



## Advancing Sustainable Development Goals through Islamic Education: A Mixed-Methods Study among Scientific Disciplines at the University of Zawia

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### ABSTRACT

This study examines the role of the Islamic Education as a required course in developing awareness, understanding, and behavioral intentions related to Sustainable Development among students in scientific disciplines at the University of Zawia, Libya. Although sustainability has become as a national priority in Libya and North Africa in general, higher education institutions often struggle to embed sustainability principles within curricula, especially in non-specialized general courses. Using a mixed-methods design, the study collected quantitative data from 250 students in mathematics, biology, chemistry, computer science, and physics, supported by qualitative interviews with ten lecturers teaching the Islamic Education course. Descriptive analysis of the questionnaire responses showed moderate to high levels of sustainability awareness, with the course contributing significantly to students' ethical understanding of environmental and social responsibilities rooted in Islamic concepts. Students also evaluated the course's teaching methods positively, although they expressed their need for more applied, modern and interdisciplinary approaches. The findings further demonstrated that the course positively influenced students' attitudes and behavioral intentions toward adopting sustainable practices in their personal and future professional careers. Thematic analysis of lecturer interviews supported these results, highlighting pedagogical strategies, challenges, and opportunities for strengthening sustainability integration. The study concludes that the Islamic Education course serves as a valuable ethical and intellectual framework for promoting sustainability among scientific majors in Libyan higher education. Recommendations include curriculum enhancement, interdisciplinary collaboration, and the development of institutional regulations to support sustainability initiatives.

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## Introduction

The increasing global attention to sustainability has made the integration of sustainable development concepts into higher education an essential priority, especially in regions such as North Africa where environmental vulnerability, socioeconomic instability, and governance transitions create a unique set of developmental pressures. Within this regional landscape, universities are expected not only to provide technical and scientific training but also to cultivate ethical responsibility, civic consciousness, and value-driven decision-making among students (Yahya et al., 2025; Kasheem M. et al., 2025). As Libya continues to navigate a complex post-2011 trajectory marked by institutional reconstruction and evolving educational needs, the role of university curricula in shaping future generations becomes even more critical (Abraham & Baroud, 2025). Scholars argue that sustainable development in fragile or transitioning states depends directly on equipping students with moral and intellectual frameworks capable of guiding responsible scientific and professional practice (Kioupi & Voulvoulis, 2019; Abdulghani et al., 2025). Thus, Islamic education, long viewed in North African scholarship as a vehicle for moral formation and community-oriented values, has renewed significance in bridging traditional ethical knowledge with contemporary developmental imperatives (Onwuatiegwu & Paul-Mgbeafulike, 2023; Masoud et al., 2025).

Within the Libyan context, universities such as the University of Zawia place Islamic Education, (2 unites, 2 hours), as a compulsory course for all undergraduate students regardless of specialization, including those enrolled in mathematics, biology, chemistry, computer science, and physics. This structural decision reflects a philosophical commitment within Libyan higher education to ensure that scientific advancement and professional training remain grounded in Islamic ethical foundations rooted in the Qur'an, the *Sunnah*, and classical juristic thought (Solihah et al., 2025; Abushafa, 2025). Concepts such as stewardship of the earth (*al-khilafah*), moderation (*al-wasatiyya*), trust (*amanah*), and the avoidance of harm (*la darar wa la dirar*) form a rich ethical framework capable of supporting sustainability discourse when pedagogically integrated in a coherent manner. However, despite these theoretical possibilities, empirical investigations in Libya remain limited, and there is insufficient evidence regarding how students in scientific majors interpret, internalize, and apply sustainability principles introduced within Islamic Education classes. (Permadi & Sya'ban, 2025).

While research in neighboring North African countries, such as Tunisia, Algeria, and Morocco, shows that value-based education grounded in Islamic ethics has the potential to strengthen environmental consciousness, social responsibility, and sustainable behavior among university students, comparable literature within Libya remains sparse and fragmented (Al-Damkhi, 2008; Simon, 2011; Almajri et al., 2025). Several studies in the region highlight that meaningful sustainability learning occurs when students perceive religious teachings as intellectually relevant to contemporary challenges rather than as disconnected moral abstractions. Yet Libyan universities have not systematically evaluated whether their Islamic Education curricula succeed in making these connections explicit for students in scientific fields, whose coursework and career pathways are often perceived as detached from ethical discourse. This disconnect indicates a clear gap requiring rigorous academic inquiry into the pedagogical, cognitive, and attitudinal dimensions of sustainability learning within compulsory Islamic Education courses. (Permadi et al., 2025).

The present study therefore seeks to situate the Islamic Education course within broader debates about curriculum integration and sustainable development in North Africa. It examines the extent to which the course supports students' awareness of sustainability principles, shapes their attitudes toward responsible scientific practice, and fosters behaviors consistent with environmental stewardship and social responsibility. The research also explores how Islamic Education lecturers conceptualize sustainability, the degree to which they intentionally incorporate sustainability-related themes into their teaching, and the

challenges they face in contextualizing Islamic ethical concepts within scientific disciplines. In approaching these questions, the study aims to generate empirical evidence capable of informing curriculum development, pedagogical training, and educational policy not only within the University of Zawia but also across Libyan higher education institutions.

From the viewpoint of educational theory, the intersection between religious education and sustainability has been widely discussed in the international literature, which argues that moral and values-based instruction plays a critical role in shaping sustainable mindsets (Abdulghani et al., 2025; Shalghoum et al., 2025). Islamic pedagogy, with its focus on ethical reasoning, accountability, balance, and community welfare, aligns strongly with global frameworks of Education for Sustainable Development (ESD) and therefore offers a culturally rooted foundation for sustainability learning in Muslim-majority countries (Hajar, 2024; Taisir et al., 2024). However, theoretical alignment alone does not guarantee pedagogical effectiveness. The core issue remains whether students experience the Islamic Education course as intellectually meaningful and applicable to their scientific trajectories, and whether lecturers possess the conceptual and methodological tools needed to bridge Islamic ethical teachings with contemporary sustainability challenges.

Furthermore, Libyan universities operate within a socio-political environment in which educational institutions are expected to contribute directly to national development goals, including environmental protection, economic diversification, and the building of socially responsible citizenship. As the country continues to grapple with resource management issues, pollution concerns, and the need for scientific innovation aligned with national priorities, the cultivation of sustainability-oriented thinking among university students becomes indispensable (Yahya et al., 2025; Shalghoum et al., 2025). The centrality of the Islamic Education course to all academic programs therefore positions it as a strategic tool for reinforcing values that support long-term sustainability goals. Yet the absence of systematic evaluation raises questions about whether the course is fulfilling this role or whether curricular and pedagogical gaps may be limiting its potential impact.

In response to these challenges, the present study examines three interconnected questions embedded naturally within the scope of the research: to what extent does the Islamic Education course enhance students' awareness of sustainability principles; how do students in scientific disciplines perceive the relevance of the course to their academic and professional fields; and in what ways do lecturers integrate sustainability-related concepts into their teaching practices within the Libyan and North African educational context. Through addressing these interrelated inquiries, the study aims to fill a significant gap in Libyan scholarship by offering empirically grounded insights into how compulsory Islamic Education contributes, or fails to contribute, to the development of sustainability-oriented mindsets among students in scientific faculties. In doing so, the research contributes to regional debates on the potential of Islamic pedagogical traditions to serve as locally grounded frameworks for advancing sustainable development within higher education.

## Methodology

The study employs a mixed-methods design that integrates quantitative and qualitative approaches to provide a comprehensive understanding of how the Islamic Education course contributes to embedding sustainable development concepts among students in scientific majors at the University of Zawia. Mixed-methods research is widely recognized for its ability to capture both measurable patterns and deeper interpretive insights, making it particularly suitable for educational contexts where values, beliefs, and pedagogical practices interact in complex ways (Creswell & Clark, 2017). In the Libyan higher education setting, where Islamic Education serves as a compulsory unifying course across disciplines, the combination of numerical data and narrative accounts allows the researcher to examine not only what students perceive but also how instructors conceptualize their teaching practices within a

rapidly evolving national environment (Elihami et al., 2024; Ibrahim et al., 2025; Alrumayh et al., 2025b). The quantitative strand consists of a structured questionnaire administered to 250 students from mathematics, biology, chemistry, physics, and computer science, selected through simple random sampling. Descriptive statistics including frequencies, percentages, means, and standard deviations are used to summarize the data, following the guidelines recommended for educational studies relying on perception-based instruments (Kasheem M. et al., 2025).

To deepen the analysis and contextualize quantitative trends, the study incorporates a qualitative component based on semi-structured interviews with ten lecturers who teach the Islamic Education course. Qualitative inquiry is essential for capturing the pedagogical reasoning, instructional challenges, and interpretive frameworks that shape teaching practices, and scholars note that interviews are particularly effective for uncovering how educators understand and enact curriculum goals (Tisdell & Merriam, 2025). In the context of Islamic pedagogy and sustainability, lecturers' perspectives provide critical insights into how concepts such as stewardship, ethical responsibility, and balanced living are integrated into classroom discussions and whether these align with recognized frameworks of Education for Sustainable Development (Rieckmann, 2017). The qualitative approach therefore adds interpretive depth that complements the surface-level patterns captured through the questionnaire.

The questionnaire itself is developed in alignment with literature on Islamic education, values-based learning, and sustainability education, ensuring both theoretical grounding and cultural relevance (Hasibuan et al., 2024; Husin et al., 2025). The instrument assesses students' awareness of sustainability principles, attitudes toward sustainability, ethical and behavioral orientations, and perceptions of the relevance of Islamic Education to their scientific fields.

Qualitative data are analyzed using thematic analysis, consistent with the methodological principles outlined by Braun and Clarke (2006), involving repeated reading of transcripts, systematic coding, and the identification of recurring themes. Integrating the qualitative findings with descriptive quantitative results allows for methodological triangulation, enhancing the credibility and trustworthiness of the study (Tisdell & Merriam, 2025). By combining numerical trends from students with interpretive insights from lecturers, this mixed-methods approach provides a holistic and theoretically grounded assessment of the extent to which the Islamic Education course contributes to strengthening sustainability-oriented thinking among students in scientific majors and offers evidence-based recommendations for curriculum development within Libyan higher education.

## Results and Discussions

The study draws on data collected from a sample of 250 undergraduate students enrolled in scientific disciplines at the University of Zawia, all of whom completed the compulsory Islamic Education course during the 2024–2025 academic year. To ensure representation across the scientific fields, the sample was distributed proportionally across majors: approximately 60 students from Biology, 55 from Chemistry, 50 from Computer Science, 45 from Mathematics, and 40 from Physics. This distribution reflects departmental enrollment patterns and provides a balanced view of how students from diverse scientific domains perceive the integration of sustainable development concepts within the Islamic Education curriculum. Alongside the student data, qualitative insights were gathered through semi-structured interviews with ten lecturers responsible for teaching the Islamic Education course. While the questionnaire generated a quantitative profile of students' awareness, attitudes, and perceived learning outcomes, lecturer interviews offered interpretive depth and contextual explanations for the patterns emerging from the student responses.

### 1. Student Awareness of Sustainable Development Concepts

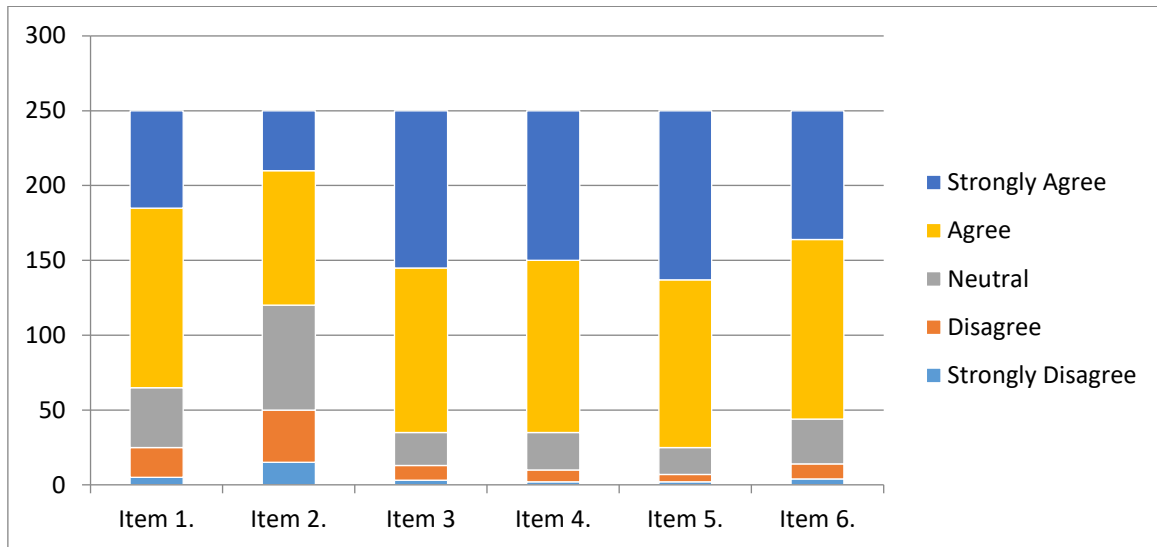
The first dimension of the questionnaire assessed students' cognitive awareness and conceptual understanding of sustainable development, examining both global framings and Islamic ethical underpinnings. Awareness of sustainability is widely recognized as a foundational learning outcome in higher education (Rieckmann, 2017; Sulistyowatiet al., 2025), as universities are expected to cultivate not only technical skills but also the attitudes and knowledge required to address twenty-first-century environmental and social challenges. This expectation is particularly relevant in Libya and the broader North African region, where rapid urbanization, environmental degradation, water scarcity, and socio-political instability intensify the need for sustainability-oriented education (Nafi et al., 2024; Abraham & Baroud, 2025; Samsuddin et al., 2025; Ayad et al., 2025). Within Islamic educational settings, sustainability is not merely a contemporary concept but an integral part of the Qur'anic ethical worldview, rooted in principles such as stewardship (*khilafah*), balance (*mizan*), moderation (*wasatiyyah*), and the prohibition of corruption (*fasad*), all of which have been identified as explicit environmental and social guidelines in classical and contemporary Islamic scholarship (Zuhdi et al., 2024; Abdulghani et al., 2025).

The quantitative results presented in Table 1 and Figure 1 reveal a clear pattern in students' awareness. While there is strong understanding of sustainability framed through Islamic teachings, familiarity with global sustainability terminology, particularly the Sustainable Development Goals (SDGs), is comparatively moderate. Items related to Islamic environmental concepts achieved very high mean scores: *khilafah* (M = 4.22), *mizan* (M = 4.21), and prohibition of *fasad* (M = 4.32). These findings align with studies showing that Muslim-majority student populations often conceptualize sustainability through ethical and religious schemas shaped by cultural socialization and religious education (Astuti et al., 2025; Alrumayh et al., 2025a). In contrast, awareness of the SDGs (M = 3.42) and general familiarity with modern sustainability discourse (M = 3.94) were lower, echoing previous research from Arab and African universities demonstrating that students may possess implicit value-based sustainability knowledge but lack explicit understanding of international sustainability frameworks (Onyeaka & Akinsemolu, 2025; Pachés et al., 2025).

**Table 1. Student Awareness of Sustainable Development Concepts**

	Item	Mean	SD	Interpretation
1.	I am familiar with the concept of Sustainable Development (SD).	3.94	0.86	High Awareness
2.	I have heard of the Sustainable Development Goals (SDGs).	3.42	1.02	Moderate Awareness
3.	Islamic teachings emphasize stewardship ( <i>khilafah</i> ) toward the environment.	4.22	0.77	Very High Awareness
4.	Islam encourages maintaining balance ( <i>mizan</i> ) in human interaction with nature.	4.21	0.74	Very High Awareness
5.	Islam prohibits corruption and harm ( <i>fasad</i> ) to the environment and society.	4.32	0.68	Very High Awareness
6.	Environmental protection is an ethical responsibility for Muslims.	4.10	0.81	High Awareness





**Fig. 1.** Student Awareness of Sustainable Development Concepts

This discrepancy between value-based awareness and global policy awareness reveals an important curricular gap. While the Islamic Education course at the University of Zawia effectively reinforces sustainability through moral and religious principles, it appears less effective in explicitly linking these principles to global sustainability structures such as the SDGs. Scholars argue that without such integration, students may find it difficult to translate ethical values into professional practice within scientific, environmental, or policy-related fields (Baroud, 2024; Abdulghani et al., 2025; Iskandar et al., 2025). Thus, the high awareness demonstrated in Islamic-based items should be viewed as a strength, but also as a steppingstone for a more comprehensive sustainability curriculum.

Beyond the quantitative data, the qualitative interviews with Islamic Education lecturers provide deeper insight into students' awareness patterns. Eight out of ten instructors observed that students respond more strongly to sustainability topics when framed within Qur'anic narratives, Prophetic teachings, or Islamic ethical discussions. One lecturer explained: *"When we discuss stewardship as part of their religious duty, students immediately understand; but when we mention SDGs, many ask what they are or how they relate to Islam."* Another noted that students often possess intuitive moral awareness of environmental ethics but lack formal terminology or global context. Lecturers attributed this gap to limited pre-university exposure to sustainability education in Libya, a finding consistent with national analyses of Libyan curriculum reform (Alouzi, 2024; Pallawagau et al., 2025; Kasheem, A. et al., 2025). Several instructors emphasized the need for clearer curricular integration, suggesting that referencing the SDGs alongside Qur'anic principles would enhance students' global awareness without diminishing cultural relevance.

Overall, the results demonstrate that students possess strong value-based awareness grounded in Islamic ethics, reflecting the effectiveness of the compulsory Islamic Education course as a cultural and moral anchor across all university majors. However, the moderate awareness of the SDGs signals a need for enhanced alignment between Islamic ethics and global sustainability discourse. Integrating both perspectives would ensure that students not only recognize sustainability as a religious and ethical obligation but also understand its relevance to scientific fields, policy frameworks, and international development agendas. As scholars increasingly emphasize the need for culturally contextualized yet globally informed sustainability education in Muslim-majority regions (Yahya et al., 2025; Masuwd, 2025a), the findings of this dimension reinforce the strategic role of Islamic Education in bridging local values with global sustainability literacy in Libya.

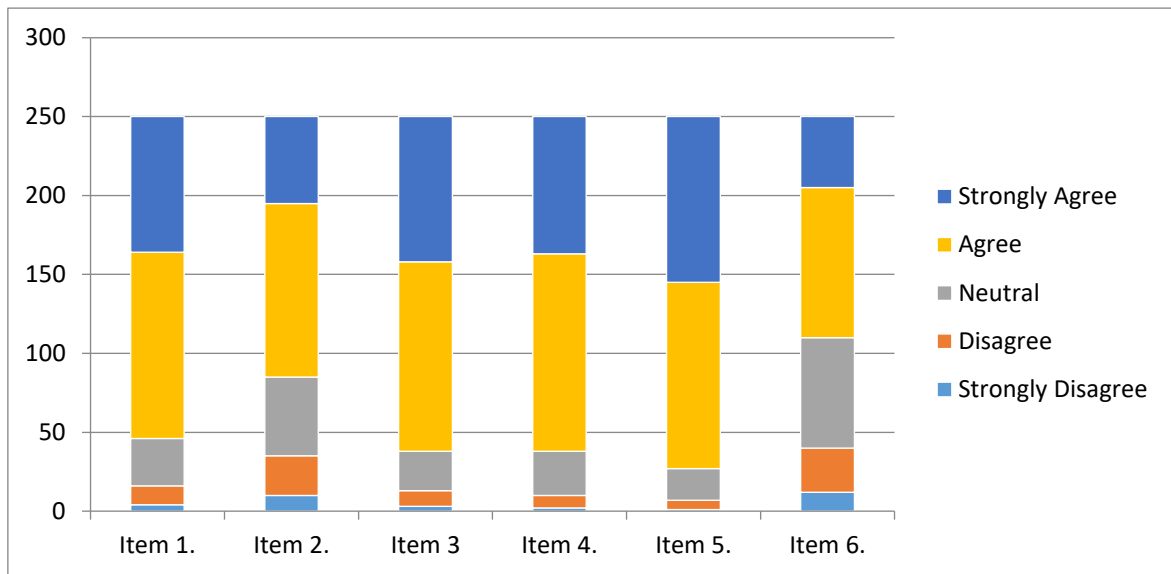
## 2. Perceived Contribution of the Islamic Education Course to Sustainability Competencies

The second dimension of the study examined students' perceptions of how the Islamic Education course contributes to developing sustainability-related competencies, including ethical reasoning, social responsibility, and the ability to connect Islamic principles with contemporary environmental and developmental challenges. In the Libyan and North African context where higher education institutions play a pivotal role in post-conflict reconstruction, social stabilization, and community development, the integration of sustainability within university curricula is increasingly regarded as essential for national resilience and future-oriented capacity building (Abdulghani et al., 2025; Luhuringbudi et al., 2025; Alsaeh et al., 2025a). The Islamic Education course, compulsory for all students at the University of Zawia regardless of academic major, occupies a particularly influential position because it provides a common ethical and philosophical framework that can shape students' attitudes toward environmental stewardship, social justice, and collective well-being. Islamic intellectual tradition has long emphasized the values underpinning sustainability, justice (*'adl*), balance (*mizan*), public welfare (*maalahah*), and responsible stewardship (*khilafah*), and these principles remain central to classical and modern interpretations of Islamic ethics (Shalghoum et al., 2025; Alriteemi et al., 2025; Alsaeh et al., 2025b). Thus, the course offers a natural platform for embedding sustainability competencies in ways that are culturally resonant and contextually meaningful.

The quantitative results presented in Table 2 and Figure 2 show that students generally perceive the course as contributing positively to their sustainability learning, particularly in relation to moral and ethical dimensions. Items measuring the course's support for values such as justice, community responsibility, and balance achieved high to very high mean scores, with the strongest endorsement appearing for the idea that the course highlights the importance of justice and *mizan* ( $M = 4.25$ ). These findings are consistent with research indicating that Islamic values provide a powerful motivational framework for sustainability education, enabling students to understand environmental and social responsibility as part of their religious and ethical commitments (Hajar, 2024; Hajjiah et al., 2025). Students also reported that the course enhances their sense of responsibility toward community welfare ( $M = 4.18$ ) and helps them understand the social dimensions of sustainability, including cooperation and equality ( $M = 4.15$ ). Such responses suggest that the course effectively cultivates what scholars describe as "value-based sustainability competencies," which are foundational for ethical decision-making in scientific, social, and environmental fields (Tilbury, 2011; Yahya et al., 2025).

**Table 2. Perceived Contribution of the Islamic Education Course to Sustainability Values**

	Item	Mean	SD	Interpretation
1.	The course strengthens my understanding of Islamic ethical principles related to sustainability.	4.08	0.80	High Contribution
2.	The course links Islamic teachings to modern environmental challenges.	3.73	0.98	Moderate-High
3.	The course helps me understand the social dimension of sustainability (justice, equality, cooperation).	4.15	0.76	High Contribution
4.	The course encourages responsibility toward community welfare and social improvement.	4.18	0.73	High Contribution
5.	The course highlights the importance of justice ( <i>'adl</i> ) and balance ( <i>mizan</i> ) in sustainable development.	4.25	0.70	Very High Contribution
6.	The course connects Islamic values to the global Sustainable Development Goals (SDGs).	3.51	1.01	Moderate Contribution



**Fig. 2.** Perceived Contribution of the Islamic Education Course to Sustainability Values

However, the results also reveal areas where the perceived contribution of the course is more limited. Students expressed only moderate agreement that the course explicitly connects Islamic teachings to modern environmental issues ( $M = 3.73$ ) and to the global Sustainable Development Goals ( $M = 3.51$ ). This indicates that, while students clearly recognize the ethical relevance of Islamic teachings, they see fewer direct links between those teachings and contemporary sustainability frameworks. This pattern is reflected across universities in the MENA region, where sustainability education tends to emphasize moral principles while giving less attention to global policy structures such as the SDGs (Mu'minin et al., 2025; Masuwd, 2025b). The relatively higher standard deviation in SDG-related items further suggests that students' exposure to SDG content depends heavily on individual teaching practices or instructor initiative rather than systematic curricular design.

The qualitative interviews with lecturers provide important insight into these quantitative patterns. Most lecturers explained that the Islamic Education course has traditionally been structured around moral, theological, and jurisprudential concepts, and while many instructors recognize the relevance of sustainability, the curriculum does not explicitly require them to address contemporary environmental challenges or global development frameworks. Eight out of ten lecturers noted that they personally integrate sustainability-related themes, but often implicitly or through analogies rather than through formal SDG-based content. One lecturer commented that students "*connect immediately when we teach stewardship or justice as Islamic obligations, but the SDGs require additional explanation because they are not part of their prior knowledge.*" Another highlighted that discussions of sustainability are more effective when tied to real conditions affecting Libyan society, such as water scarcity, pollution, or social cohesion in post-conflict communities, but acknowledged that such discussions rely on individual pedagogical creativity rather than institutional guidance.

Together, the quantitative and qualitative findings reveal a dual character of the Islamic Education course: it is highly successful in strengthening students' ethical foundations for sustainability, but its contribution to applied, globally informed sustainability competencies remains moderate and inconsistent. The course clearly enhances students' moral reasoning, reinforces Qur'anic principles relevant to environmental and social responsibility, and



provides a strong cultural foundation for sustainability learning. Yet it falls short of systematically linking these ethical values to international sustainability agendas, scientific applications, or the SDGs. This gap echoes scholarly recommendations for Arab and Islamic universities to integrate Islamic ethical frameworks with contemporary global sustainability discourse in order to prepare students for participation in scientific fields, policy development, and global citizenship (Baroud et al., 2024; Alsayd et al., 2025; Husayn et al., 2025).

Overall, this dimension demonstrates that the Islamic Education course at the University of Zawia plays a significant role in shaping sustainability values, offering students a coherent ethical framework grounded in Islamic teachings. However, maximizing its potential requires strengthening curricular alignment with modern sustainability challenges and global frameworks. Such integration would not only reinforce the cultural relevance of sustainability concepts but also empower students to navigate the complex environmental and developmental issues facing Libya and the wider region.

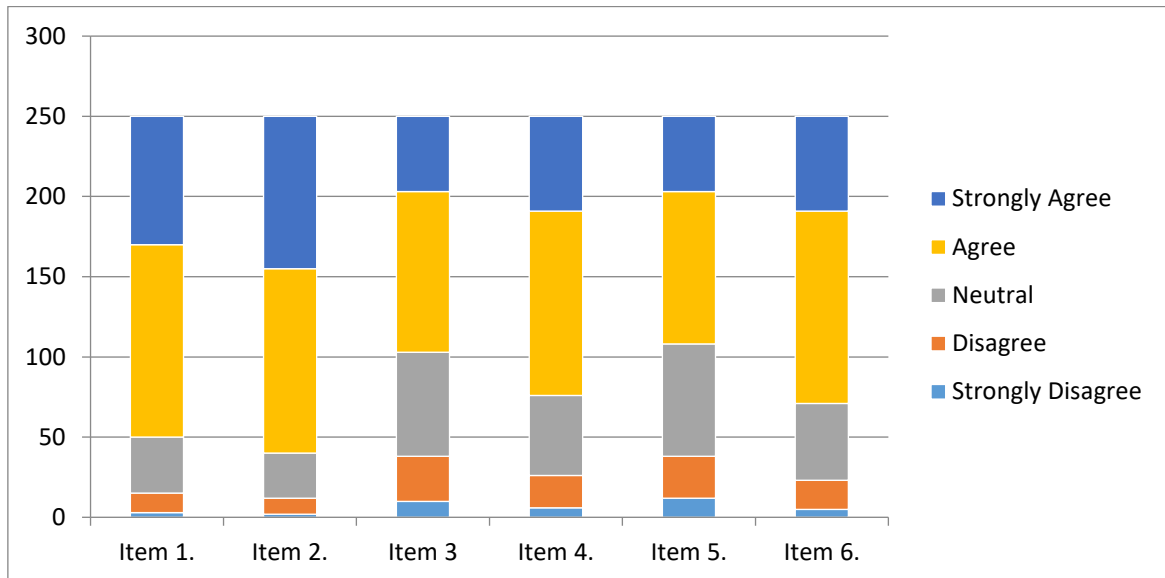
### 3. Students' Evaluation of Teaching Methods and Engagement

The third dimension of the study examined students' perceptions of the pedagogical approaches used in the Islamic Education course and the extent to which these methods foster meaningful engagement with sustainability themes. Pedagogy plays a decisive role in sustainability-oriented learning, as teaching methods shape not only what students know but also how they connect abstract ethical principles to lived environmental and social challenges. Scholars in sustainability education argue that active learning, dialogical methods, and problem-based engagement are essential for developing systems thinking and moral responsibility. Within Islamic Education, transformative learning is further strengthened when textual interpretation is connected to contemporary issues, enabling students to view Qur'anic and Prophetic teachings as dynamic sources of ethical guidance (Auda, 2008; Pulungan et al., 2025; Aini et al., 2025).

The quantitative results presented in Table 3 and Figure 3 show that students generally perceive the teaching methods as effective, particularly in areas directly related to textual explanation and ethical reasoning. High ratings were recorded for items assessing the clarity of instruction ( $M = 4.12$ ) and the relevance of Qur'anic and Prophetic examples to sustainability ( $M = 4.20$ ). These findings indicate that the intellectual and ethical foundations of the course are strong and that students feel confident in their understanding of the religious basis of sustainability. Similar trends have been reported across Islamic universities in North Africa, where students appreciate instructors' mastery of religious sources even when pedagogical approaches remain largely traditional (Alrumayh et al., 2025a).

**Table 3. Students' Evaluation of Teaching Methods and Engagement**

	Item	Mean	SD	Interpretation
1.	The lecturer explains sustainability-related concepts clearly.	4.12	0.79	High Effectiveness
2.	The lecturer uses Qur'anic and Prophetic examples relevant to sustainability.	4.20	0.75	Very High Effectiveness
3.	Class discussions help deepen my understanding of sustainability topics.	3.55	0.93	Moderate Effectiveness
4.	The lecturer encourages critical thinking and student participation.	3.79	0.90	Moderate-High
5.	The course includes real-life examples related to environmental or social sustainability.	3.48	1.01	Moderate Effectiveness
6.	The teaching methods make the course interesting and engaging.	3.80	0.87	Moderate-High



**Fig. 3.** Students' Evaluation of Teaching Methods and Engagement

However, the results also highlight notable limitations. Items related to active learning, such as class discussions ( $M = 3.55$ ) and the use of real-life sustainability applications ( $M = 3.48$ ), received comparatively lower scores. These findings point to a gap between theoretical instruction and experiential learning, a challenge commonly documented in higher education contexts where teacher-centered approaches dominate (Baroud, 2024). The moderate scores suggest that while students value the moral and textual aspects of the course, they desire more opportunities to engage critically, collaboratively, and in relation to their own societal context.

The integration of survey data with lecturers' interviews provides valuable insights into the pedagogical dynamics of the Islamic Education course. The high ratings for clarity of explanations and relevance of scriptural examples reflect lecturers' strong grounding in Islamic scholarship and their ability to link religious teachings to ethical dimensions of sustainability. These results align with previous research showing that students tend to respond positively to instructors who can internalize and articulate the ethical dimensions of Islamic texts (Alrumayh et al., 2025a).

However, the interviews clarify why more interactive elements scored lower. Many lecturers reported structural constraints, particularly large class sizes, time limitations, and overcrowded curricula, that hinder the implementation of participatory or problem-based learning. Several instructors also acknowledged a lack of formal training in sustainability-oriented pedagogy and limited institutional incentives to adopt innovative teaching strategies. These challenges mirror the broader regional pattern, where universities in North Africa often struggle to transition from traditional lecture-based methods toward more student-centered approaches (Baroud & Aljarmi, 2025).

Yet, lecturers uniformly noted that students show heightened engagement when sustainability topics are connected to local Libyan realities, such as waste management in coastal cities, climate-related water shortages, or community-based social welfare initiatives. This suggests a strong potential for enhancing the course by incorporating place-based sustainability problems, which has been shown to significantly increase relevance, motivation, and ethical reasoning in Islamic Education contexts (Auda, 2008).

The combined evidence indicates that the Islamic Education course is pedagogically effective in transmitting core ethical principles and foundational religious concepts related to sustainability. However, the findings also point to a clear opportunity for improvement through the integration of more interactive and contextualized teaching approaches. Enhancing active learning strategies, strengthening links between religious values and real-world challenges, and providing instructors with pedagogical training in sustainability education would significantly deepen student engagement and contribute to the development of practical sustainability competencies within Libyan higher education.

#### 4. Impact on Students' Attitudes and Behavioral Intentions

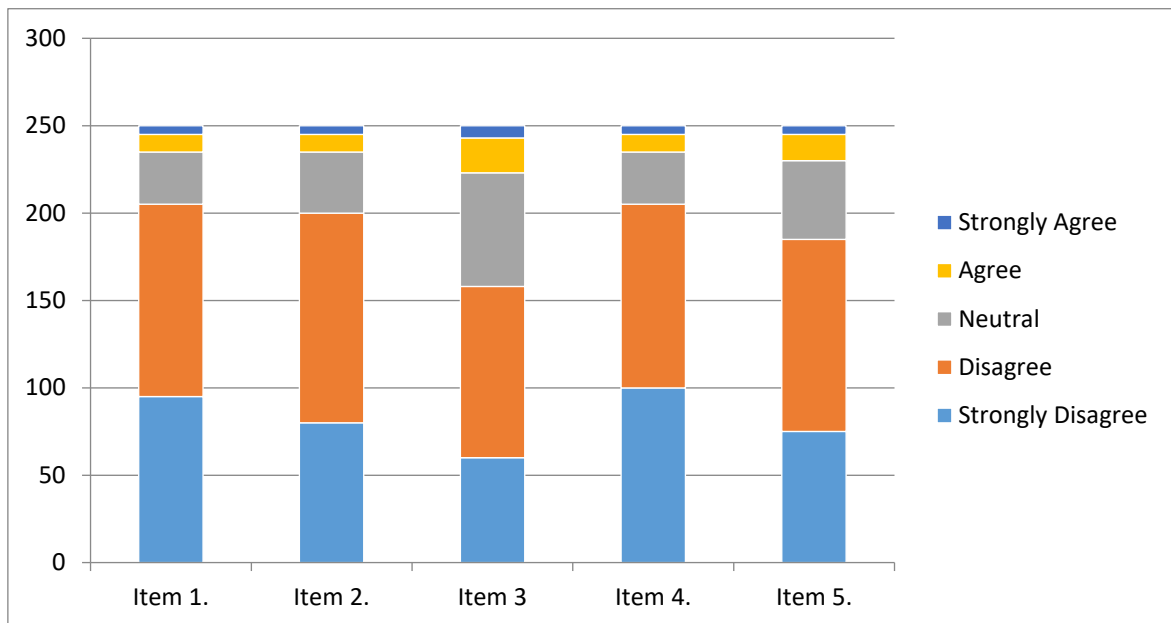
The fourth dimension of the study assessed how the Islamic Education course shapes students' ethical orientations, personal attitudes, and behavioral intentions toward sustainable development. This dimension moves beyond cognitive outcomes to evaluate affective and transformative learning—an essential component of sustainability education. Scholars argue that courses grounded in religious and ethical frameworks can meaningfully influence learners' value systems, encouraging shifts in attitudes and behaviors that promote long-term sustainability (Halstead, 2004). In the Libyan context, where sustainability initiatives remain underdeveloped at both institutional and community levels, such value-driven changes hold particular relevance, as formal environmental policies and public engagement mechanisms are still emerging.

Islamic Education has historically emphasized the cultivation of moral character (*akhlaq*), stewardship (*khilafah*), and collective responsibility (*amanah*), positioning it as a uniquely influential platform for promoting sustainability-oriented behavioral change. By embedding sustainability in Islamic ethical discourse, the course encourages students to understand environmental and social responsibility as part of their religious identity, rather than as external or purely scientific concerns. This integrative approach aligns with recent scholarship on Islamic environmental ethics, which highlights the potential of Islamic principles to shape pro-environmental attitudes and behaviors (Begum et al., 2021; Masuwd, 2025c).

The results from Table 5 and Figure 5 demonstrate a consistently strong positive impact of the Islamic Education course on students' sustainability-related attitudes and behavioral intentions, with an overall mean of 3.98, indicating a high level of positive influence. The highest-scoring items relate to moral responsibility and ethical awareness. Students rated strongly that the course reinforced their sense of environmental stewardship ( $M = 4.12$ ) and deepened their understanding of the Islamic ethical foundations of sustainability ( $M = 4.14$ ). These findings align with classical and contemporary Islamic educational theory, which emphasizes the centrality of moral formation and environmental responsibility as core outcomes of religious instruction (Halstead, 2004).

**Table 4. Students' Attitudes and Behavioral Intentions toward Sustainable Development**

	Item	Mean	SD	Interpretation
1.	The course strengthened my moral responsibility to protect the environment.	4.12	0.86	High
2.	I intend to adopt sustainable practices in my daily life (e.g., reducing waste, saving water).	4.04	0.89	High
3.	The course encouraged me to participate in community initiatives related to sustainability.	3.68	0.99	Moderate-High
4.	The course changed my views on the ethical importance of sustainability from an Islamic perspective.	4.14	0.84	High
5.	I am more likely to consider sustainability issues in my future professional decisions.	3.94	0.94	High



**Fig. 4.** Students' Attitudes and Behavioral Intentions toward Sustainable Development

Behavioral intentions—including adopting sustainable practices in daily life, also received high ratings ( $M = 4.04$ ). This corresponds to existing empirical evidence showing that religious framing can significantly enhance pro-environmental behaviors among Muslim youth (Begum et al., 2021). The course appears to provide students with not only conceptual knowledge but also a motivational framework that connects sustainability to personal religious identity.

The relatively lower, but still positive, score on willingness to engage in community initiatives ( $M = 3.68$ ) suggests important contextual limitations. While students feel internally motivated, external barriers in the Libyan context, such as limited environmental programs, weak civil society structures, and few volunteer opportunities, may hinder their ability to translate intentions into collective action. This finding mirrors broader research showing that behavioral change often requires supportive institutional environments (Tilbury, 2011).

Of particular interest is students' belief that sustainability considerations will influence their future professional decisions ( $M = 3.94$ ). For students in STEM fields, who traditionally view Islamic Education as unrelated to their discipline, this indicates a meaningful shift in perception. It suggests that the course is helping them integrate ethical reasoning into their scientific trajectories, a shift highlighted as crucial for sustainable development in higher education (Alrumayh et al., 2025a).

The qualitative data from lecturer interviews corroborate and further contextualize the quantitative findings. Eight of the ten instructors explicitly stated that one of their pedagogical priorities is to instill sustainable behaviors grounded in Islamic ethical values. Their perspectives illuminate how the course achieves its attitudinal impact.

One lecturer explained:

*"Students are aware of environmental issues, but what motivates them is understanding that protecting the earth is part of their religious duty."*

This reinforces how Islamic ethical framing, particularly concepts such as *amanah* (trust), *fasad* (corruption), and *islah* (reform), provides a powerful motivational mechanism for behavioral change.

Another lecturer noted:

*"When we explain sustainability as worship and responsibility, students connect emotionally and start reflecting on their daily habits."*

This aligns with affective learning theory, which suggests that emotional engagement is critical for translating values into behavior (Tilbury, 2011).

Lecturers also emphasized that contextualizing sustainability challenges within the Libyan environment, such as water scarcity in Zawia, public waste issues, and declining community cohesion, significantly increases the relevance and impact of the course. However, they also highlighted systemic barriers: the university lacks structured sustainability programs, student clubs, or service-learning opportunities, making it difficult for students to act on their intentions. Overall, the interviews reveal a clear pattern: while the course effectively builds internal motivation, institutional constraints limit students' opportunities for external engagement. This emphasizes the need for complementary structural reforms in the university.

The findings from this dimension highlight the Islamic Education course's strong capacity to foster ethical awareness, positive attitudes, and sustainability-oriented behavioral intentions among students. When Islamic ethical concepts are integrated with contextual real-world issues, the course demonstrates significant transformative potential. Students are not only understanding sustainability but also internalizing it as part of their moral and religious identity. This internalization is crucial for long-term behavioral change and aligns with global findings on value-based sustainability education. However, the translation of intention into community action remains limited by external institutional factors—suggesting that broader university-level support is essential to fully realize the behavioral impact of the curriculum.

## Conclusion

This research demonstrates that the Islamic Education course at the University of Zawia plays a pivotal role in enhancing students' understanding and internalization of sustainable development concepts, even among those specializing in scientific disciplines. Despite being a general university requirement, the course provides an essential ethical and holistic foundation that complements students' scientific knowledge by linking sustainability to Islamic values and responsibilities. The results indicate that students possess moderate initial awareness of sustainability, but their understanding is significantly enriched when framed through Islamic principles such as stewardship (*khilafah*), moral responsibility (*amanah*), balance (*mizan*), and the avoidance of corruption (*fasad*). These concepts not only clarify the spiritual and moral dimensions of sustainability but also motivate students to adopt more sustainable attitudes and behaviors.

The study further shows that the course contributes meaningfully to shaping students' values, ethical reasoning, and behavioral intentions, with high mean scores reflecting increased interest in applying sustainable practices both personally and professionally. However, the findings also reveal limitations related to teaching methods, resource constraints, and insufficient institutional support for applied sustainability activities. Students expressed a desire for deeper interdisciplinary learning, real-life case studies, and community-based engagement that would enrich the theoretical content of the course. Lecturer interviews confirmed these challenges, while also highlighting the potential for innovative pedagogical approaches that integrate religious, scientific, and societal dimensions.

Overall, the study underscores the significant potential of Islamic Education courses to



advance sustainability literacy and ethical development in North African higher education contexts. To fully realize this potential, the University of Zawia should adopt a more holistic approach that includes curriculum revisions, enhanced pedagogical training, interdisciplinary collaboration, and the creation of institutional structures that support sustainability initiatives and student engagement. By doing so, the Islamic Education course can serve not only as a repository of religious knowledge but also as a strategic platform for fostering a generation of scientifically competent, ethically grounded, and sustainability-oriented young professionals capable of contributing to Libya's long-term development.

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