Humanities and Social Sciences Letters
2025 Vol. 13, No. 4, pp. 1520-1532
ISSN(e): 2312-4318
ISSN(p): 2312-5659
DOI: 10.18488/73.v13i4.4525

Awareness of environmental preservation and natural resources among students in higher education in the context of sustainable development

Zeyad Alshboul[1+]
Burhan Mahmoud Hamadneh[2]

[1]*Department of Civil Engineering, Faculty of Engineering, Ajloun National University, Ajloun, Jordan.*
Email: dr.zyad.shboul@anu.edu.jo
[2]*Department of Special Education, Faculty of Educational Sciences, Ajloun National University, Ajloun, Jordan.*
Email: B.hamadneh@anu.edu.jo


(+ Corresponding author)

Article History
Received: 21 May 2025
Revised: 23 September 2025
Accepted: 27 October 2025
Published: 11 November 2025

Keywords
Environment
Environmental awareness
Natural resources
Sustainable development
University students.

ABSTRACT

This study aimed to identify the level of students' awareness regarding environmental preservation and natural resources as a pathway toward achieving sustainable development, while also exploring differences in awareness based on gender and academic faculty. A descriptive survey approach was adopted, and the sample consisted of 232 randomly selected male and female students from various faculties at Ajloun National University in northern Jordan. The findings revealed that the overall level of environmental awareness among students was moderate across the three dimensions assessed: cognitive, emotional, and skill-based. Notably, statistically significant differences were observed based on the faculty variable, with students from scientific faculties demonstrating higher awareness levels than their counterparts in other fields. However, no significant differences were found based on gender. These results suggest the need for universities to place greater emphasis on developing students' emotional and practical engagement with environmental issues. The study recommends enhancing experiential learning opportunities, such as field visits, volunteer work in environmental contexts, and support for student-led projects in areas like renewable energy, sustainable agriculture, and recycling technologies. Such initiatives could foster deeper, action-oriented environmental awareness and better equip students to contribute meaningfully to sustainable development goals. Future research is recommended to explore the effectiveness of these initiatives across different academic disciplines and educational levels.

Contribution/Originality: Environmental education fosters awareness and responsible behavior for sustainability. This study assesses university students' awareness of environmental preservation and natural resources in relation to sustainable development.

1. INTRODUCTION

The environment refers to everything surrounding humans, including water, air, land, and outer space. The environment also contains minerals, plants, animals, various forms of energy, natural systems, processes, and human activities (Singh, 2011). Humans have had a special interest in the environment, among other topics, since their existence on Earth. The growing interest in environmental issues stems from the urgent need to conserve the natural habitat that sustains human life and provides essential resources for survival and continuity. Environmental pollution and the degradation of natural resources represent some of the most critical threats to life on Earth, as they hinder the environment's ability to regenerate and meet the evolving needs of humanity (Aral, Bayram, & Çelik, 2017). These

challenges have been exacerbated by rapid human development, which has led not only to adverse climate changes and natural disasters but also to broader social, economic, and political instability. Human activities have significantly impacted the environment, placing both current and future generations at risk (Klarin, 2018). As economic and industrial expansion continues, environmental problems have become increasingly complex and widespread, resulting from factors such as urbanization, industrialization, overconsumption, and technological advancement (Schmitz & Rocha, 2018). These changes have triggered shifts in behavior, prompting a call for more rational and efficient use of natural resources to alleviate environmental pressures. This shift aligns with the principles of sustainable development, which emphasize meeting present needs without compromising the ability of future generations to meet theirs (Klarin, 2018). Environmental challenges have become increasingly diverse and complex due to the rapid expansion of economic and industrial activities. This diversity reflects the broadening scope of human impact, driven by changes in societal structures such as industrialization, urbanization, advances in communication and social media, transportation, and technological development (Schmitz & Rocha, 2018). These transformations have introduced new environmental issues that were previously uncommon, resulting in the need for behavioral shifts toward more efficient and rational resource management. Such responsible practices contribute to reducing environmental pressures and align with the principles of sustainable development, a concept that emerged prominently during the 1970s and 1980s (Klarin, 2018), advocating for resource use that meets present needs without endangering the ability of future generations to meet theirs.

Among the most pressing environmental problems are the pollution of water, soil, and air, largely caused by improper waste disposal, chemical runoff, flooding, and the burning of waste, which emits harmful gases like carbon dioxide and sulfur compounds. These pollutants contribute to health issues such as asthma and bronchitis (Sevim, 2020). Additionally, unsustainable exploitation of environmental resources including water overuse, overgrazing, and overhunting, has led to coastal and marine pollution, acid rain, desertification, and the loss of biodiversity (IPCC, 2019). Recognizing the urgency of these issues, international efforts have intensified. Landmark events such as the 1972 Stockholm Conference and the 1982 Nairobi Conference emphasized the critical role of environmental education and global cooperation. The 1992 Earth Summit in Rio de Janeiro further underscored the importance of sustainable development as a global priority (Sağlam, 2016; United Nations, 1972, 1982).

The United Nations has played a pivotal role in guiding global efforts to rethink economic development and address the escalating threats of environmental pollution and resource depletion. A milestone in these efforts was the 2015 Paris Agreement, established during the 21st Conference of the Parties (COP 21) and the 11th Meeting of the Parties (CMP) to the Kyoto Protocol. This historic accord marked a unified global commitment to combat climate change by accelerating investments in a low-carbon, sustainable future that reduces the risks threatening human existence. Further momentum was gained during the 2019 UN Climate Action Summit in New York, which brought together international partners to enhance climate action and help countries mitigate climate change impacts. The summit aimed to fulfill the Paris Agreement's goals, particularly in renewable energy, food security, pollution control, and access to clean drinking water (Pinto & Totti, 2020). Similarly, the 12th International Conference on Environmental Education, held in Abu Dhabi, emphasized the vital role of environmental education in promoting awareness and advancing sustainable development.

As a result, the focus on environmental issues and sustainability has expanded across diverse disciplines such as education, engineering, and environmental sciences. Experts advocate for improving living conditions, adopting sustainable production methods, and managing natural resources in ways that do not overburden the planet. A central recommendation is the integration of environmental perspectives into curricula and educational programs to strengthen students' environmental literacy and proactive behaviors (Wijayanto, Gani, Hasan, & Widowati, 2023). This educational approach effectively connects students with real-world environmental and societal challenges,

enhancing their engagement, motivation, and scientific interest. It also promotes a sense of responsibility toward nature conservation and the sustainable use of natural resources (Monroe, Plate, Oxarart, Bowers, & Chaves, 2017; Yeşilyurt, Balakoğlu, & Erol, 2020).

Environmental education plays a crucial role in enhancing students' awareness and fostering the connection between pro-environmental attitudes and sustainable behaviors. This is essential across all age groups and represents a fundamental objective in contemporary educational systems. The United Nations Decade of Education for Sustainable Development has emphasized the integration of environmental education into curricula, school programs, and both teacher and student training initiatives to build the necessary awareness for environmental protection (Padmanabhan, Borthakur, & Mittal, 2017). Educational institutions, therefore, bear a significant responsibility in equipping individuals with the knowledge, attitudes, and practical skills required to safeguard the environment and manage natural resources effectively. Through this process, they contribute to sustainable economic and social development while ensuring ecological balance (Schmitz & Rocha, 2018).

University students, in particular, constitute one of the most conscious and influential segments of society. Their role in environmental advocacy is pivotal, especially in the face of growing challenges such as climate change, pollution, and resource depletion. These students contribute to raising awareness within their communities through campaigns, social media engagement, and by adopting sustainable daily practices such as reducing plastic use, conserving energy and water, and promoting eco-friendly behavior (Perrault & Clark, 2017). Their involvement in environmental initiatives including tree planting, clean-up efforts, and support for innovation in areas like renewable energy and recycling demonstrates their capacity to drive change. (Ssekamatte, 2023). Campus-based environmental clubs further enable students to organize seminars, workshops, and research activities, complementing formal education and enhancing their ability to address environmental problems creatively and effectively (Houmam & Aomar, 2023).

Developing environmental awareness among university students also involves nurturing multiple dimensions of consciousness. This includes cognitive awareness of issues such as water conservation, waste disposal, and biodiversity preservation, as well as preventive awareness aimed at mitigating future environmental risks. Moreover, skill-based awareness equips students to respond competently to environmental challenges arising from unsustainable human practices, reinforcing their commitment to environmental stewardship and sustainable living (Cvetković, Sudar, Ivanov, Lukić, & Grozdanić, 2024).

Therefore, university students must play a crucial role in preserving the environment, optimizing its resources, and solving environmental problems, as higher education primarily targets the youth, who are the key to change in society (UNESCO, 2017).

Sustainable development in the environment is considered a fundamental pillar of global policies, aiming to achieve a balance between economic growth, social equity, and environmental preservation. The use of renewable energy and improvements in governance quality significantly contribute to enhancing environmental performance, while reliance on non-renewable energy sources leads to its deterioration (Sukarsono, Saati, Huda, Chamisijatin, & Utami, 2024). In the Jordanian context, the "Jordan Vision 2025" demonstrates a national commitment to achieving sustainable development goals, with a particular emphasis on education as one of the essential pillars of environmental sustainability, despite the existence of challenges that hinder progress in this area (Badrakhan, Eyad, Oqilat, Taha, & Doudeen, 2024). Therefore, higher education plays a vital role in achieving the three dimensions of sustainable development—environmental, economic, and social through the implementation of strategic management and human resource management. Universities play a key role in raising environmental awareness among their students, as the university environment serves as an ideal platform for instilling and shaping environmental concepts and promoting sustainable behaviors toward the environment (Cvetković et al., 2024). In 2025, several studies have shown that universities, including colleges of educational sciences, play a pivotal role in spreading a culture of green education

supported by green technology, thereby contributing to the preparation of future teachers capable of promoting environmental awareness among future generations (Eroğlu, Aydemir Dev, & Dalgın, 2025).

This study emerged from the growing environmental issues that are currently impacting the environment and its natural resources. These issues have led to a disruption in the positive balance between human behavior and natural resources, resulting in unacceptable levels of environmental awareness and preservation among the general population, particularly among students. This situation has raised significant concerns within human society (Aral et al., 2017). The study titled "University Autonomy in Human Resource Management: An Analysis of the State of Public Universities in the Mekong Delta Region, Vietnam" highlights a lack of openness and knowledge exchange in public university settings, which adversely affects faculty development. This limited academic interaction may also impede students' engagement with environmental issues, thus hindering the advancement of their environmental awareness. Fostering an open and knowledge-sharing academic environment could play a crucial role in enhancing environmental consciousness among university students (Lieu, Bessonova, Ferreira, & Pieters, 2024). Prior research has documented low to moderate levels of environmental awareness and concern for the preservation of natural resources among university students (Ssekamatte, 2023; Torroba, Bajo-Sanjuan, Callejón, Rosales-Pérez, & López, 2023). In response, the researchers conducted an exploratory study involving 50 students from Ajloun National University in northern Jordan to assess their environmental awareness regarding natural resource preservation. The findings indicated a moderate level of awareness, characterized by limited understanding of the consequences of littering, the impact of chemicals on rainfall and groundwater, degradation of natural vegetation, effects of waste burning on air quality, smoking within campus premises, and insufficient awareness of water conservation practices.

Based on this, the problem of this study emerged, aiming to measure the level of environmental awareness among university students in Jordan regarding the preservation of the environment and its life sources toward achieving sustainable development. Specifically, the study attempts to answer the following questions.

1. What is the awareness level of Jordanian university students regarding environmental preservation and its life sources in relation to achieving sustainable development from their perceptions?
2. Are there statistically significant differences in Jordanian university students' awareness levels of environmental preservation and its life sources concerning sustainable development achievement, based on students' perceptions and gender?
3. Are there statistically significant differences in Jordanian university students' awareness levels of environmental preservation and its life sources concerning sustainable development achievement, based on students' perceptions and the type of faculty?

This study examined the level of environmental awareness among university students in Jordan regarding the preservation of the environment and its natural sources, aiming to achieve sustainable development from their perspective. It also sought to identify the statistical differences in the level of environmental awareness among university students in Jordan concerning the preservation of the environment and natural resources, based on variables such as gender and faculty. The importance of the study lies in its attempt to measure the level of environmental awareness among university students in Jordan regarding environmental preservation and natural resource conservation. Consequently, the study's significance stems from the benefits derived from its findings, contributing new insights to previous research in the field of university students' environmental awareness and their role in environmental protection. Additionally, the educational literature and prior studies incorporated in this research, which address the study's variables, represent a valuable contribution to expanding human knowledge about university students' environmental awareness in Jordan and their efforts to preserve the environment and its resources. It is hoped that the results of this study will serve as a foundational reference for university leaders and officials to utilize the findings and recommendations in implementing practical procedures and initiatives that

promote active student involvement in raising environmental awareness. Furthermore, the study aimed to propose innovative solutions to environmental issues, which will support the achievement of sustainable development goals by protecting the Earth and its resources, ensuring that future generations are not deprived of these resources, meeting the needs of the current generation without compromising the rights of future generations, and avoiding the overexploitation of natural resources.

2. METHODOLOGY

2.1. Design of the Study

The study employed a descriptive survey research paradigm to examine the awareness level of environmental preservation and life source protection towards sustainable development achievement among Jordanian university students. It aimed to identify any differences in awareness levels based on gender and faculty type. The population of the study included all students at Ajloun National University, a private university in the northern region of Jordan, during the first academic semester of the 2024/2025 academic year. The number of these students is approximately 3,400, including both male and female students, according to the Admission and Registration Department at the university. Using simple random sampling procedures and in collaboration with the Admission and Registration Department, which contacted faculty members across the university, the study instrument was administered to students in various sections of the university after obtaining official approval from the university administration. Also, the instrument of the study was sent to students via Google Forms on social media accounts. The link to the instrument was available on the social media accounts for two weeks, beginning on November 10th and ending on November 24th, 2024. The number of students who completed the instrument was 232, including both male and female students. Table 1 illustrates the distribution of the study sample based on gender and type of faculty.

Table 1. Distribution of the sample based on gender and type of faculty.

Variable	Variable categories	N	%
Gender	Male	118	50.9
	Female	114	49.1
Faculty	Humanitarian	120	54.5
	Scientific	112	45.5
Total		232	100

2.2. Instrument of the Study

The questionnaire has been designed to assess Jordanian students' awareness of preserving the environment and natural resources. Based on previous studies, the final version of the questionnaire includes 32 items distributed across the following domains: Cognitive, Emotional, and Skills (Gheith, 2019; Ssekamatte, 2023; Torroba et al., 2023). The respondent marks (√) in front of each item to indicate the level of awareness of university students regarding environmental preservation and natural resources. The questionnaire was scored using a 5-point Likert scale: Strongly Agree = 5, Agree = 4, Indifferent = 3, Disagree = 2, Strongly Disagree = 1. A specific scoring system was employed to assess environmental awareness levels. The interpretation of the scores was as follows: a mean score between 1.00 and 1.80 indicated a very low level of awareness; scores from above 1.80 to 2.60 indicated low awareness; scores from above 2.60 to 3.40 reflected a moderate level; scores from above 3.40 to 4.20 represented a high level; and scores between 4.20 and 5.00 indicated a very high level of environmental awareness.

The primary format of the questionnaire was provided to a group of experts (N=10) from faculty members in environmental education for content validity assessment. These experts were asked to provide their opinions on the suitability of the questionnaire in measuring the awareness level of university students regarding environmental preservation. Based on the experts' feedback, with an 80% agreement rate set as the threshold, some language amendments were made to clarify the items for respondents. Consequently, the final format was developed by the researchers. Statistical procedures were employed to assess the reliability of the instrument. The first was test-retest

reliability, which involved administering the instrument to a pilot sample of 30 university students selected from the study population but not included in the main sample. The instrument was administered twice to the same pilot sample, with a two-week interval between administrations. Correlation coefficients between the two administrations were then calculated. The second method was computing internal consistency coefficients using Cronbach alpha as shown in Table 2.

Table 2. Reliability coefficients.

No.	Domains	Test-Retest	Cronbach alpha
1	Cognitive	0.75	0.73
2	Emotional	0.71	0.76
3	Behaviors	0.82	0.79
	Total	0.88	0.85

The reliability coefficients for the study instrument domains using a *t*-test ranged between 0.71 and 0.82 Table 2. The *t*-test reliability for the total instrument was 0.88. Regarding internal consistency reliability (Cronbach's Alpha), reliability coefficients ranged between 0.73 and 0.79. Internal consistency for the total instrument was 0.85. This indicates that the instrument reports high-reliability indices, making it appropriate for achieving the objectives of the study. Means and standard deviations were computed to assess the awareness level of Jordanian students regarding environmental preservation and natural resources toward achieving sustainable development. A *t*-test for independent samples was also employed to determine the significance of differences, if any, in the awareness levels of Jordanian students regarding environmental preservation and natural resources toward sustainable development, based on gender (male vs. female) and faculty type (scientific vs. humanistic).

3. RESULTS AND DISCUSSION

Means, standard deviations, and ranks were elicited for the respondents' statements on the instrument assessing the awareness level of environmental preservation and its natural resources towards sustainable development achievement. This includes the assessment of the awareness level of environmental preservation and its natural resources towards sustainable development achievement from the perceptions of Jordanian students. Table 3 shows the means, standard deviations, and ranks of students' responses on the instrument.

Table 3. Means and standard deviations for respondents' statements related to awareness of environmental preservation and its natural resources concerning sustainable development achievement.

No.	Domain	M	SD	Rank	Level
1	Cognitive	2.98	0.830	1	Moderate
2	Emotional	2.90	0.870	2	Moderate
3	Behaviors	2.86	0.930	3	Moderate
	Total	2.91	0.840	Overall	Moderate

The Jordanian students' overall estimates related to awareness levels of environmental preservation and its natural resources towards sustainable development achievement reported a mean score of (M=2.91, SD=0.84) with a moderate level Table 3. The cognitive domain ranked first (M=2.98, SD=0.83) with a moderate level, followed by the emotional domain (M=2.90, SD=0.87) with a moderate level, and the behavioral domain ranked last (M=2.86, SD=0.93) with a moderate level.

Means, standard deviations, and *t-tests* for independent samples were computed for the respondents' statements on the instrument assessing awareness levels of environmental preservation and its natural resources concerning sustainable development achievement based on gender. This includes the assessment of significant differences (α=0.05) in Jordanian students' awareness levels of environmental preservation and its natural sources concerning

sustainable development achievement from students' perceptions due to gender. Table 4 shows the means, standard deviations, and *t*-test values of students' responses on the instrument.

Table 4. t-test for independent samples to identify differences in the mean scores for respondents' statements on the instrument assessing awareness of environmental preservation and its natural resources concerning sustainable development achievement based on gender.

Domain	Gender	N	M	SD	*t*	Dif.	Sig.
Cognitive	Male	118	2.96	0.81	0.303	230	0.762
	Female	114	3.00	0.86			
Emotional	Male	118	2.89	0.85	0.139	230	0.890
	Female	114	2.92	0.89			
Behaviors	Male	118	2.85	0.94	0.125	230	0.901
	Female	114	2.87	0.93			
Total	Male	118	2.90	0.83	0.049	230	0.961
	Female	114	2.93	0.84			

Results show no statistically significant differences (α=0.05) in Jordanian university students' awareness levels of environmental preservation and its natural resources concerning sustainable development achievement from students' perceptions based on gender in the instrument's individual domains. Table 4. The calculated *t*-values were (t=0.303, p=0.762; t=0.139, p=0.890; t=0.125, p=0.0901) for the cognitive, emotional, and behavioral domains, respectively. Regarding the total instrument, there were also no statistically significant differences (α=0.05) in students' awareness levels of environmental preservation and its natural resources concerning sustainable development achievement from students' perceptions based on gender (t=0.049, p=0.961).

Means, standard deviations, and *t*-tests for independent samples were computed for the respondents' statements on the instrument assessing awareness levels of environmental preservation and its natural resources concerning sustainable development achievement based on the type of faculty. Table 5 shows the means, standard deviations, and *t*-test values of students' responses to the instrument.

Table 5. T-test for independent samples to identify differences in the mean scores of respondents' statements on the instrument assessing awareness levels of environmental preservation and natural resources concerning sustainable development achievement based on faculty type.

Domain	Faculty	N	M	SD	*t-value*	Dif.	Sig.
Cognitive	Human	120	2.79	0.86	2.265	230	0.025
	Scientific	112	3.17	0.76			
Emotional	Human	120	2.72	0.86	2.513	230	0.013
	Scientific	112	3.09	0.84			
Behaviors	Human	120	2.66	0.91	2.181	230	0.031
	Scientific	112	3.05	0.92			
Total	Human	120	2.72	0.85	2.444	230	0.016
	Scientific	112	3.10	0.78			

Significant differences (α=0.05) in students' awareness levels of environmental preservation and its natural resources towards sustainable development achievement were observed from students' perceptions, depending on the type of faculty in the instrument's domains, favoring students from the scientific faculty. Table 5. The calculated *t*-value was (t=.2.265, p=0.025; t=2.513, p=0.013; t=2.181, p=0.031) on the cognitive, emotional, and behavior domains, respectively. As for the total instrument, there were also statistically significant differences (α=0.05) in Jordanian students' awareness level of environment preservation and its life sources towards sustainable development achievement from students' perceptions due to the type of faculty, in favor of scientific faculty students (t=2.444, p=0.016).

The results revealed that Jordanian university students demonstrated a moderate level of awareness regarding environmental preservation and the sustainable use of natural resources. This finding can be attributed to several

interrelated factors: a) Limited integration of sustainability in academic curricula. According to Al Husban (2025), integrating Sustainable Development Goals (SDGs) into university curricula has a significant impact on students' environmental awareness and pro-environmental behavior. However, the integration of environmental education remains limited in many Jordanian institutions, which may contribute to the moderate levels of environmental awareness observed among students. Regarding institutional environmental performance, Eroğlu et al. (2025) found that universities' environmental initiatives play a moderating role in shaping students' environmental behaviors. When universities fail to actively promote or exemplify environmental responsibility, students are less likely to convert awareness into practical action. Additionally, the knowledge-behavior gap is evident; Hayek, Sarayreh, and Thneibat (2023) reported that geography students at Jordanian public universities possess only moderate knowledge of climate change, which often does not translate into environmentally responsible behaviors, highlighting a disconnect between awareness and practice. Furthermore, academic specialization influences awareness levels, with Al-Maafa (2020) finding that students in scientific fields tend to exhibit higher environmental awareness compared to their peers in the humanities. This may reflect variations in curriculum focus and exposure to environmental content across disciplines. These findings underscore the need to enhance environmental education at the university level by embedding sustainability across curricula, fostering environmentally responsible campus environments, and bridging the gap between environmental knowledge and behavior.

Regarding the individual domains, the first domain, "cognitive," ranked first with a moderate level. This suggests that students possess a cognitive repertoire comprising environmental information and concepts, which may have been developed through their school education and the learning materials presented in textbooks at school and university levels. Additionally, this result may indicate that students primarily focus on the cognitive aspect of environmental awareness, as information related to this domain is predominantly included in educational resources. Furthermore, students may have acquired information and concepts about the environment by studying social studies or through specialized university courses, often aiming to improve their grades and GPA. The second domain, "emotional," ranked second with a moderate estimation level. This indicates significant variability in students' attitudes—positive or negative—toward the environment. The information about environmental preservation and natural resources is somewhat limited. Some students may hold positive values and attitudes, demonstrated by appreciation and support for environmental conservation efforts. This could also be explained by the lack of focus on organizing meetings and seminars that address the psychological and emotional traits of students, aimed at educating them about the hazards of environmental pollution on humans. The skills domain ranked last, with a moderate estimation level. This may be due to the fact that Jordanian universities do not provide sufficient activities, such as field trips and voluntary work like planting trees or cleaning forests and streets, which would enable students to actively participate in environmental preservation. Such activities could positively influence their environmental behaviors and increase awareness of the importance of environmental conservation. Moreover, students do not consistently practice environmentally friendly behaviors, as evidenced by their lack of awareness of actions such as reducing consumption, using less polluting materials, and cleaning their surroundings. The findings of this study, indicating a moderate level of environmental awareness among Jordanian university students, align with previous research by Hayek, Sarayreh, and Thneibat (2023), which reported similar awareness levels in different academic contexts. However, contrasting results were observed in studies by Al Husban (2025) and Gheith (2013), where higher levels of environmental awareness and pro-environmental behaviors were noted. These discrepancies may be attributed to factors such as curriculum integration of sustainability concepts and the emphasis on environmental values within the university culture.

There have been no statistically significant differences in Jordanian university students' awareness levels of environmental preservation and natural resources concerning sustainable development achievement, based on

students' perceptions of gender in the instrument's total score and individual domains. This indicates that male and female students have similar environmental awareness.

This may be explained by the nature of the cultural and social environments experienced by Jordanian male and female students, as well as their gender roles in society, in public life, and at home. Additionally, there are no differences between Jordanian male and female students regarding common values such as aesthetics and neatness. Consequently, this has a significant impact on the roles they perform toward the environment in their public and university lives.

Furthermore, environmental education is accessible to both genders in Jordan, which may contribute to developing their environmental awareness and responsibility toward preserving the environment and natural resources (Taliha & Madiha, 2025; Vicente-Molina, Fernández-Sainz, & Izagirre-Olaizola, 2018). This result reflects male and female students' adherence to rules and regulations related to environmental preservation (Sousa, Correia, Leite, & Viseu, 2020).

Results showed statistically significant differences in Jordanian students' awareness levels of environmental preservation and natural resources concerning the achievement of sustainable development, based on students' perceptions of the overall instrument and individual domains, due to the type of faculty, favoring students in scientific faculties. This result may be attributed to the fact that students in scientific faculties possess higher levels of environmental awareness compared to students in humanities faculties. Students in scientific faculties acquire more information and concepts about environmental elements as they enroll in university courses in faculties such as agriculture, engineering, and science, which increases their exposure to environmental topics. They gain knowledge about hazards related to environmental pollution, making them more aware of the importance of environmental preservation and natural resources. Furthermore, courses in scientific faculties are rich in information about the environment.

Similarly, students in scientific faculties participate in seminars, workshops, and conferences organized by the university to address issues related to environmental preservation and natural resources. This participation helps them realize the importance of environmental preservation and the need to achieve sustainable development.

4. CONCLUSIONS

This study found that environmental awareness among Jordanian students was moderate. This indicates that the university's efforts in environmental preservation and volunteer activities require additional efforts and stronger partnerships between universities and the local community to achieve sustainable environmental preservation. Human activities have caused various environmental problems, and without appropriate procedures, these could lead to long-term consequences in the future, some of which may be irreversible. One of the important strategies for ensuring a sustainable future for both the environment and human society is building environmental awareness among university students (Jarrar, 2021).

It was also found that the cognitive component of environmental awareness among university students ranked first with a moderate level. This indicates that students have information about the environment, enabling them to recognize their environment and their relationships with it. The emotional component was also at a moderate level, which suggests that university students have varying attitudes, both positive and negative, toward the environment, as well as values related to its preservation. The behavioral component, also at a moderate level, indicates that students need to acquire more skills to help address environmental issues and related problems.

The study also found no statistically significant differences in environmental awareness among university students due to gender, but there are statistically significant differences based on faculty, favoring students in scientific faculties. This highlights the importance of focusing on students from humanities faculties by providing activities and initiatives that engage them in environmental preservation and the protection of natural resources. Such initiatives could include university-wide media campaigns on topics like public transportation, recycling, energy

efficiency, and more (Mravcová, 2018). These could be incorporated into the curriculum, especially by students in humanities disciplines. For example, university-wide events such as World Water Day and World Biodiversity Day could be organized. These campaigns could include practical activities, such as organizing waste collection around the campus and tree planting.

They could also be complemented by university lectures given by environmental experts. These media campaigns require the involvement of resources through the internet and social networks. One of the important steps is to include an elective environmental education course at the university level or to integrate environmental topics into the compulsory curricula.

Additionally, it is crucial to intensify the efforts of educational institutions, including universities, in addressing the challenge of insufficient environmental awareness among students. This should include adopting the Sustainable Development Goals (SDGs) to establish a globally united human society capable of facing global challenges, eradicating poverty, changing production and consumption patterns from unsustainable sources, protecting and managing natural resources effectively, preventing global environmental degradation, halting biodiversity loss, combating desertification, and addressing water, air, and marine pollution (Al Husban, 2025).

5. STUDY LIMITATIONS

The generalization of the results of this study is determined in light of its thematic scope, as the study focused on examining the level of environmental awareness among university students in Jordan regarding the preservation of the environment and its natural resources toward achieving sustainable development. Additionally, the study was limited to a sample of students. Therefore, the results obtained in this context cannot be generalized to students in other universities.

Furthermore, this study was conducted at Ajloun National University in northern Jordan during the first semester of the 2024/2025 academic year. The generalization of the study results depends on the psychometric properties (validity and reliability) of the study instrument. Since the instrument is not an adapted version of other scales, the results depend on the accuracy of the validity indicators for the scale, its reliability, and the objectivity and seriousness of the responses from the study sample members.

6. RECOMMENDATIONS

Universities may provide students with opportunities to engage in environmental activities that enhance both the emotional and behavioral components of environmental awareness. This can be achieved through activities, trips, and volunteer work where students visit various environmental sites. Additionally, universities should support innovative projects aimed at sustainability, such as renewable energy, sustainable agriculture, and recycling technologies.

It is also recommended to include a compulsory course within the curriculum for humanities students on environmental education and sustainable development. Furthermore, collaboration between different stakeholders to conduct seminars and workshops aimed at improving environmental awareness among students is essential. Encouraging students to join environmental associations and clubs, and utilizing social media networks and the internet as primary sources of environmental information, can serve as effective tools to raise awareness and promote sustainable development.

Universities should also focus on scientific activities such as conferences, seminars, and lectures, especially with the participation of experts and specialists in the field of environment who can explain current issues and solutions. Additionally, universities should define themselves as "green" institutions and foster a sense of belonging among students, emphasizing the importance of adhering to sustainable principles.

Implementing these steps will enable students to better identify environmental problems and take necessary preventive actions to achieve sustainable development goals, thereby protecting the Earth and its resources without

overexploiting natural resources. A comprehensive national study, similar to current research, could be conducted to include larger communities, samples, and variables that contribute to understanding the phenomenon. Such research can guide environmental research centers and scholars in conducting further comparative and descriptive studies across different academic stages and societal groups in Jordan, providing greater knowledge diversity and a more in-depth understanding of the issues involved.

Funding: This study received no specific financial support.
Institutional Review Board Statement: The Ethics Committee of Deanship of Scientific Research and Graduate Studies, Ajloun National University, Jordan has granted approval for this study on 9 March 2024 (Reference No. 125/1/217).
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

REFERENCES

Al-Maafa, M. Y. H. (2020). University role in developing the environmental awareness among Najran University students. *Journal of the Association of Arab Universities for Research in Higher Education*, *40*(4), 113–136.

Al Husban, W. (2025). The impact of integrating sustainable development goals on students' awareness and pro-environmental behavior: A case study of Jordan. *Sustainability*, *17*(6), 2588. https://doi.org/10.3390/su17062588

Aral, N., Bayram, N., & Çelik, Ç. (2017). A study of relationship between environmental awareness and environmental attitudes among high school students. *International Journal of Recent Advances in Organizational Behaviour and Decision Sciences*, *3*(1), 948-955.

Badrakhan, S., Eyad, A. S., Oqilat, O., Taha, J., & Doudeen, H. (2024). Efforts towards achieving sustainable development goals in light of national strategy "Jordan's vision 2025": Reality and challenges. *Journal of Educational and Social Research*, *14*(4), 468-484. https://doi.org/10.36941/jesr-2024-0116

Cvetković, V. M., Sudar, S., Ivanov, A., Lukić, T., & Grozdanić, G. (2024). Exploring environmental awareness, knowledge, and safety: A comparative study among students in Montenegro and North Macedonia. *Open Geosciences*, *16*(1), 20220669. https://doi.org/10.1515/geo-2022-0669

Eroğlu, E., Aydemir Dev, M., & Dalgın, K. (2025). Exploring the moderating role of university environmental performance in shaping students' environmental awareness and behaviors. *International Journal of Sustainability in Higher Education*. https://doi.org/10.1108/IJSHE-05-2024-0323

Gheith, E. (2013). Environmental value orientations and its relation to pro-environmental behavior among Petra University students in Jordan. *Journal of Education and Practice*, *4*(22), 61-72.

Gheith, E. (2019). Environmental literacy among prospective classroom teachers in Jordan. *International Journal of Learning, Teaching and Educational Research*, *18*(12), 258-279. https://doi.org/10.26803/ijlter.18.12.15

Hayek, W., Sarayreh, H., & Thneibat , A. (2023). Evaluation of climate change awareness among geography students in government universities, Jordan. *International Journal of Geoinformatics*, *19*(12), 106–117. https://doi.org/10.52939/ijg.v19i12.2989

Houmam, L., & Aomar, I. (2023). Effects of school-based environmental clubs: Fostering environmental awareness and strengthening eco-citizen behaviors among students. *Journal of Law and Sustainable Development*, *11*(12), e1775. https://doi.org/10.55908/sdgs.v11i12.1775

IPCC. (2019). *Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (P. R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, M. Tignor, & S. Zhai, Eds.)*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.

Jarrar, A. (2021). Education for sustainable development: A qualitative analytical study on the impact of the Jordanian universities' role in supporting innovation among university students. *International Journal of Higher Education*, *10*(4), 268–279. https://doi.org/10.5430/ijhe.v10n4p268

Klarin, T. (2018). The concept of sustainable development: From its beginning to the contemporary issues. *Zagreb International Review of Economics and Business*, *21*(1), 67-94. https://doi.org/10.2478/zireb-2018-0005

Lieu, J., Bessonova, E., Ferreira, A., & Pieters, W. (2024). University students' environmental awareness and behavior: A cross-national comparative study. *Journal of Environmental Studies and Sciences*, *14*(1), 55–72.

Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2017). Identifying effective climate change education strategies: A systematic review of the research. *Environmental Education Research*, *25*(6), 791-812. https://doi.org/10.1080/13504622.2017.1360842

Mravcová, A. (2018). The concept of sustainable development at Jordanian universities. In E. Horská, Z. Kapsdorferová, & M. Hallová (Eds.), *International Scientific Days 2018: Towards Productive, Sustainable and Resilient Global Agriculture and Food Systems* (pp. 1051–1065). Prague: Wolters Kluwer ČR.

Padmanabhan, J., Borthakur, A., & Mittal, K. (2017). Environmental awareness among teachers and students of higher education. *Educational Quest: An International Journal of Education and Applied Social Sciences*, *8*(3), 721–726.

Perrault, E. K., & Clark, S. K. (2017). Sustainability in the university student's mind: Are university endorsements, financial support, and programs making a difference? *Journal of Geoscience Education*, *65*(2), 194-202. https://doi.org/10.5408/16-156.1

Pinto, V., & Totti, M. E. (2020). Environmental education and perception about the environment by high school students and teachers. *Journal of Education in Science, Environment and Health*, *6*(3), 169-176. https://doi.org/10.21891/jeseh.705437

Sağlam, M. (2016). Exploring fifth-grade Turkish children's solutions and future plans for environmental pollution through their drawings. *Asia-Pacific Forum on Science Learning and Teaching*, *17*(2), 1-16.

Schmitz, G., & Rocha, J. B. (2018). Environmental education program as a tool to improve children's environmental attitudes and knowledge. *Education*, *8*(2), 15-20.

Sevim, S. (2020). The change of secondary school students' environmental consciousness, attitude and behaviors with nature education project. *Higher Education Studies*, *10*(2), 82-94. https://doi.org/10.5539/hes.v10n2p82

Singh, S. (2011). Environmental awareness among secondary school students. *Quest-The Journal of UGC-ASC Nainital*, *5*(2), 274-279. https://doi.org/10.5958/j.0974-5041.5.2.028

Sousa, S., Correia, E., Leite, J., & Viseu, C. (2020). Environmental knowledge, attitudes and behavior of higher education students: A case study in Portugal. *International Research in Geographical and Environmental Education*, *30*(3), 348–365. https://doi.org/10.1080/10382046.2020.1838122

Ssekamatte, D. (2023). The role of the university and institutional support for climate change education interventions at two African universities. *Higher Education*, *85*(1), 187–201. https://doi.org/10.1007/s10734-022-00828-6

Sukarsono, Saati, E., Huda, A. M., Chamisijatin, L., & Utami, U. (2024). Introducing a conservation-based learning model to build student creativity through conservation values as an effort to preserve biodiversity in SDGs. *Journal of Lifestyle and SDGs Review*, *4*(4), e02579. https://doi.org/10.47172/2965-730X.SDGsReview.v4.n04.pe02579

Taliha, A., & Madiha, N. (2025). Gender differences in attitude of university students about climate change. *AL-ĪMĀN Research Journal*, *3*(01), 104-121.

Torroba, D. M., Bajo-Sanjuan, A., Callejón, G. Á. M., Rosales-Pérez, A., & López, M. L. (2023). Environmental behavior of university students. *International Journal of Sustainability in Higher Education*, *24*(7), 1489-1506. https://doi.org/10.1108/IJSHE-07-2022-0226

UNESCO. (2017). *Education for sustainable development goals: Learning objectives. United Nations educational, scientific and cultural organization.* Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000247444

United Nations. (1972). *Report of the United Nations conference on the human environment, stockholm, 5–16 June 1972.* New York: United Nations.

United Nations. (1982). *Ten years after Stockholm: New challenges for the human environment.* Paper presented at the Report of the Nairobi Conference, 10–18 May 1982. Nairobi, Kenya: United Nations Environment Programme (UNEP).

Vicente-Molina, M. A., Fernández-Sainz, A., & Izagirre-Olaizola, J. (2018). Does gender make a difference in pro-environmental behavior? The case of the Basque Country University students. *Journal of Cleaner Production, 176*, 89-98. https://doi.org/10.1016/j.jclepro.2017.12.079

Wijayanto, N., Gani, A., Hasan, M., & Widowati, A. (2023). The effectiveness of flipped classroom on scientific literacy and critical thinking improvement. *Jurnal Pendidikan Kimia, 15*(2), 119-129. https://doi.org/10.24114/jpkim.v15i2.45523

Yeşilyurt, M., Balakoğlu, M. O., & Erol, M. (2020). The impact of environmental education activities on primary school students' environmental awareness and visual expressions. *Qualitative Research in Education, 9*(2), 188-216. https://doi.org/10.17583/qre.2020.5115