observations and recommendations provided

by the referees. The final version of the instrument consisted of (23) items.

The questionnaire was designed using a five-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), with corresponding numerical values assigned as follows: (5, 4, 3, 2, 1), respectively. The validity and reliability of the scale were verified through face validity and internal consistency. The following criterion was adopted for interpreting the five-point scale.

Category Range = Upper Limit of Scale (5) - Minimum Scale (1)

Number of Categories Required (5)

=0.80

Then add the answer (0.80) to the end of each category, and accordingly, the criterion for judging the role level is as follows:

Arithmetic Mean Range	Application Degree
1.00 - less than 1.80	Very Low
1.80 - less than 2.60	Low
2.60 - less than 3.40	Moderate
3.40 - less than 4.20	High
4.20 - 5.00	Very High

Table (2) Pearson correlation coefficients values for the relationship of the paragraphs to the instrument and the domain to which they belong.

School Waste Management			Rationalizing resource consumption			Green Educational Activities			Environmental Awareness and Inculcating Behaviors		
Paragraph Number	Correlation coefficient b:		Paragraph Number	Correlation coefficient b:		Paragraph Number	Correlation coefficient b:		Paragraph Number	Correlation coefficient b:	
	Scope	Tool		Scope	Tool		Scope	Tool		Scope	Tool
1	.791**	.677**	1	.793**	.636**	1	.840**	.728**	1	.767**	.736**
2	.799**	.666**	2	.796**	.647**	2	.835**	.746**	2	.837**	.720**
3	.820**	.749**	3	.807**	.645**	3	.846**	.796**	3	.813**	.693**
4	.810**	.738**	4	.678**	.457**	4	.841**	.762**	4	.802**	.664**
5	.834**	.739**	5	.819**	.797**	5	.889**	.808**	5	.805**	.686**
6	.854**	.791**	6	.775**	.766**				6	.795**	.705**

\*\*Statistically significant at the significance level (0.01)

The data presented in Table (2) indicate that the correlation coefficients between each item and Domain D (school waste management) ranged from (.791\*\* to .854\*\*), while their correlations with the overall instrument ranged from (.666\*\* to .791\*\*). The Pearson correlation coefficients between each item and the domain of rationalizing resource consumption ranged from (.678\*\* to .819\*\*), and their correlations with the overall instrument ranged from (.457\*\* to .797\*\*).

Furthermore, the Pearson correlation coefficients between each item and the domain of green

educational activities ranged from (.835\*\* to .889\*\*). With respect to the domain of environmental awareness and behavior reinforcement, the Pearson correlation coefficients ranged from (.767\*\* to .837\*\*), and their correlations with the overall instrument ranged from (.664\*\* to .736\*\*). All reported values are statistically significant.

To verify the reliability of the instrument, Cronbach's Alpha coefficient was calculated as an indicator of internal consistency, as shown in the following table.

Table (3) Internal consistency coefficient according to Cronbach's alpha equation.

Themes	Scope	Number of paragraphs	Cronbach's alpha coefficient
The Role of Eco-Friendly Practices	School Waste Management	6	0.847
	Rationalizing resource consumption	6	0.829
	Green Educational Activities	5	0.851
	Environmental Awareness and Inculcating Behaviors	6	0.836
	The role of eco-friendly practices as a whole	23	0.852

The data presented in Table (3) indicate that the internal consistency coefficients for the domains of environmentally friendly practices were as follows: the first domain, school waste management, recorded (0.847); the second domain, rationalization of resource consumption, recorded (0.829); the third domain, green educational activities, recorded (0.851); and the fourth domain, environmental awareness and behavior reinforcement, recorded (0.836). The overall reliability coefficient for the role of environmentally friendly practices as a whole reached (0.852).

### **Study Variables**

#### **Main Variable:**

The primary variable of the study is represented by the degree of environmentally friendly practices, reflected in the following domains: school waste management, rationalization of resource consumption, green educational activities, and environmental awareness and behavior reinforcement.

#### **Demographic Variables:**

#### **Study Procedures**

In order to attain the study goals, the researcher followed the following procedures:

A thorough analysis of the theoretical literature and past studies pertaining to the research problem was done to clarify the problem statement, enhance the theoretical basis of the study, identify the procedures and the study population and sample.

- The research instrument, which is the questionnaire, was formulated by the researcher at the beginning of the study because no appropriate research instrument was found to match the objectives of the present study in the past study. The interview questions were also developed by the researcher.
- The final version of the questionnaire was made and the validity and reliability of the questionnaire were checked.

It was also determined by official statistics in that the study population was comprised of first grade, second grade, and third grade teachers of schools in the Wadi Al-Seer in the academic year 2025/2026.

- The study sample (questionnaire) was randomly chosen teachers of the first three grades in the Wadi Al-Seer district.

The questionnaire was carried out and sent to the sampled members. The process of answering was well explained and the participants were told that the

data was to be used only in scientific research. They were asked to answer everything correctly.

The data were to be entered by first collecting the questionnaires. Following the validation of the appropriateness of the items in the questionnaires to statistical analysis, and classifying them based on the variables to be used in the study, (343) questionnaires were obtained.

The completed data evolution was opened into the Statistical Package of the Social Sciences (SPSS) to come up with the results.

The researcher was able to analyze and interpret the findings and based on the findings, provide the required recommendations and suggestions.

### **Questionnaire Analysis using statistical methods**

To ensure that the data were analyzed in line with the content and purpose of the study, Statistical Package of the Social Sciences (SPSS) was used to conduct the analysis. Statistical methods used were the following:

- Pearson correlation coefficient and Cronbach Alpha coefficient to show the reliability of the study tool.
- Meanings of frequencies and percentages to outline the distribution of the study sample by demographic variables.
- Arithmetic means and standard deviation of the questionnaire items and the domains individually.

Various analysis of variance (MANOVA) to test the impact of gender, years of service, educational qualification, type of education, school size (number of students), school participation, and environmental initiatives on the influence of eco-friendly practices applied by the first three grade teachers in ensuring environmental sustainability.

## **STUDY RESULTS**

**The results of the first question: " What is the role of environmentally friendly practices for the teachers of the first three grades in promoting environmental sustainability in the schools of the Wadi Al-Sir district"?**

To answer this question, the arithmetic averages and standard deviations of the axes of the study tool "The Role of Environmentally Friendly Practices of the Teachers of the First Three Grades in Promoting Environmental Sustainability in the Schools of the Wadi Al-Sir District" were calculated, taking into account their descending order according to their averages, and Table (4) shows this.

**Table (4) The arithmetic averages and standard deviations of the areas of the "Role of Eco-Friendly Practices" axis, taking into account their descending order according to their arithmetic averages**

Domain Number	Scope	Arithmetic Average	Standard deviation	Rank	Level
2	<b>Rationalizing resource consumption</b>	4.29	0.58	1	very big
4	<b>Environmental Awareness and Inculcating Behaviors</b>	4.12	0.63	2	Large
3	<b>Green Educational Activities</b>	4.11	0.69	3	Large
1	<b>School Waste Management</b>	3.93	0.82	4	Large
	<b>as a whole</b>	4.11	0.59		Large

It is seen based on the findings in Table (4) that the average of the domains of the study axis, The Role of Environmentally Friendly Practices, was between 3.93 and 4.29 and it rank as the fourth and final. The total arithmetic mean of the axis was 4.11, which means a high level of implementation.

It is possible to explain this result referring to the increased focus of the importance of environmental problems in the sphere of school life, and the commitment of teachers to introduce the ideas of environment into the curriculum of classrooms and extracurricular life, in keeping with the features of the students in the first three classes. Such outcomes can also be explained by the fact that the teachers of the first grade are aware of the level of impact that they can have on the students in terms of conserving environmental values and behaviors even at the initial education level, and by directives and awareness programmes offered by the Ministry of Education which underline the necessity to unify the concepts of environmental sustainability at schools.

The results of the current study can be compared to those provided by Petkou, Kounani, Tsioun, and Afedoulidou (2025), which concluded that the teachers saw the relevance of the sustainable school and its ability to teach environmental awareness and behavior of the children. Those findings are also in line with Borg et al. (2025), who determined that schools with environmental accreditation have a

greater level of practices related to sustainability as opposed to the schools that are not accredited. On the same note, the results can be contrasted with Habib (2025), who established that the implementation of environmentally friendly practices in the school environment helps to increase environmental awareness and positive behavior in students, and with Al-Qadi (2024), who also found that environmental programs are effective to promote the emergence of environmentally friendly practices in children.

On the other hand, the findings of the present research paper are partially variable to those of Ezzeddine (2024), who stated that the existence of green organizational culture dimensions in schools was average. They do not also correspond to the results of Vikane and Hoydalvik (2023), which showed that among early childhood teachers, there is a relative lack of conceptual knowledge of sustainability principles.

The average and standard deviations of the responses of the study sample were calculated in each domain separately as follows:

#### - *School Waste Management*

The arithmetic means and standard deviations of the items in the domain of School Waste Management were determined and tabulated in descending order of arithmetic means of the items, which have been indicated in Table (5).

**Table (5) Mathematical Averages and Standard Deviations for the Paragraphs of the "School Waste Management"**

Number	Paragraph	Arithmetic Average	Standard deviation	Rank	Level
5	Engaging students in activities that promote recycling and waste utilization	4.12	0.91	1	Large
6	Applying practical educational strategies that develop students' skills for proper handling of school waste	4.08	0.88	2	Large
4	Directing students to reduce waste production during activities	4.05	0.90	3	Large
2	Encourage students to reuse simple materials such as plastic bottles instead of throwing them away	3.97	0.98	4	Large
3	Customize containers for recyclable waste inside the classroom	3.80	1.17	5	Large
1	Sorting waste in school grades according to their types	3.57	1.17	6	Large
	<b>The field as a whole</b>	3.93	0.82	-	Large

The results presented in Table (5) indicate that the arithmetic means of the items within the "School Waste Management" domain ranged between 3.57 and 4.12. The highest-rated item was item (5), which states, "Engaging students in activities that promote recycling and utilization of waste," with an arithmetic mean of 4.12, indicating a high degree of implementation. Conversely, the lowest-rated item was item (1), which states, "Sorting waste in school classrooms according to its types."

These findings highlight the need for schools to provide classroom resources and materials that facilitate the effective implementation of waste sorting practices, thereby contributing to the promotion and consolidation of environmentally

friendly behaviors among students from early educational stages. This outcome aligns with the findings of Al-Balshi (2023), who confirmed that the successful implementation of green school practices requires clearly defined roles and continuous administrative support.

#### - *Environmental Consciousness and Inculcating behaviours*

The arithmetic means and standard deviations of the paragraphs in the field of "Environmental Awareness and Inculcating Behaviors" were computed with regard to their grading down in terms of their arithmetic averages as represented in Table (8).

**Table (8) Mathematical Averages and Standard Deviations for the Paragraphs of the Field of "Environmental Awareness and Inculcating Behaviors"**

Number	Paragraph	Arithmetic Average	Standard deviation	Rank	Level
1	Introduce students to home ways to protect the environment from .pollution risks	4.22	0.72	1	very big
5	Encourage students to employ environmental practices in their .homes and communities	4.22	0.69	1	very big
3	Provide practical models of positive environmental behaviors within .the school	4.18	0.69	3	Large
6	.Holding awareness lectures for students and their parents	4.12	0.78	4	Large
4	.Encouraging students to walk and rationalize transportation	4.00	0.88	5	Large
2	Engage students in simple local and global environmental .discussions	3.99	0.91	6	Large
<b>The field as a whole</b>		4.12	0.63	-	Large

The results presented in Table (8) indicate that the arithmetic means of the items within the "Environmental Awareness and Inculcating Behaviors" domain ranged between 3.99 and 4.22. The highest-rated items were items (1) and (5), which state, "Introducing students to home ways to protect the environment from the risks of pollution" and "Encouraging students to employ environmental practices in their homes and communities," respectively, both with an arithmetic mean of 4.22, reflecting a very high degree of implementation. Item (6), which states, "Holding awareness lectures for students and their parents," ranked fourth with an arithmetic mean of 3.99, reflecting a high degree of implementation. The overall arithmetic mean for the "Environmental Awareness and Inculcating Behaviors" domain reached a high level.

This outcome can be attributed to the active role of teachers in promoting positive environmental behaviors and the importance of employing diverse strategies for environmental awareness that align

with students' characteristics and educational needs. It may also reflect teachers' recognition of the critical partnership between school and family in consolidating sustainable environmental behaviors. These findings are consistent with the study of Habib (2025), which emphasized the role of family and community participation in supporting school environmental initiatives.

**Regarding the second research question, which asked: "Are there statistically significant differences at the significance level ( $\alpha = 0.05$ ) in teachers' responses concerning the role of eco-friendly practices in supporting environmental sustainability based on variables (gender, years of experience, and level of education)?"**

To answer this question, the arithmetic means and standard deviations of the role of environmentally friendly practices were calculated according to the variables (gender, years of service, level of education, type of education, school size [number of students], school participation, and environmental initiatives), as presented in Table (9).

**Table (9) Mathematical Averages and Standard Deviations of the Role of Eco-Friendly Practices Attributable to Variables (Gender, Years of Service, Level of Education)**

Variable	Category		School Waste Management	Rationalizing resource consumption	Green Educational Activities	Environmental Awareness and Inculcating Behaviors	Total Grade
Gender	Male	Going to	3.54	4.10	4.05	3.94	3.90
		on	1.13	0.67	0.65	0.76	0.67
	Female	Going to	3.99	4.31	4.11	4.15	4.14
		on	0.75	0.57	0.69	0.60	0.58
Years of Experience	Less than 10 years	Going to	3.97	4.31	4.16	4.23	4.17
		on	0.80	0.56	0.71	0.60	0.59
	5-10 years	Going to	3.95	4.28	4.07	4.13	4.11
		on	0.77	0.52	0.62	0.52	0.53
	More than 10 years	Going to	3.91	4.28	4.10	4.08	4.09
		on	0.84	0.61	0.70	0.66	0.62
Education Level	Bachelor	Going to	3.99	4.33	4.14	4.16	4.16
		on	0.72	0.56	0.64	0.57	0.53
	Higher diploma	Going to	3.91	4.24	4.07	4.06	4.07
		on	0.90	0.61	0.79	0.74	0.69
	Master	Going to	4.07	4.40	4.30	4.24	4.25
		on	0.72	0.43	0.58	0.61	0.53
	PhD	Going to	3.52	4.02	3.82	3.89	3.81
		on					

Note. Q: Arithmetic mean p: Standard deviation

Table (9) shows noticeable variations in the arithmetic means and standard deviations of the role of environmentally friendly practices according to the variables (gender, years of service, and level of education). To determine the statistical significance

of the differences among these means, a three-way multiple analysis of variance (MANOVA) was applied to the questionnaire as a whole. The results of this analysis are presented in Table (10).

**Table 10: Triple Variance Analysis without Interaction of the Effect of (Gender, Years of Service, Level of Education) on the Responses of the Study Sample Members to the Role of Eco-Friendly Practices**

Source of Contrast	Total Squares	Degrees of Freedom	Average Squares	P Value	Statistical significance
Gender	0.658	1	0.658	1.949	0.164
Years of Service	0.252	2	0.126	0.374	0.689
Education Level	3.701	3	1.234	3.656	*0.013
Error	112.004	332	0.337		
Kidney					

Table (10) indicates that there are no statistically significant differences ( $\alpha = 0.05$ ) attributable to the variables of gender, years of service, or type of education in the responses of the study sample regarding the role of environmentally friendly practices. This finding can be explained by the influence of teachers' educational level on their perception of the importance of eco-friendly practices. Teachers with higher qualifications tend to possess broader knowledge of environmental

sustainability and its classroom applications, which is reflected in their appreciation and understanding of these practices.

However, statistically significant differences ( $\alpha = 0.05$ ) were observed for the variable of educational level. To identify the specific locations of these differences, post-hoc comparisons were conducted using the Scheffé method. The results of these comparisons are presented in Table (11).

**Table 11: Oral Dimensional Comparisons of the Effect of the Education Level Variable for the Axis (Role of Eco-Friendly Practices)**

Category	Arithmetic Average	Bachelor	Higher diploma	Master	PhD
Bachelor	4.16	-	0.09	-0.09	.34*
Higher diploma	4.07			-0.18	0.25
Master	4.25			-	.43*
PhD	3.81				-

The data in Table (11) indicate statistically significant differences in the role of environmentally

friendly practices attributable to the level of education. These differences appear between the

bachelor's and doctoral levels, favoring the bachelor's category, and between the master's and doctoral levels, favoring the master's category.

To examine the substantive differences in the arithmetic means of the fields of the study tool

regarding the role of environmentally friendly practices, as influenced by the variables of gender, years of service, and level of education, a three-way multiple variance analysis was conducted.

**Table (12) Triple Variance Analysis of the Impact of (Gender, Years of Service, Level of Education) on the Role of Eco-Friendly Practices**

Source of Contrast	Domains	Total Squares	Degrees of Freedom	Average Squares	P Value	Statistical significance
Gender Hoteling= 0.054 H = 0.002	School Waste Management	3.587	1	3.587	5.638	0.018
	Rationalizing resource consumption	0.629	1	0.629	1.883	0.171
	Green Educational Activities	0.057	1	0.057	0.124	0.725
	Environmental Awareness and Inculcating Behaviors	0.386	1	0.386	1.031	0.311
Years of Service Lux Lambda = 0.985 H = 0.764	School Waste Management	0.092	2	0.046	0.073	0.930
	Rationalizing resource consumption	0.021	2	0.011	0.032	0.968
	Green Educational Activities	0.502	2	0.251	0.545	0.581
	Environmental Awareness and Inculcating Behaviors	0.941	2	0.471	1.258	0.285
Education Level Lux Lambda = 0.961 H = 0.360	School Waste Management	5.493	3	1.831	2.878	0.036
	Rationalizing resource consumption	3.117	3	1.039	3.109	0.027
	Green Educational Activities	4.533	3	1.511	3.277	0.021
	Environmental Awareness and Inculcating Behaviors	2.38	3	0.794	2.122	0.097
Error	School Waste Management	211.233	332	0.636		
	Rationalizing resource consumption	110.933	332	0.334		
	Green Educational Activities	153.091	332	0.461		
	Environmental Awareness and Inculcating Behaviors	124.208	332	0.374		
Kidney	School Waste Management	228.316	342			
	Rationalizing resource consumption	116.833	342			
	Green Educational Activities	161.497	342			
	Environmental Awareness and Inculcating Behaviors	134.050	342			

As can be seen in Table (12), statistically significant differences (0.05) can be attributed to the impact of gender on the domain of school waste management, and the differences are in favor of female. There was no statistically significant gender difference (0.05) in the rationalization of resource consumption, green educational activities and environmental awareness and behavior inculcation.

It further states that years of service showed no statistically significant difference (0.05) that could be attributed to years of the service across the school waste management, rationalization of resource consumption, green educational activities, and environmental awareness and behavior inculcation. Likewise, the differences in the level of education in the field of environmental awareness and behavior inculcation showed no statistically significant differences ( $\alpha=0.05$ ).

This can be explained by the fact that gender affects some of the environmental practices including school waste management where female gender is

more aware and participates in this activity and this may be due to possible attention to fine details in daily routine in terms of hygiene and waste sorting. Conversely, it seems that professional orientation and training programs offered to teachers are more responsible in the areas of resource rationalization, green educational activities, and environmental awareness and behavior inculcation than demographic factors.

Even though years of service did not have a significant influence in some of the areas, it indicates that experience is not enough to improve environmental practices as continuous training and environmental education are significant. Nonetheless, statistically significant differences (0.05) were noticed in the years of service in the areas of school waste management, rationalization of resource consumption, and green educational activities. As a strategy to establish the locations of these differences, dimensional comparisons were performed on the Chiffe method as exhibited in Table (13).

**Table (13): Oral Dimensional Comparisons of the Effect of the Education Level Variable for the Field of School Waste Management**

Category	Arithmetic Average	Bachelor	Higher diploma	Master	PhD
Bachelor	3.99	-	0.08	-0.07	.46*
Higher diploma	3.91		-	-0.15	0.38
Master	4.07			-	.54*
PhD	3.52				-

The data in Table (13) indicate statistically significant differences in the impact of the level of education in the field of school waste management. These differences were observed between the Bachelor's and PhD levels, favoring the Bachelor's category. This may be attributed to the tendency of teachers with higher qualifications to focus more on theoretical aspects, whereas teachers holding

Bachelor's or Master's degrees are more actively engaged in daily practical classroom practices, which significantly enhances the implementation of waste management activities. This finding aligns with the study by Vikane and Høydalsvik (2023), which emphasized the need to strengthen the applied component of sustainability education for teachers.

**Table (14): Oral Dimensional Comparisons of the Effect of the Education Level Variable for the Field of (Rationalization of Resource Consumption)**

Category	Arithmetic Average	Bachelor	Higher diploma	Master	PhD
Bachelor	4.33	-	0.09	-0.06	.31*
Higher diploma	4.24		-	-0.16	0.21
Master	4.40			-	.38*
PhD	4.02				-

The data in Table (14) indicate statistically significant differences in the impact of the level of education on the field of rationalization of resource consumption. These differences were observed

between the Bachelor's and PhD levels, favoring the Bachelor's category, and between the Master's and PhD levels, favoring the Master's category.

**Table (15): Oral Dimensional Comparisons of the Effect of the Education Level Variable for the Field of (Green Educational Activities)**

Category	Arithmetic Average	Bachelor	Higher diploma	Master	PhD
Bachelor	4.14	-	0.07	-0.15	0.31
Higher diploma	4.07		-	-0.23	0.24
Master	4.30			-	.4729*
PhD	3.82				-

Table (15) shows that the effect of the level of education on the green educational activities field has statistically significant differences. These were in differences between masters and PhD level with the master category being more favorable. This is due to the focus by teachers holding Master degree on practicality and application of environmental education in classroom.

### Recommendations

- Introduce continuous professional learning of teachers to increase their ability to use the environmental education strategies, such as active teaching, project-based learning, and environmental surveying.
- Support environmental practices by the provision of classroom and school resources that are environmentally friendly including eco-friendly teaching aids, tools to minimize the use of paper and energy as well as the encouragement of the use of digital technologies instead of traditional methods.

- Create awareness through workshops and collaborate with parents to make them environmentally responsible at home and community-level as well as to get them involved in community service work that will create sustainability.

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### CONFLICT OF INTEREST

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