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**To cite this article:** Janith Iddawala, Mohamed Shaja Mohamed Musthaffa & Chandima Gayan Yapa (2025) Do higher education institutes lay a foundation for sustainability education? Perspectives from tourism and hospitality undergraduates, *Research in Hospitality Management*, 15:3, 267-280, DOI: [10.1080/22243534.2025.2582322](https://doi.org/10.1080/22243534.2025.2582322)

**To link to this article:** <https://doi.org/10.1080/22243534.2025.2582322>



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Published online: 12 Dec 2025.



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# Do higher education institutes lay a foundation for sustainability education? Perspectives from tourism and hospitality undergraduates

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**ABSTRACT:** Education for sustainable development has transformed from a discretionary to an essential element of consideration in higher education institutes. Nonetheless, limited attempts have been made to uncover the effectiveness and importance of such efforts in research scholarship, particularly in the Sri Lankan context. Hence, this article attempts to systematically evaluate the effectiveness and importance of incorporating dedicated sustainability-centric pedagogical interventions. This study collected data from 151 tourism and hospitality undergraduates at a higher education institute in Sri Lanka using a concurrent embedded mixed-methods approach. The findings of the study reveal that the extent of sustainability and sustainable tourism knowledge among undergraduates cannot be solely attributed to a dedicated sustainability module. However, students with higher general sustainability knowledge also demonstrated greater sustainable tourism-specific knowledge. Additionally, tourism and hospitality undergraduates perceived learning about sustainability as highly important and held high expectations from higher education institutes to act as principal educators in sustainability considerations.

**KEYWORDS:** education for sustainability, mixed methods research, sustainability pedagogy, tourism education

## Introduction

Since the inception of the sustainability concept, its advocates have earmarked the higher education sector to play an essential and influential role in driving the sustainability agenda globally (Lozano et al., 2013; Žalėnienė & Pereira, 2021). As a sector with an inherent focus on increasing knowledge, skills, awareness and values, the advent of the sustainability concept led to the emergence of education for sustainable development (ESD) in higher education institutes (HEIs), underpinning their commitment to achieving sustainability (Alshuwaikhat et al., 2016; Pauw et al., 2015). Over the years, the implementation and embedding of education for sustainable development in HEI curricula have continued to proliferate, with the higher education sector realising the mandatory role it should play in driving knowledge and value transitions among students to solve global sustainability issues (Boca & Saraçlı, 2019; Crawford & Cifuentes-Faura, 2022).

The importance of ESD has attracted notable interest from the tourism industry in recent years (Akinci et al., 2018). Sustainable development remains a vital consideration for the progression of tourism due to its numerous positive and negative economic, environmental and sociocultural impacts (Mowforth & Munt, 2015). As a result, sustainability has been emerging as an essential skill that employers are demanding from contemporary

tourism and hospitality graduates (Rawlinson & Dewhurst, 2013). Hence, sustainability concepts have become crucial components embedded in tourism and hospitality degree programmes to facilitate sustainability knowledge and skills development, with the underlying aim of developing the tourism industry sustainably (Paris, 2016).

As the importance of sustainable tourism continues to grow exponentially, particularly across Asian countries, a growing body of regional literature has emerged, examining various aspects of ESD interventions in tourism and hospitality programmes offered by HEIs (Berjokzina & Melanthiou, 2021; Shafieieh et al., 2024; Tavitiyaman & Zhang, 2022). However, Sri Lanka remains a notable outlier in the region, with scant attempts being made to explore ESD interventions adopted by the country's HEIs that focus on delivering tourism and hospitality-related educational offerings. This is a significant omission, considering Sri Lanka's positioning as an emerging tourism destination that urgently requires a workforce of tourism professionals equipped with sustainability competencies (Adikaram & Surangi, 2024; Iddawala et al., 2024; Kumar & Stauvermann, 2023; Perera et al., 2023).

Hence, this study aims to address this critical gap by uncovering the importance and effectiveness of incorporating dedicated ESD interventions at HEIs from the perspective of tourism and hospitality undergraduates at a leading HEI in Sri Lanka. The overall objectives of this study are twofold.

The current ESD scholarship rarely takes rigorous test-based approaches to test the association of ESD interventions in uplifting student knowledge. As Farsari (2022) argues, the lack of such objective evaluations of dedicated ESD interventions by HEIs could hinder the effective assessment of whether tourism and hospitality undergraduates are gaining the needed sustainability knowledge through such interventions. Hence, this article firstly focuses on systematically evaluating the association between incorporating a dedicated sustainability-centric pedagogical intervention and tourism and hospitality undergraduates' sustainability knowledge through a test-based approach focusing on students who had completed a dedicated ESD intervention at an HEI in Sri Lanka.

Moreover, the current ESD scholarship takes an institution- and teacher-centric approach to preconceive ESD as an important aspect that should be incorporated in student curricula. Hence, there is a significant lack of tourism and hospitality undergraduate-centred studies that explore the intersection of tourism education, sustainability and student voices, as the majority of the existing literature focuses on institutional or educator perspectives, or adopts a blended approach involving both academic staff and students (Chen et al., 2022; McGrath et al., 2020; Mínguez et al., 2021). Therefore, as the second objective, this study focuses on assessing the perceived importance of engaging in sustainability education at HEIs from the typically under-represented viewpoint of tourism and hospitality undergraduates. Overall, this study intends to assist in bridging the gap between institutional intent and tourism and hospitality undergraduates' experience, offering insights that can assist curriculum development, teaching practices and policymaking based on the context of a Sri Lankan HEI focusing on tourism and hospitality education.

## Literature review

### *Education for sustainable development (ESD) in HEIs*

Crawford and Cifuentes-Faura (2022, p. 1) define ESD as "the practice of embedding educational practices that enable sustainable knowledge development in discipline contexts". ESD primarily aims to develop students' sustainability competencies by educating them to address environmental, social and economic issues, leading to an overall improvement of the broader society (Fuertes-Camacho et al., 2019; Hinduja et al., 2023; Zwolinska et al., 2022). Globally, HEIs have introduced novel approaches to developing and delivering ESD (Wals, 2014). While such approaches remain unique from one institution to another, the prominent methods of ESD adaptation at HEIs can be broadly categorised into three approaches: (1) designing sustainability-specific modules; (2) designing sustainability-specific courses or programmes; and (3) incorporating sustainability pedagogies into existing disciplinary courses (Rajabifard et al., 2021). However, Annan-Diab and Molinari (2017) propose an alternative suggestion for ESD, taking an interdisciplinary approach by combining sustainability-related modules with other disciplines to encourage the delivery of a more integrated and practical understanding of sustainability.

Even from a tourism perspective, developing sustainability knowledge and skills through ESD has become a crucial consideration (Paris, 2016). When assessing the existing practices of embedding sustainability in tourism curricula, the recurrent observable theme is for HEIs to introduce sustainable

pedagogies interlinked with the tourism and hospitality domain specialisation, either through dedicated modules such as *planning for sustainable tourism*, or *sociocultural impacts of tourism*, or dedicated majors such as *eco-tourism* (Boley, 2011; Millar et al., 2012; Zizka, 2022). While this approach has merits, Argento et al. (2020) argue that the focus should also be directed towards teaching sustainability at an introductory level in a transdisciplinary manner to increase the competence and subject consensus among tourism graduates.

### *Critical considerations for ESD intervention implementation: A theoretical overview*

The existing scholarship suggests that academics face numerous challenges in embedding ESD interventions across tourism curricula due to the relative complexity of the sustainability concept and perceptual differences among tourism stakeholders regarding sustainability (Boley, 2011; Phi & Waldesten, 2021). Resonating with the above, Mínguez et al. (2021) argue that some tourism programmes not only fail to deliver a "value-based education" concerning sustainable tourism, but also fail to transfer the practical skills required to implement sustainability, highlighting the transmissive nature of delivery of the contemporary sustainable tourism-centric programmes offered through HEIs. Nonetheless, several seminal theories associated with the broader ESD context present critical considerations that can lay a pathway towards a more seamless integration of ESD in HEI curricula. For instance, Barkathunnisha et al. (2017) postulate that transmissive pedagogical approaches to higher education with the intention of imposing an "accepted knowledge" should no longer be considered as viable in tourism education, particularly to address complex knowledge domains such as sustainable development.

Tourism academics need to re-evaluate their ongoing courses and ensure the delivery of holistic ESD interventions that meet the expectations of the contemporary tourism industry (Zhang & Tavitiyaman, 2022). Therefore, it is idealised that ESD interventions in tourism education should adopt a transformative approach that leverages experiential learning methods to facilitate critical reflection and systems thinking among tourism and hospitality undergraduates (Cotterell et al., 2019; Gaard et al., 2017). Accordingly, the transformative learning theory is identified as a positive stimulus for the development of ESD pedagogy. Transformative learning in ESD has become an emergent field of inquiry that supports theoretical production as well as teaching and learning practices towards sustainability (Rodríguez Aboytes & Barth, 2020). Transformative ESD interventions could assist in the development of ecological responsibility, cultural sensitivity and ethical decision-making competencies among tourism and hospitality undergraduates while preparing them to meet the diverse challenges in contemporary working environments. Furthermore, the critical pedagogy theory stipulates that ESD interventions must go beyond focusing merely on human well-being, and provide pathways for students to develop skills such as reflexivity, ethical responsiveness, critique and social engagement, while enabling the recognition of the need for sustaining non-human species and the broader environment (Kearins & Springett, 2003; Kopnina, 2020). It reiterates that ESD interventions should not be reduced to mere content-transmission exercises, but rather should empower students to think critically and thereby enact social change (Reffhaug & Lysgaard, 2024). In the contemporary

context, a design-based education approach provides an ideal foundation to integrate these theories when developing ESD interventions by prioritising a learner-oriented model of teaching and learning, while enabling tourism and hospitality undergraduates to develop the skills and capacities required to cope with the complexities of a real, dynamic and rapidly changing world (Assen et al., 2021).

### *Effectiveness of ESD at HEIs*

Effectiveness of ESD is an umbrella term that encapsulates the three learning outcome domains: knowledge, attitude and practice (Al-Nuaimi & Al-Ghamdi, 2022). The degree of sustainability knowledge provision through ESD is perceived as a vital metric in measuring the success of ESD initiatives (Vicente-Molina et al., 2013). Previous research suggests that the knowledge domain influences a student's sustainability consciousness and leads towards positive attitude and behavioural changes towards sustainability conceptions (Fisher & McAdams, 2015; Hinduja et al., 2023). Hence, this research focuses on assessing ESD's effectiveness purely from a knowledge domain perspective.

Several studies in ESD literature have focused on the effectiveness of engaging in ESD at HEIs from a knowledge domain perspective. Nonetheless, Redman et al. (2021) postulate that most current sustainability knowledge-related studies adopt scaled self-assessment approaches for research. Despite their popularity, self-assessment tools are often critiqued for their lack of robustness, reliability and validity in measuring sustainability competencies. Conversely, only a handful of studies adopt rigorous test-based approaches to examine sustainability knowledge competencies, especially in the contexts of HEIs (Redman et al., 2021). For instance, a study by Bahae et al. (2014) measured Iranian students' knowledge of various aspects of the sustainable development paradigm by comparing students who had and had not received ESD. In this study, respondents who had received ESD at HEIs showed more knowledge of certain sustainability concepts than students with no or less ESD experience at the university level. Additionally, Zwickle et al. (2014) developed a 16-question tool embedding all triple bottom-line considerations to quantitatively measure sustainability knowledge among college and university students. Meanwhile, Kuehl et al. (2023) developed a 46-item questionnaire to analyse sustainability knowledge among university students in the USA. The student respondents from Zwickle et al. (2014) and Kuehl et al. (2023) averaged 69% and 72% respectively on the sustainability knowledge competency tests, showcasing the positive effectiveness of ESD initiatives of HEIs in enhancing the sustainability knowledge of the students. Additionally, studies by Leiva-Brondo et al. (2022) and Zamora-Polo et al. (2019) focused on uncovering Spanish students' knowledge levels concerning sustainability and Sustainable Development Goals (SDGs) knowledge. The study by Leiva-Brondo et al. (2022), which focused on assessing sustainability literacy and perceptions towards SDGs, showcased moderate sustainability knowledge levels and low SDG knowledge levels among the undergraduates of the sampled Spanish university, despite the respective university taking notable strides towards enhancing the sustainability and SDG knowledge base of its students. Similarly, a study by Zamora-Polo et al. (2019) also identified SDG knowledge among undergraduates as low, while

signalling the consistency of SDG unawareness between Spanish undergraduates and the general Spanish population.

Despite the plurality of research from a general HEI student perspective, only a handful of research studies have focused on the effectiveness of ESD from tourism student perspectives. For instance, a self-administered questionnaire study conducted by Chawla and Manhas (2015) uncovered positive perceptions regarding learning about sustainability among hospitality students based in India. The study further indicated that ESD is most effective when it is fully integrated into all aspects of the hospitality curriculum, or serves as a comprehensive framework within which hospitality management courses are designed and delivered. Moreover, Camargo and Gretzel (2017) adopted a self-assessment approach to empirically assess tourism students' knowledge and feelings towards sustainability and sustainable tourism in Latin American universities. The study findings uncovered that university students' knowledge of sustainable tourism was mostly limited to the environmental dimension. A study by Hales and Jennings (2017) leveraged a sustainable tourism-specific module to compare pre- and post-course conceptions regarding sustainable tourism. The study findings showcased a positive relationship between introducing ESD interventions and tourism students' sustainability knowledge, with the students showcasing a deeper understanding of sustainability at the end of the module. The current scholarship on the effectiveness of ESD, both from broad and tourism-specific perspectives, indicates mixed results, with ESD efforts of HEIs having high and low influences on student sustainability knowledge.

### *Importance of ESD at HEIs*

The relative importance of practising ESD is held to a higher ideal at HEIs due to the pivotal role of university students as future change-makers (Vicente-Molina et al., 2013). The importance of committing to ESD at HEIs rests on several factors. Firstly, ESD is recognised for its ability to provide students with sustainability knowledge and skills that can ultimately benefit the students, their employers and the broader society (Khalil et al., 2013; Weybrecht, 2021). Secondly, ESD raises awareness regarding growing global challenges that will likely impact future generations, and proposes sustainable approaches to meet these challenges (Boca & Saraçlı, 2019; Zwolinska et al., 2022). Thirdly, ESD acts as a driver of attitudinal and behavioural change capable of influencing the pro-sustainable behaviour of students (Biasutti, 2015; Vicente-Molina et al., 2013). For instance, Leite (2022) highlights that integrating the Sustainable Development Goals (SDGs), a globally recognised reference point for sustainable development, in curricula could influence critical citizenship skills while maintaining a consistent standard. Moreover, transformative ESD approaches can serve as a vital bridge in linking students' world views with the sustainable paradigm, leading towards the creation of more ethically engaged students who align themselves with sustainable practices voluntarily (Marshall, 2025).

Contrary to research on the effectiveness of ESD at HEIs, there have been minimal attempts to assess the importance of ESD from students' perspectives in generic and tourism-specific pedagogical studies. However, a few studies focused on perceptions and attitudes towards sustainability and ESD uncovered several insights regarding student perceptions of the importance of ESD at an HEI level. For instance, a case study

by García-González et al. (2020) focusing on graduate teaching students revealed that students perceived ESD as the leading solution to address contemporary social and environmental problems. Similarly, a study by Sundermann and Fischer (2019) showed that half of multidisciplinary undergraduates in their first year at a German university perceived ESD as relevant for their respective majors and future career progression. Moreover, several studies in tourism scholarship revealed that tourism undergraduates perceived ESD as an important educational consideration. For instance, Camargo and Gretzel (2017) explicitly showcased how tourism undergraduates perceived studying sustainable tourism at HEIs as extremely important. In Hales and Jennings (2017) study, tourism students perceived education as an important facet of sustainable tourism, yet believed that ESD initiatives must be business- and state-centric. A comparative study by Arrobas et al. (2020) showed that tourism students perceived triple-bottom-line centric subjects to be more important than environmental sciences students. The scant ESD scholarship available on student perspectives on the importance of ESD suggests that students perceived ESD as an important consideration.

### Research gaps

The empirical review shows that two critical research gaps persist in current ESD scholarship. First, minimal research attempts have been undertaken to measure how specific ESD pedagogical interventions impact students' sustainability competencies (Alm et al., 2022; Jung et al., 2019). This gap is further exacerbated from a tourism and hospitality perspective due to the minimal ESD knowledge domain research conducted in the area. Addressing this gap, especially by considering tourism and hospitality undergraduates' conceptions towards specific ESD interventions employed by HEIs, remains pivotal to improving the overall effectiveness of such initiatives in the long run (Sundermann & Fischer, 2019). Secondly, scant attempts have been made to uncover student perceptions regarding the importance of implementing dedicated ESD interventions at a HEI level. One of the main factors contributing to this persistent gap is that most existing ESD studies commence with a preconceived ontological assumption of ESD being important, resulting in the vast majority of ESD scholarship focusing on other research areas. Even though it is difficult to argue otherwise, university students in specific contexts may not see ESD with the same degree of importance as desired by ESD educators. Hence, there is a growing need for research to incorporate student perceptions on the importance of ESD at HEIs for the progression of ESD scholarship (Abubakar et al., 2016).

Sustainability is an essential skill and leadership quality that employers demand from contemporary tourism and hospitality graduates (Sheldon et al., 2011). Researchers have argued that students graduating with tourism degrees should possess sustainability knowledge and be prepared to incorporate sustainability learning while working in the industry (Boley, 2011; Deale et al., 2009). Hence, assessing the effectiveness and importance of ESD from a tourism undergraduate perspective provides valuable implications for academia and the tourism industry to gauge and understand a viable way forward to achieve industry-wide sustainable development.

## Methods

### Case description

This study uses a single case study under a concurrent embedded mixed-methods approach to critically investigate the underlying research problem (Corcoran et al., 2004). The single case study approach aligned with the research's purpose of assessing the importance and effectiveness of incorporating dedicated pedagogical ESD interventions, as it enabled us to test and generate theoretical considerations using a relevant case example. Hence, a Sri Lankan HEI that offers ESD through a dedicated module to students reading for an undergraduate degree in event, tourism and hospitality management was selected for this research.

*Introduction to Sustainable Development (ISD)* is a non-credit mandatory module (the module grade does not impact the student's grade point average, yet students must pass the module to complete their degree) offered by the chosen HEI to all its first-year undergraduates across all disciplines. The module was developed in line with global best practices, following a comprehensive cross-faculty consultation, drawing insights from academics representing multidisciplinary knowledge and pedagogical backgrounds (Argento et al., 2020; Sibbel, 2009; Wals, 2014). As a module delivered in the first year, ISD's focus was not to address all the complexities associated with the sustainability concept, but rather to provide a general understanding of sustainability and act as a stepping stone for students to then explore more nuanced aspects of sustainability through discipline-specific modules and activities during later parts of their respective degree programmes (Fisher & McAdams, 2015; Khalil et al., 2013). The logic behind introducing ISD during the first year resonated with past research highlighting the importance of incorporating sustainability studies early in the HEI curriculum to influence students' responsible behaviours (Fisher & McAdams, 2015; Rajaram, 2013).

### Research design

Mixed-methods research enables researchers to explore a range of research questions without being confined to a single approach (Johnson & Onwuegbuzie, 2004). Correspondingly, this study adopted a concurrent embedded mixed-methods strategy where the quantitative method was used as the first and dominant data collection method, while qualitative data was used to support the quantitative results in an in-depth manner (Dewasiri et al., 2018). This approach enabled the provision of a nuanced understanding of tourism and hospitality undergraduates' perspectives on the effectiveness and importance of ESD from a tourism viewpoint while complementing the quantitative findings.

In the context of this research, quantitative and qualitative data were collected simultaneously using a survey instrument consisting of closed and open-ended questions. The survey primarily consisted of two main sections. The first section of the survey was developed as a test to rigorously measure the knowledge domain of the respondents. It consisted of ten multiple-choice questions and two open-ended questions on sustainability and sustainable tourism. An adaptation method was used to develop the knowledge domain questions to ensure their validity and reliability by basing all test questions on previous research questionnaires that had explicitly used test-based approaches for sustainable knowledge

measurement (Camargo & Gretzel, 2017; Kuehl et al., 2023; Leiva-Brondo et al., 2022; Saunders et al., 2023; Zamora-Polo et al., 2019; Zwickle et al., 2014). The second section of the survey consisted of dichotomous questions aimed at assessing ESD's perceived effectiveness and importance from a tourism undergraduate perspective. The respondents were allowed to provide open-ended responses to each of the dichotomous questions if they wanted to elaborate on their answer choices. The underlying reason for allowing open-ended responses to justify the dichotomous question responses stemmed from the belief that open-ended questions enabled respondents to provide crucial personal perceptions, especially regarding the importance of ESD at an HEI level (Neuert et al., 2021). Finally, to enhance the validity, an expert opinion was obtained before the deployment of the survey (Adikaram et al., 2023).

**Population, sample and survey administration**

A controlled physical classroom environment was deemed suitable for conducting the survey, mainly to ensure the reliability of the knowledge domain testing question responses (Hake, 1998). Hence, a convenience sampling method was utilised by factoring in aspects such as student attendance and student willingness to ensure the participation of a sizable sample that met the requirements of the statistical tests and encompassed the parameters of the population (Creswell & Clark, 2018).

At the time of data collection, 307 tourism and hospitality undergraduates across the third-, second- and first-year semesters had completed the ISD module at the HEI. An open invitation was circulated among these tourism and hospitality undergraduates requesting their voluntary participation. The e-mail provided details on the scope of the research and specified a time, date and location for the proposed data collection to ensure that students could make an informed decision regarding their participation. Accordingly, 151 tourism and hospitality undergraduates participated in the specified days of data collection. Once the students were seated in a classroom-style setting, an access link to the survey was shared electronically, enabling them to participate using their mobile phones or computers. The survey clearly articulated the purpose of the research and prompted the respondents to provide their consent and proceed, or voluntarily withdraw from participation (Tulyakul & Meepring, 2020). The respondents were allocated 45 minutes, and a research team member invigilated the process to ensure the students answered the questions independently. The survey automatically recorded all responses anonymously. Such control measures aided in increasing the validity and transparency of the data collection process.

**Data analysis**

The first section of the survey focused on sustainable knowledge testing and was analysed quantitatively by scoring the correct responses to the multiple-choice questions (Kuehl et al., 2023). Additionally, responses to sustainable tourism-related open-ended questions were scored using a definitive analysis system where scores were assigned to each response based on their correctness (González & Sebastián-López, 2022). Accordingly, the responses to the two open-ended questions by the tourism and hospitality undergraduates were compared against the conceptual definition and key concepts related to sustainable tourism derived from the World Tourism Organisation's (WTO) definition of sustainable development of

tourism and the sustainability fields of work proposed by the WTO to ensure the reliability and consistency of evaluation (Camargo & Gretzel, 2017). Subsequently, a correlation analysis was conducted to examine relationships between variables using SPSS software. Firstly, correlation analysis was utilised to explore the association between tourism and hospitality undergraduates' sustainability knowledge and their sustainable tourism knowledge, determined by their respective scores. Another correlation analysis assessed the relationship between sustainability knowledge and the ISD module grades, which they self-reported in the anonymous questionnaire. Furthermore, annual comparisons were conducted to evaluate sustainability knowledge using the one-way ANOVA and Tukey honestly significant difference (HSD) tests.

The second section of the survey, focusing on perceived effectiveness and importance, was subjected to two types of analysis. Firstly, a descriptive statistics analysis was conducted to summarise the Yes/No responses to the dichotomous questions. Secondly, a thematic analysis was employed to identify and analyse recurring themes in the qualitative data generated through the open-ended elaborations that supplemented the respondents' choices in the dichotomous questions. As a part of this approach, a subset of the responses to all open-ended questions was first inductively coded to better understand the respondents' justifications for selecting a Yes/No response for a respective question by two of the authors individually (Clarke & Braun, 2017). Secondly, the individually coded datasets were cross-compared by the two authors to develop a mutually agreed coding frame to apply across the overall dataset. Thirdly, the two authors adopted a collaborative coding approach by leveraging the developed coding frame to develop thematic findings and further supplement the statistical findings (O'Connor & Joffe, 2020).

**Findings**

**Association of ESD – Findings based on the test-based approach**

*Sustainability knowledge*

The association of the ISD module was primarily evaluated by measuring the current sustainability knowledge of the sampled tourism and hospitality undergraduates using a test-based approach. As shown in Table 1, most respondents demonstrated a "Good" level of sustainability knowledge by scoring more than 7 out of 10 on the knowledge test. Approximately 35.8% of respondents fell into the "Average" category, scoring between 4 and 6 points. Conversely, only a small proportion, constituting 6% of the respondents, exhibited poor sustainability knowledge, scoring less than or equal to 3 out of 10.

The mean score attained by the respondents was calculated as 5.89, with a standard deviation of 2.186. These statistical measures suggest a moderately satisfactory level of sustainability knowledge among tourism and hospitality undergraduates who

TABLE 1. Sustainability knowledge retention assessment results

		Frequency	%	Valid %	Cumulative %
Valid	Good	88	58.3	58.3	58.3
	Average	54	35.8	35.8	94.0
	Poor	9	6.0	6.0	100.0
	Total	151	100.0	100.0	

have completed the ISD module. Further, the study investigated sustainability knowledge across different academic years by examining the statistical means of respondents utilising the one-way ANOVA test in Table 2.

The results of the ANOVA test revealed a significant difference among the mean scores of respondents across the three academic years ( $p = 0.036$ ), indicating that at least one year's mean score significantly differed from others in terms of sustainability knowledge. To further elucidate these findings, a post hoc test, specifically the Tukey honestly significant difference (HSD) test, was conducted to compare the academic years.

The results in Table 3 reveal significant mean differences between the scores of tourism and hospitality undergraduates in the first and second years (mean difference = 1.027,  $p = 0.038$ ) and no significant differences between the scores of first- and third-year tourism and hospitality undergraduates and second- and third-year tourism and hospitality undergraduates. Further, examination of the significant mean difference between the first- and second-year tourism and hospitality undergraduates scores suggest higher sustainability knowledge among first-year tourism and hospitality undergraduates. This discrepancy may be attributed to the recency of module completion, with first-year tourism and hospitality undergraduates having completed the module more recently than the second-year students.

#### *Sustainable tourism knowledge*

The study further examined the respondents' sustainable tourism knowledge, as presented in Table 4. The table illustrates the

frequency distribution and percentages of respondents that fall into different categories of sustainable tourism knowledge.

Most respondents demonstrated "Good" sustainable tourism knowledge, scoring 5 or 6 points out of 6, while 31.1% of respondents fell into the "Average" category, having scored 3 or 4 points. Conversely, 29.8% of the respondents exhibited poor sustainable tourism knowledge, scoring 2 or fewer points. Notably, a significant portion in the "Poor" category were still familiarising themselves with tourism modules as they emerged from the first and second years of study. The mean score attained by the respondents was calculated as 3.51, with a standard deviation of 1.963. These statistical measures suggest a moderately satisfactory level of sustainable tourism knowledge among tourism and hospitality undergraduates who have completed the ISD module.

#### *ISD module grade v sustainability knowledge*

The study also cross-examined the tourism and hospitality undergraduates' ISD module grade and their sustainability knowledge by utilising correlation analysis to ascertain the nature and strength of this relationship. As presented in Table 5, the correlation analysis unveiled a weak but statistically significant positive correlation between ISD module results which they self-reported in the anonymous questionnaire and sustainability knowledge ( $r = 0.168$ ,  $p = 0.039$ ,  $n = 151$ ). While this suggests a slight association, the strength of the relationship is low, and the significance is marginal. Therefore, the result does not imply a strong predictive link between academic performance in the ISD module and sustainability knowledge.

TABLE 2. Annual comparison of sustainability knowledge retention one-way ANOVA results

	Sum of squares	df	Mean square	F	Sig.
Between groups	31.447	2	15.723	3.394	0.036
Within groups	685.639	148	4.633		
Total	717.086	150			

TABLE 5. Correlation results—ISD module final grade v sustainability knowledge retention ( $N = 151$ )

		Final grade	Sustainability knowledge
Final grade	Pearson correlation	1	0.168*
	Sig. (2-tailed)		0.039
Sustainability knowledge	Pearson correlation	0.168*	1
	Sig. (2-tailed)	0.039	

\*Correlation is significant at the 0.05 level (2-tailed)

TABLE 3. Multiple comparisons of annual sustainability knowledge retention

(I) Year	(J) Year	Mean difference (I-J)	SE	Sig.	95% confidence interval	
					Lower bound	Upper bound
1	2	1.027*	0.414	0.038	0.05	2.01
	3	0.330	0.558	0.825	-0.99	1.65
2	1	-1.027*	0.414	0.038	-2.01	-0.05
	3	-0.697	0.496	0.340	-1.87	0.48
3	1	-0.330	0.558	0.825	-1.65	0.99
	2	0.697	0.496	0.340	-0.48	1.87

\*The mean difference is significant at the 0.05 level

TABLE 4. Sustainable tourism knowledge assessment results

		Frequency	%	Valid %	Cumulative %
Valid	Good	59	39.1	39.1	39.1
	Average	47	31.1	31.1	70.2
	Poor	45	29.8	29.8	100.0
	Total	151	100.0	100.0	

*ISD module grade v sustainable tourism knowledge*

Consequently, the study investigated the correlation between the final grades of tourism and hospitality undergraduates in the ISD module and their understanding of sustainable tourism concepts (Table 6). The correlation analysis revealed a weak and statistically insignificant association between final grade and sustainable tourism knowledge ( $r = 0.106, p = 0.196, n = 151$ ). This suggests that there is no significant linear relationship between final grades and the tourism and hospitality undergraduates' level of understanding of sustainable tourism.

*Sustainability knowledge v sustainable tourism knowledge*

Finally, the study explored the correlation between sustainability knowledge and sustainable tourism knowledge among participants (Table 7). Correlation analysis revealed a statistically significant moderate positive correlation between sustainability knowledge and sustainable tourism knowledge ( $r = 0.412, p < 0.001, n = 151$ ). This finding indicates a moderate association between the two variables, suggesting that higher levels of sustainability knowledge tend to be associated with higher sustainable tourism knowledge.

TABLE 6. Correlation results—ISD module final grade v sustainable tourism knowledge (N = 151)

		Final grade	Sustainable tourism knowledge
Final grade	Pearson correlation	1	0.106
	Sig. (2-tailed)		0.196
Sustainable tourism knowledge	Pearson correlation	0.106	1
	Sig. (2-tailed)	0.196	

TABLE 7. Correlation results—Sustainability knowledge retention v sustainable tourism knowledge (N = 151)

		Sustainable tourism knowledge	Sustainability knowledge retention
Sustainable tourism knowledge	Pearson correlation	1	0.412**
	Sig. (2-tailed)		<0.001
Sustainability knowledge retention	Pearson correlation	0.412**	1
	Sig. (2-tailed)	<0.001	

\*\*Correlation is significant at the 0.01 level (2-tailed)

TABLE 8. Summary of the thematic analysis findings

Question	Yes (%)	No (%)	No idea (%)
<i>Tourism students' perspectives on the effectiveness of ESD</i>			
1. Do you believe studying a sustainability-specific module alone provides you with the desired knowledge regarding sustainability?	59.6	33.1	7.3
2. Did studying the ISD module make it easier to study about sustainable tourism during the latter parts of your university life?	86.8	8.6	4.6
3. Have you had other opportunities to learn about sustainable tourism in a discipline-specific manner following the ISD module?	54.3	37.1	8.6
4. Have you had opportunities to practice/ implement learnings from the ISD module at the university?	77.5	19.2	3.3
<i>Tourism students' perspectives on the importance of ESD</i>			
1. As a tourism undergraduate, do you believe studying sustainability is important?	98.0	2.0	0.0
2. Do you believe that having studied the ISD module will be beneficial in your future employment endeavours?	94.7	3.3	2.0
3. Do you believe it is important to study sustainability through a dedicated module?	88.7	8.6	2.6
4. Did the module being non-credit have an impact on your perceived importance of the subject?	51.0	43.0	6.0
5. Would you have pursued the ISD module if it were not mandatory?	62.9	28.5	8.6
6. Do you think your HEI has the primary responsibility of teaching sustainability considerations to you?	68.9	24.5	6.6

**The perceived effectiveness and importance of ESD—descriptive and qualitative analysis results**

As shown in Table 8, the analysis of the dichotomous questions showcased that dedicated pedagogical interventions to enhance undergraduate sustainability knowledge are significantly effective. The findings further suggested that tourism and hospitality undergraduates perceive ESD interventions at HEIs as highly important. Moreover, approximately 50% of the respondents elaborated on their choice using open-ended statements. The succeeding sub-sections summarises these qualitative findings using a thematic analysis.

*Tourism and hospitality undergraduates perspectives on the effectiveness of ISD*

When assessing the perceived pedagogical effectiveness of ISD, 59.6% of the respondents believed studying a sustainability-specific module alone provided them with comprehensive knowledge of sustainability. Nearly a third of the respondents did not believe that studying a specific module alone provided the necessary sustainability knowledge. The responses from the tourism and hospitality undergraduates who held this perception suggested that a sustainability-specific module was only adequate in providing foundational sustainability knowledge, and holistic ESD could only be achieved through additional pedagogical interventions throughout the degree programme. However, 86.8% of the tourism and hospitality undergraduates agreed that reading for the ISD module made it easier to study sustainability from a tourism discipline-specific context in subsequent semesters.

*Understanding core principles of sustainability, such as the importance of balancing environmental, social and economic factors, can serve as a solid foundation for exploring specific applications within the tourism industry. Moreover, concepts such as SDG, environmental conservation, community engagement and ethical considerations are highly relevant to sustainable tourism studies* (Respondent 46).

Based on tourism and hospitality undergraduates' perceptions, it is predicted that having background knowledge in sustainable development enhances tourism and hospitality undergraduates' critical thinking capabilities, especially when analysing tourism's impacts on local communities, cultures and environments and exploring strategies for promoting responsible and sustainable tourism practices.

*Tourism and hospitality undergraduates' perceptions of tourism sustainability-specific learning opportunities*

According to the findings, merely 54.3% of respondents had opportunities to pursue sustainable tourism-specific education besides the ISD module. However, most tourism and hospitality undergraduates who had received opportunities to learn about sustainable tourism were from the third year, whereas nearly all tourism and hospitality undergraduates who claimed they had not had opportunities to learn sustainable tourism in a discipline-specific manner came from the first and second years. The tourism and hospitality undergraduates who claimed to have received sustainable tourism-specific education highlighted learning opportunities such as dedicated sustainable tourism modules and undergraduate dissertations in their responses. In contrast to learning opportunities, more tourism and hospitality undergraduates claimed they had opportunities to implement the knowledge gained through the ISD module through a wide array of extracurricular activities, including group projects, awareness programmes, CSR activities and volunteering activities.

*Yes. I had a couple of opportunities to implement what I learned in some sessions and the events. Example - tree planting event organised by the sustainable tourism circle (Respondent 147).*

*Through our sustainable tourism circle, we were able to do some initiatives like a beekeeping project, herbal garden project and also a sustainable tourism awareness programme at ABC College (Respondent 22).*

These sentiments suggest that tourism and hospitality undergraduates passionate about sustainable tourism engaged in discipline-specific projects at the HEI regardless of their year of study.

*Tourism and hospitality undergraduates' perspectives on the importance of ESD*

Nearly all responses indicated that sustainability is an important area of study for tourism and hospitality undergraduates. Many respondents believed that studying sustainability concepts led to a positive change in their responsible behaviour.

*...studying sustainability is crucial for tourism undergraduates. It's essential because it helps us understand how to minimise negative impacts on the environment and local communities while promoting responsible travel practices. By learning about sustainability, we can contribute to a more ethical and sustainable tourism industry for the future (Respondent 24).*

Additionally, several respondents believed tourism's future progression depended on its long-term sustainability commitment. This point of view was further validated by nearly all respondents, who believed that studying sustainability was an important consideration for their future employment prospects. This sentiment was strongly supported by the tourism and hospitality undergraduates holding a common opinion that contemporary tourism organisations were highly focused on sustainability conceptions, and was further validated by final-year tourism and hospitality undergraduates who were already employed in sustainably conscious tourism organisations.

*I think it will be beneficial in future employment endeavours as it demonstrates a commitment to responsible practices. Employers increasingly value*

*individuals who can contribute to sustainable tourism initiatives, making this knowledge highly sought after in the job market (Respondent 151).*

*Yes, I believe having studied sustainability modules will be beneficial for my future employment endeavours as I am currently employed in an organisation that is highly focused on sustainable tourism initiatives and is actively involved in making the Sri Lankan tourism industry much more sustainable through their practices and policies (Respondent 23).*

Interestingly, in addition to their potential contribution as employees, a few tourism and hospitality undergraduates also believed that studying sustainability concepts enabled them to become more conscious and responsible consumers of tourism products.

*Importance of dedicated pedagogical instruments for delivering ESD*

The research findings suggested that tourism and hospitality undergraduates perceived incorporating a dedicated module to teach sustainability as highly important.

*Definitely! Studying a sustainability-specific module can provide valuable knowledge within the sustainability paradigm. It offers a focused approach to understanding sustainability principles, which can be applied across various fields, including tourism (Respondent 24).*

*I feel like studying sustainability through a dedicated module is important as it offers a structured approach to learning key concepts and strategies (Respondent 151).*

The provision of focused and structured learning experiences appeared to be the two most common factors influencing the tourism and hospitality undergraduates' positive perception of studying sustainability through a dedicated module. The respondents had divided sentiments regarding ISD being offered as a non-credit module. Nearly half the respondents mentioned that the module being categorised as non-credit negatively influenced their perception. A common belief among such tourism and hospitality undergraduates was that a non-credit module is perceived as less critical than credit-bearing modules, as it does not directly contribute to academic progress. Nonetheless, several tourism and hospitality undergraduates claimed their perceived importance of the subject remained unmoved because they valued the module's content and learning outcomes.

*No, the fact that the module was non-credit did not impact my perceived importance of the subject. I recognised the value and significance of studying sustainability, regardless of whether it was for credit. The knowledge and understanding gained from the module are what mattered most to me (Respondent 48).*

Similarly, tourism and hospitality undergraduates shared mixed responses regarding pursuing the ISD module if it were not mandatory. A majority of the respondents believed they would have pursued the module regardless of the mandatory status, primarily driven by the perceived importance and their passion for sustainability.

*Oh, definitely! Even if the Introduction to Sustainable Development module weren't mandatory, I would have pursued it willingly. It's a topic that genuinely interests*

*me, and I'm passionate about making a positive impact* (Respondent 48).

*Yes, I would have pursued the ISD module even if it was not mandatory because I recognise the importance of sustainability in various aspects of life and believe it is essential for personal and professional development* (Respondent 138).

Simultaneously, nearly a third of the respondents believed that they would not have pursued ISD, primarily because a lack of awareness and sustainability education before their university life hindered their ability to make an informed decision about the importance of learning about sustainability considerations.

#### *The role of HEIs in ESD*

When asked about the responsibility of delivering ESD, most respondents stated that HEIs hold the primary responsibility. However, several respondents went on to claim that ESD needs to be a shared responsibility distributed among a plurality of stakeholders.

*Just as the university is responsible, I believe that the school is also responsible for our sustainability studies* (Respondent 18).

*I do not think the university has the primary responsibility as this subject should be and will be an essential part of our lives. Hence, the responsibility of teaching these to students should fall on all educational bodies starting from parents to primary/secondary schools to university and even expand up to workplaces* (Respondent 22).

The overarching remarks suggested that ESD must begin at home, continue in schools and HEIs, and expand to workplaces to create an optimal learning experience.

## Discussion

### *The effectiveness of dedicated ESD pedagogical interventions*

This study first assessed the current knowledge of sustainability among tourism and hospitality undergraduates using a test-based approach. The findings indicate that 58.3% of tourism and hospitality undergraduates possess good sustainability knowledge, showcasing a lower cohort average than similar studies conducted in HEIs in developed countries (Kuehl et al., 2023; Zwickle et al., 2014). Similarly, only 39.1% of tourism and hospitality undergraduates displayed commendable levels of sustainable tourism knowledge, in contrast to studies stemming from developed countries (Camargo & Gretzel, 2017; Hales & Jennings, 2017). However, the sustainability knowledge levels of Sri Lankan students emerged either on par or above par with the sustainability knowledge levels of the university students in the Global South, particularly in the Asian and African contexts, where existing studies consistently report low to moderate levels of sustainability knowledge among university students (Chen et al., 2025; He et al., 2011; Sekhar & Raina, 2021). Accordingly, the study acknowledges that Sri Lanka's ESD context is broadly representative of the Global South, potentially due to the continued dominance of teacher-centred pedagogical practices, which is an influence that aligns with trends observed across the Global South. Hence, this study underscores the importance of enhancing sustainability knowledge among students in the

Global South. A critical point of consideration during this process should be to re-evaluate current ESD offerings in the region and ensure they move beyond dominant Western paradigms to meaningfully adapt to the contexts of each country in which they are being implemented (Anapey, 2024; Nilsson Dahlström, 2025).

Furthermore, the correlations between the grades obtained for the ISD module, the current sustainability knowledge and sustainable tourism knowledge revealed weak and insignificant associations, highlighting that sustainability and sustainable tourism knowledge formation among tourism and hospitality undergraduates cannot be purely attributed to a student's success or failure in a general sustainability-centric module. Supplementing the statistical findings, the thematic analysis also highlighted the limitations of achieving ESD outcomes purely through a stand-alone module. On one hand, the emergence of this weak association between the stand-alone module and student knowledge could be attributed to the transmissive nature of its delivery. The ISD module under consideration was a mandatory module taught to all first-year undergraduates across disciplines at the HEI, where knowledge transition was limited to a traditional lecture-based set-up (Gaard et al., 2017). The respective HEI adopts this approach predominantly due to the size of student cohorts and timetabling considerations. While previous research acknowledges the benefits of such approaches in delivering ESD (Argento et al., 2020), the findings of this study allude to the need for incorporating learning approaches that can incentivise genuine change in students. This requirement is particularly evidenced in established theories such as transformative learning and critical pedagogy that highlight the need for embedding real-world reflections through interactive, discussion-based and student-centred methods to challenge students' usual ways of thinking to create deeper transformation among students regarding sustainability conceptions (Cotterell et al., 2019; Mezirow, 1997; Reffhaug & Lysgaard, 2024).

Nonetheless, resonating with the findings of Uleanya et al. (2024), this study acknowledges that incorporating a dedicated sustainability-related module can have a significant influence on university students, especially in the case of HEIs in the Global South, considering the lack of ESD efforts at the primary and secondary education levels in such countries (Akinci et al., 2018; Fuertes-Camacho et al., 2019). However, it is idealised that a concentrated effort, such as the ISD module, needs to be supplemented with sustainability-centric pedagogical interventions incrementally inculcated throughout the educational offering, including sustainable tourism discipline-specific modules and specialisation pathways (Argento et al., 2020; Boley, 2011; Fisher & McAdams, 2015; Millar et al., 2012; Zizka, 2022).

This study also examined sustainable tourism knowledge by tourism and hospitality undergraduates' semester level to determine whether knowledge improves as tourism and hospitality undergraduates progress through their academic programme. The analysis revealed that senior tourism and hospitality undergraduates (i.e. 3rd-years) demonstrated significantly higher sustainable tourism knowledge compared to their junior counterparts. This finding resonates with previous studies in suggesting that cumulative exposure to discipline-specific sustainability education beyond the foundational ISD module contributes to enhanced knowledge acquisition (Maoela et al., 2024). Hence, these results further underscore

the importance of integrating ESD progressively throughout the curriculum to foster deeper understanding and competence in sustainable tourism (Michel & Zwickle, 2021).

Correspondingly, this study indicated that senior tourism and hospitality undergraduates (i.e. 3rd-years) exposed to further sustainable tourism-specific education following the ISD module had better sustainable tourism knowledge than junior tourism and hospitality undergraduates (Michel & Zwickle, 2021). The study also revealed a positive correlation between tourism and hospitality undergraduates' current sustainability knowledge and sustainable tourism knowledge, postulating that undergraduates with commendable sustainability knowledge also tend to possess higher sustainable tourism knowledge. Moreover, this study further asserted the methodological significance of using a test-based approach for sustainability competency measurement (Redman et al., 2021). Using a test-based approach instead of a self-rating approach provided a more accurate picture of sustainability knowledge levels, as self-rating may have garnered different results, especially considering the positive sentiments regarding the effectiveness of ESD interventions shared in open-ended responses.

#### ***The importance of dedicated ESD pedagogical interventions***

The thematic analysis showcased the importance of delivering sustainability education through a dedicated module, substantiating the need for semester-long and focused modules for delivering ESD (Rajaram, 2013). The findings uncovered that learning sustainability was perceived as highly important by tourism and hospitality undergraduates, while also further validating the ideology of gaining sustainability knowledge leading to responsible behaviour from a demand-side perspective (Biasutti, 2015; Vicente-Molina et al., 2013). Importantly, this research provided much-desired evidence to justify HEIs' ESD efforts in the Sri Lankan context by showing that tourism and hospitality undergraduates perceived ESD as an important aspect of their educational experience, aligning with similar sentiments shared by their counterparts in the Global South (Goel et al., 2023; Khalil et al., 2013; Maela et al., 2024). The findings particularly pointed out the tourism and hospitality undergraduates' positive perception of ESD and its positive impact on future employment opportunities. This perception uncovered a highly desirable phenomenon by showcasing that tourism and hospitality undergraduates were willing to pursue ESD, which aligned with contemporary organisations' aspirations for skilled tourism and hospitality undergraduates who advocate for sustainable development to join their workplaces (Alm et al., 2022). However, the mixed responses regarding credit provisioning and the module's mandatory status highlighted the need to consider tourism and hospitality undergraduates' perspectives when integrating ESD interventions. Hence, the study underlines the need for HEIs to circumvent issues such as crowding the curriculum and lack of sustainability awareness to prevent negatively impacting tourism and hospitality undergraduates' interest in ESD (Wilson & von der Heide, 2013). Finally, this research further suggests that the broader responsibility of delivering ESD, especially from a tourism and hospitality undergraduate's perspective, rests on HEIs. Hence, it is idealised that HEIs have a profound and mandatory responsibility to deliver ESD (Sibbel, 2009).

#### ***Implications for tourism- and hospitality-centric ESD reformation in HEIs***

The findings of this research posed several implications for HEIs and future ESD research as shown in the conceptual framework in Figure 1. The framework proposes that HEIs must first integrate a dedicated sustainable development-centric module as an early offering in their respective curricula to lay a foundation for ESD and establish a degree of consistency in sustainability knowledge levels among tourism and hospitality undergraduates. Following this, the HEIs must follow a holistic approach in embedding sustainability considerations in their educational offerings by focusing on designing sustainability-specific modules, incorporating sustainability aspects into generic tourism and hospitality modules and introducing sustainability-specific extra-curricular activities as suggested across pillars 2, 3 and 4 in the conceptual framework (see Figure 1) (Rajabifard et al., 2021).

Accordingly, HEIs must leverage a combination of transformative pedagogical approaches to assist in the delivery of the required sustainability competencies that empower students to critically reflect on their learning and translate it into real-world practice (Melissen & Damen, 2014; Pretorius et al., 2021). For instance, specialised sustainable tourism and hospitality modules suggested in pillar 2 must consider integrating simulations, locally grounded case studies, projects with a deliverable to an organisation, study abroad programmes, short-term training programmes and field visits in their overall educational offerings to showcase sustainability efforts in practice to tourism and hospitality undergraduates (Cornet et al., 2024; Pretorius et al., 2021; Tarrant et al., 2021; Tavitiyaman & Zhang, 2022). Moreover, sustainability considerations should also be embedded in mainstream tourism and hospitality modules to influence tourism and hospitality undergraduates behaviours, particularly when handling the day-to-day operations of the industry. For example, as an industry responsible for high amounts of food wastage, a module focusing on food and beverage operations could also be expanded to reflect on aspects such as waste management while aligning with the sustainable paradigm (Demetriou, 2022; Tavitiyaman & Zhang, 2022). Additionally, as proposed in the 4<sup>th</sup> pillar of engagement, given the highly practical nature of the tourism industry, HEIs' sustainability-centric offerings need to transcend classroom learning and incorporate supplementary opportunities for tourism and hospitality undergraduates to practise their sustainability learning through extra-curricular activities (Uleanya et al., 2024; Weybrecht, 2021). For instance, HEIs must consider establishing student-led sustainable tourism and hospitality-centric action clubs to positively influence pro-sustainable behaviours among tourism and hospitality undergraduates through experiential learning activities that align with sustainability considerations (Papavasileiou et al., 2025).

This study further elucidates that making such notable curriculum reforms needs to be underpinned by several enabling factors. Given the study's findings validating the obligatory role played by HEIs in ESD, it is idealised that HEIs must play a leadership role in making such a paradigm shift in their offerings. Hence, it is essential for senior management teams at HEIs to have a genuine interest in making radical changes to embed sustainability considerations in their offerings more comprehensively (Menon & Suresh, 2022). Furthermore, if an HEI strives towards a holistic ESD offering, it must also invest in

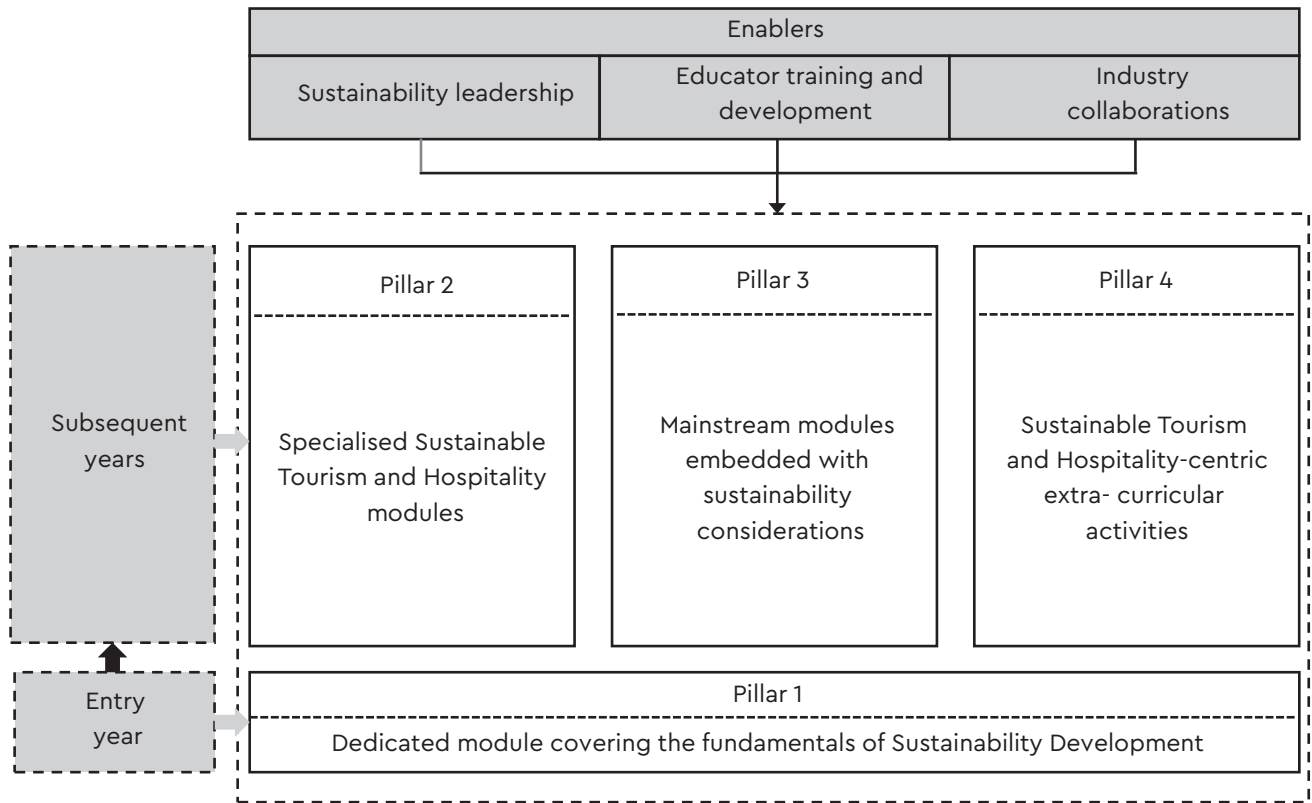


FIGURE 1. Conceptual framework

pedagogical training programmes centred around sustainability for its academics, regardless of their specialisations (Michel & Zwickle, 2021). Sustainability competence development among tourism and hospitality academics, on a rigorous and continuous basis, will enable the institutionalisation of ESD across the entire HEI, leading towards the realisation of the proposed pillars of engagement in this study (Leal Filho et al., 2018; Sammalisto, 2015). Finally, HEIs must also develop effective industry partnerships and work collaboratively in creating internships and industrial training that embed sustainability considerations to allow tourism and hospitality undergraduates to apply their theoretical knowledge in workplace settings (Vermolen, 2025).

### Conclusion

This research attempted to bring a novel perspective to current scholarship by evaluating the association, perceived effectiveness and importance of education for sustainable development at HEIs through the viewpoint of tourism and hospitality undergraduates. The study identified that the single ESD intervention of having a dedicated sustainability module alone does not sufficiently contribute towards the upliftment of sustainability education for tourism and hospitality undergraduates. Yet, such an intervention was deemed highly effective and important from the tourism and hospitality undergraduates' perspective. This perception stemmed from the belief that such dedicated modules at an entry-level enable tourism and hospitality undergraduates to understand the importance of studying sustainability concepts and to facilitate their future sustainability education endeavours. Hence, it is

suggested that HEIs engaged in ESD for tourism and hospitality undergraduates must not only focus on creating dedicated and generalised sustainability pedagogical interventions, but should instead focus on inculcating ESD aspects across the HEI curricula.

### Limitations and directions for future research

While this research provides a comprehensive assessment of ESD's association, perceived importance and effectiveness, it is essential to acknowledge several study limitations. The study hypothesises that a significant positive association between sustainability knowledge and sustainable tourism knowledge is influenced by factors besides HEIs' planned pedagogical interventions, which were unexplored in this research. Future research could identify such factors to better equip tourism and hospitality undergraduates to address global challenges in the tourism industry. Given the cross-sectional design and reliance on correlational analysis, only associations can be discussed rather than effectiveness in the absence of pre- and post-intervention testing or a control group in a test-based approach. It is recommended that future research employ more rigorous and diverse designs, including pre- and post-intervention measures and control groups, to strengthen causal inference and broaden understanding of the effectiveness of ESD interventions from tourism and hospitality undergraduates' perspectives. Moreover, this study focused on a case study approach where tourism and hospitality undergraduate perspectives on ESD were uncovered at a single HEI in Sri Lanka. The study also leveraged a convenience sampling approach, targeting tourism and hospitality undergraduate students from first to third year with varying degrees of exposure to sustainability education, which

the study has showcased to have a notable impact on their level of sustainability knowledge. Hence, future research could focus on more expansive yet purposively selected samples to draw parallels between HEIs in developed and developing country contexts.

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## References

- Abubakar, I. R., Al-Shihri, F. S., & Ahmed, S. M. (2016). Students' assessment of campus sustainability at the University of Dammam, Saudi Arabia. *Sustainability*, 8(1), 59. <https://doi.org/10.3390/su8010059>
- Adikaram, A., Gooneratne, T., & Udunuwara, M. (2023). *Crafting Your Research (Part iv) Writing and Presenting*. Lake House.
- Adikaram, K. K., & Surangi, S. (2024). Creating opportunities in a challenging environment: experiential crisis learning behaviour of tourism SMEs in Sri Lanka. *Cogent Business & Management*, 11(1), 2314803. <https://doi.org/10.1080/23311975.2024.2314803>
- Akinci, Z., Yurcu, G., & Ekin, Y. (2018). Relationships between student personality traits, mobbing, and depression within the context of sustainable tourism education: The case of a faculty of tourism. *Sustainability*, 10(10), 3418. <https://doi.org/10.3390/su10103418>
- Al-Nuaimi, S. R., & Al-Ghamdi, S. G. (2022). Assessment of knowledge, attitude and practice towards sustainability aspects among higher education students in Qatar. *Sustainability*, 14(20), 13149. <https://doi.org/10.3390/su142013149>
- Alm, K., Beery, T. H., Eiblmeier, D., & Fahmy, T. (2022). Students' learning sustainability – implicit, explicit or non-existent: a case study approach on students' key competencies addressing the SDGs in HEI program. *International Journal of Sustainability in Higher Education*, 23(8), 60–84. <https://doi.org/10.1108/IJSHE-12-2020-0484>
- Alshuwaikhat, H. M., Adenle, Y. A., & Saghir, B. (2016). Sustainability assessment of higher education institutions in Saudi Arabia. *Sustainability*, 8(8), 750. <https://doi.org/10.3390/su8080750>
- Anapey, G. M. (2024). Achieving education for sustainable education learning outcomes: an integrated model for higher education in the global South. *International Journal of Educational Reform*, 10567879241270503. <https://doi.org/10.1177/10567879241270503>
- Annan-Diab, F., & Molinari, C. (2017). Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. *The International Journal of Management Education*, 15(2, Part B), 73–83. <https://doi.org/10.1016/j.ijme.2017.03.006>
- Argento, D., Einarson, D., Mårtensson, L., Persson, C., Wendin, K., & Westergren, A. (2020). Integrating sustainability in higher education: a Swedish case. *International Journal of Sustainability in Higher Education*, 21(6), 1131–1150. <https://doi.org/10.1108/IJSHE-10-2019-0292>
- Arrobas, F., Ferreira, J., Brito-Henriques, E., & Fernandes, A. (2020). Measuring tourism and environmental sciences students' attitudes towards sustainable tourism. *The Journal of Hospitality, Leisure, Sport & Tourism Education*, 27, 100273. <https://doi.org/10.1016/j.jhlste.2020.100273>
- Assen, H., de Boer, M. R., & Fernandes, M. B. (2021). Moving to design-based education in hotel management school: proof of success and beyond – a research journey. *Research in Hospitality Management*, 11(2), 145–150. <https://doi.org/10.1080/22243534.2021.1917754>
- Bahaei, M., Perez-Batres, L. A., Pisani, M. J., Miller, V. V., & Saremi, M. (2014). Sustainable development in Iran: An exploratory study of university students' attitudes and knowledge about sustainable development. *Corporate Social-Responsibility and Environmental Management*, 21(3), 175–187. <https://doi.org/10.1002/csr.1312>
- Barkathunnisha, A. B., Lee, D., & Price, A. (2017). Transcending towards a spirituality-based platform in tourism higher education: A contemplation of the pedagogical implications. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 21, 174–184. <https://doi.org/10.1016/j.jhlste.2016.11.003>
- Berjzokina, G., & Melanthiou, Y. (2021). Is tourism and hospitality education supporting sustainability? *Worldwide Hospitality and Tourism Themes*, 13(6), 744–753. <https://doi.org/10.1108/WHATT-07-2021-0101>
- Biasutti, M. (2015). An intensive programme on education for sustainable development: the participants' experience. *Environmental Education Research*, 21(5), 734–752. <https://doi.org/10.1080/13504622.2014.921805>
- Boca, G., & Saraçlı, S. (2019). Environmental education and student's perception, for sustainability. *Sustainability*, 11(6), 1553. <https://doi.org/10.3390/su11061553>
- Boley, B. B. (2011). Sustainability in hospitality and tourism education: Towards an integrated curriculum. *Journal of Hospitality & Tourism Education*, 23(4), 22–31. <https://doi.org/10.1080/10963758.2011.10697017>
- Camargo, B. A., & Gretzel, U. (2017). What do tourism students know about sustainability and sustainable tourism? An exploratory study of Latin American students. *Journal of Teaching in Travel & Tourism*, 17(2), 101–117. <https://doi.org/10.1080/15313220.2017.1294038>
- Chawla, G., & Manhas, P. (2015). Sustainability in higher education: An exploratory investigation of hospitality management courses. *Asia-Pacific Journal of Innovation in Hospitality and Tourism*, 4(2), 2. <https://doi.org/10.7603/s40930-015-0002-x>
- Chen, M., Pei, T., Jeronen, E., Wang, Z., & Xu, L. (2022). Teaching and learning methods for promoting sustainability in tourism education. *Sustainability*, 14(21), 14592. <https://doi.org/10.3390/su142114592>
- Chen, Z., Razman, M. R., Zakaria, S. Z. S., & Lee, K. E. (2025). Assessing knowledge, attitudes and behaviours for sustainable development: a case study of Tibet University. *Discover Sustainability*, 6(1), 594. <https://doi.org/10.1007/s43621-025-01437-w>
- Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology*, 12(3), 297–298. <https://doi.org/10.1080/17439760.2016.1262613>
- Corcoran, P. B., Walker, K. E., & Wals, A. E. J. (2004). Case studies, make-your-case studies, and case stories: a critique of case-study methodology in sustainability in higher education. *Environmental Education Research*, 10(1), 7–21. <https://doi.org/10.1080/1350462032000173670>
- Cornet, S., Barpanda, S., Guidi, M. A. D., & Viswanathan, P. K. (2024). Sustainability education and community development in higher education using participatory and case based approaches in India. *International Journal of Sustainability in Higher Education*, 25(9), 94–110. <https://doi.org/10.1108/IJSHE-07-2022-0242>
- Cotterell, D., Hales, R., Arcodia, C., & Ferreira, J. A. (2019). Overcommitted to tourism and under committed to sustainability: the urgency of teaching "strong sustainability" in tourism courses. *Journal of Sustainable Tourism*, 27(7), 882–902. <https://doi.org/10.1080/09669582.2018.1545777>
- Crawford, J., & Cifuentes-Faura, J. (2022). Sustainability in higher education during the COVID-19 pandemic: A systematic review. *Sustainability*, 14(3), 1879. <https://doi.org/10.3390/su14031879>
- Creswell, J. W., & Clark, V. L. P. (2018). *Designing and Conducting Mixed-Methods Research* (3rd edn). SAGE.
- Deale, C., Nichols, J., & Jacques, P. (2009). A descriptive study of sustainability education in the hospitality curriculum. *Journal of Hospitality & Tourism Education*, 21(4), 34–42. <https://doi.org/10.1080/10963758.2009.10696958>
- Demetriou, P. (2022). Hotel food waste in Cyprus: An exploratory case study of hotels in Limassol. *Cogent Social Sciences*, 8(1), 2026556. <https://doi.org/10.1080/23311886.2022.2026556>
- Dewasiri, N. J., Weerakoon, Y. K. B., & Azeez, A. A. (2018). Mixed methods in finance research: The rationale and research designs. *International Journal of Qualitative Methods*, 17(1), 1609406918801730. <https://doi.org/10.1177/1609406918801730>
- Farsari, I. (2022). Pedagogy for sustainable tourism: reflections on the curriculum space of a master programme in Sweden. *Journal of Teaching in Travel & Tourism*, 22(1), 6–35. <https://doi.org/10.1080/15313220.2021.1978127>

- Fisher, P. B., & McAdams, E. (2015). Gaps in sustainability education: The impact of higher education coursework on perceptions of sustainability. *International Journal of Sustainability in Higher Education*, 16(4), 407–423. <https://doi.org/10.1108/IJSHE-08-2013-0106>
- Fuertes-Camacho, M. T., Graell-Martín, M., Fuentes-Loss, M., & Balaguer-Fàbregas, M. C. (2019). Integrating sustainability into higher education curricula through the project method, a global learning strategy. *Sustainability*, 11(3), 767. <https://doi.org/10.3390/su11030767>
- García-González, E., Jiménez-Fontana, R., & Goded, P. A. (2020). Approaches to teaching and learning for sustainability: Characterizing students' perceptions. *Journal of Cleaner Production*, 274, 122928. <https://doi.org/10.1016/j.jclepro.2020.122928>
- Gaard, G. C., Blades, J., & Wright, M. (2017). Assessing sustainability curriculum: From transmissive to transformative approaches. *International Journal of Sustainability in Higher Education*, 18(7), 1263–1278. <https://doi.org/10.1108/IJSHE-11-2015-0186>
- Goel, A., Iyer-Raniga, U., Jain, S., Addya, A., Srivastava, S., Pandey, R., & Rath, S. (2023). Student perceptions of environmental education in India. *Sustainability*, 15(21), 15346. <https://doi.org/10.3390/su152115346>
- González, R. d. M., & Sebastián-López, M. (2022). Education on sustainable development goals: Geographical perspectives for gender equality in sustainable cities and communities. *Sustainability*, 14(7), 4042. <https://doi.org/10.3390/su14074042>
- Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, 66(1), 64–74. <https://doi.org/10.1119/1.18809>
- Hales, R., & Jennings, G. (2017). Transformation for sustainability: The role of complexity in tourism students' understanding of sustainable tourism. *The Journal of Hospitality, Leisure, Sport & Tourism Education*, 21, 185–194. <https://doi.org/10.1016/j.jhlste.2017.08.001>
- He, X., Hong, T., Liu, L., & Tiefenbacher, J. (2011). A comparative study of environmental knowledge, attitudes and behaviors among university students in China. *International Research in Geographical and Environmental Education*, 20(2), 91–104. <https://doi.org/10.1080/10382046.2011.564783>
- Hinduja, P., Mohammad, R. F., Siddiqui, S., Noor, S., & Hussain, A. (2023). Sustainability in higher education institutions in Pakistan: A systematic review of progress and challenges. *Sustainability*, 15(4), 3406. <https://doi.org/10.3390/su15043406>
- Iddawala, J., Welengoda, B. M., & Rathnayaka, B. T. (2024). Sustainability practices, sustainable development goals and the hospitality sector: perspectives from Sri Lankan chain hotels. *Research in Hospitality Management*, 14(2), 112–123. <https://doi.org/10.1080/22243534.2024.2393437>
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed-methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14–26. <https://doi.org/10.3102/0013189X033007014>
- Jung, Y., Park, K., & Ahn, J. (2019). Sustainability in higher education: Perceptions of social responsibility among university students. *Social Sciences*, 8(3), 90. <https://doi.org/10.3390/socsci8030090>
- Kearins, K., & Springett, D. (2003). Educating for sustainability: Developing critical skills. *Journal of Management Education*, 27(2), 188–204. <https://doi.org/10.1177/1052562903251411>
- Khalil, D., Ramzy, O., & Mostafa, R. (2013). Perception towards sustainable development concept: Egyptian students' perspective. *Sustainability Accounting, Management and Policy Journal*, 4(3), 307–327. [https://doi.org/10.1108/SAMPJ-01-2013-0008?urlappend=%3Futm\\_source%3Dresearchgate.net%26medium%3Darticle](https://doi.org/10.1108/SAMPJ-01-2013-0008?urlappend=%3Futm_source%3Dresearchgate.net%26medium%3Darticle)
- Kopinina, H. (2020). Education for the future? Critical evaluation of education for sustainable development goals. *The Journal of Environmental Education*, 51(4), 280–291. <https://doi.org/10.1080/00958964.2019.1710444>
- Kuehl, C., Sparks, A. C., Hodges, H., & Smith, E. R. A. N. (2023). Exploring sustainability literacy: developing and assessing a bottom-up measure of what students know about sustainability. *Frontiers in Sustainability*, 4, 1–10. <https://doi.org/10.3389/frsus.2023.1167041>
- Kumar, R. R., & Stauvermann, P. J. (2023). Tourism and economic growth in the Pacific region: evidence from five small island economies. *Journal of the Asia Pacific Economy*, 28(3), 894–921. <https://doi.org/10.1080/13547860.2021.1944796>
- Leal Filho, W., Raath, S., Lazzarini, B., Vargas, V. R., de Souza, L., Anholon, R., Quelhas, O. L. G., Haddad, R., Klavins, M., & Orlovic, V. L. (2018). The role of transformation in learning and education for sustainability. *Journal of Cleaner Production*, 199, 286–295. <https://doi.org/10.1016/j.jclepro.2018.07.017>
- Leite, S. (2022). Using the SDGs for global citizenship education: definitions, challenges, and opportunities. *Globalisation, Societies and Education*, 20(3), 401–413. <https://doi.org/10.1080/14767724.2021.1882957>
- Leiva-Brondo, M., Lajara-Camilleri, N., Vidal-Meló, A., Atarés, A., & Lull, C. (2022). Spanish university students' awareness and perception of sustainable development goals and sustainability literacy. *Sustainability*, 14(8), 4552. <https://doi.org/10.3390/su14084552>
- Lozano, R., Lukman, R., Lozano, F. J., Huisingh, D., & Lambrechts, W. (2013). Declarations for sustainability in higher education: becoming better leaders, through addressing the university system. *Journal of Cleaner Production*, 48, 10–19. <https://doi.org/10.1016/j.jclepro.2011.10.006>
- Maoela, M. A., Chapungu, L., & Nhamo, G. (2024). Students' awareness, knowledge and attitudes towards the sustainable development goals at the University of South Africa. *International Journal of Sustainability in Higher Education*, 25(9), 455–473. <https://doi.org/10.1108/IJSHE-11-2023-0518>
- Marshall, H. (2025). Integrating sustainability into religious education. *Journal of Beliefs & Values*, 1–20. <https://doi.org/10.1080/13617672.2025.2504983>
- McGrath, G. M., Lockstone-Binney, L., Ong, F., Wilson-Evered, E., Blaer, M., & Whitelaw, P. (2020). Teaching sustainability in tourism education: a teaching simulation. *Journal of Sustainable Tourism*, 29(5), 795–812. <https://doi.org/10.1080/09669582.2020.1791892>
- Melissen, F., & Damen, M. (2014). Addressing sustainability in hotel management education: designing a curriculum based on input from key stakeholders. *Research in Hospitality Management*, 4(1–2), 71–76. <https://doi.org/10.1080/22243534.2014.11828316>
- Menon, S., & Suresh, M. (2022). Modelling the enablers of sustainability in higher education institutions. *Journal of Modelling in Management*, 17(2), 405–439. <https://doi.org/10.1108/JM2-07-2019-0169>
- Michel, J. O., & Zwickle, A. (2021). The effect of information source on higher education students' sustainability knowledge. *Environmental Education Research*, 27(7), 1080–1098. <https://doi.org/10.1080/13504622.2021.1897527>
- Millar, M., Brown, C., Carruthers, C., Jones, T., Kim, Y.S., Raab, C., Teeters, K. and Yang, L.T. (2012). Implementing environmental sustainability in the global hospitality, tourism, and leisure industries: Developing a comprehensive cross-disciplinary curriculum. In *Higher education for sustainability* (pp. 124–136). Routledge.
- Mínguez, C., Martínez-Hernández, C., & Yubero, C. (2021). Higher education and the sustainable tourism pedagogy: Are tourism students ready to lead change in the post pandemic era? *The Journal of Hospitality, Leisure, Sport & Tourism Education*, 29, 100329. <https://doi.org/10.1016/j.jhlste.2021.100329>
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 1997(74), 5–12. <https://doi.org/10.1002/ace.7401>
- Mowforth, M., & Munt, I. (2015). *Tourism and Sustainability: Development, globalisation and new tourism in the third world*. Routledge. <https://doi.org/10.4324/9781315795348>
- Nilsson Dahlström, Å. (2025). Challenges and opportunities for social sustainability in education: a scoping review. *Cogent Social Sciences*, 11(1), 2491706. <https://doi.org/10.1080/23311886.2025.2491706>
- Neuert, C., Meitinger, K., Behr, D., & Schonlau, M. (2021). The use of open-ended questions in surveys. *Methods, Data, Analyses: A Journal for Quantitative Methods and Survey Methodology*, 15(1), 3–6.

- O'Connor, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods*, 19. <https://doi.org/10.1177/1609406919899220>
- Papavasileiou, A., Konteos, G., Kalogiannidis, S., Kalfas, D., & Papadopoulou, C. I. (2025). Investigating the impact of sustainability-themed extracurricular activities on student engagement with the 17 SDGs by 2026: A case study of Greece. *Sustainability*, 17(7), 3071. <https://doi.org/10.3390/su17073071>
- Paris, C. (2016). Sustainability: A threshold concept for tourism education. *Tourism (Zagreb, Croatia)*, 64(3), 329-337.
- Pauw, J. B.-d., Gericke, N., Olsson, D., & Berglund, T. (2015). The effectiveness of education for sustainable development. *Sustainability*, 7(11), 15693-15717. <https://doi.org/10.3390/su71115693>
- Perera, P., Jayakody, C., Jayapali, U., & Newsome, D. (2023). Challenges and opportunities for the resumption of nature tourism in post-pandemic Sri Lanka. *International Journal of Geoheritage and Parks*, 11(2), 234-246. <https://doi.org/10.1016/j.ijgeop.2023.03.001>
- Phi, G. T., & Waldesten, T. (2021). Educating sustainability through hackathons in the hospitality industry: a case study of Scandic hotels. *Scandinavian Journal of Hospitality and Tourism*, 21(2), 212-228. <https://doi.org/10.1080/15022250.2021.1879669>
- Pretorius, R. W., Carow, S., Wilson, G., & Schmitz, P. (2021). Using real-world engagements for sustainability learning in ODeL in the Global South: Challenges and opportunities. *International Journal of Sustainability in Higher Education*, 22(6), 1316-1335. <https://doi.org/10.1108/IJSHE-08-2020-0287>
- Rajabifard, A., Kahalimoghadam, M., Lumantarna, E., Herath, N., Hui, F. K. P., & Assarkhaniki, Z. (2021). Applying SDGs as a systematic approach for incorporating sustainability in higher education. *International Journal of Sustainability in Higher Education*, 22(6), 1266-1284. <https://doi.org/10.1108/IJSHE-10-2020-0418>
- Rajaram, G. M. (2013). Transforming higher education: A practical plan for integrating sustainability to business education. *Independent Business Review*, 6(2), 125.
- Rawlinson, S., & Dewhurst, P. (2013). How can effective university-industry partnerships be developed? *Worldwide Hospitality and Tourism Themes*, 5(3), 255-267. <https://doi.org/10.1108/WHATT-02-2013-0004>
- Redman, A., Wiek, A., & Barth, M. (2021). Current practice of assessing students' sustainability competencies: a review of tools. *Sustainability Science*, 16(1), 117-135. <https://doi.org/10.1007/s11625-020-00855-1>
- Reffhaug, M. B. A., & Lysgaard, J. A. (2024). Conceptualisations of 'critical thinking' in environmental and sustainability education. *Environmental Education Research*, 30(9), 1519-1534. <https://doi.org/10.1080/13504622.2024.2363848>
- Rodríguez Aboytes, J. G., & Barth, M. (2020). Transformative learning in the field of sustainability: a systematic literature review (1999-2019). *International Journal of Sustainability in Higher Education*, 21(5), 993-1013. <https://doi.org/10.1108/IJSHE-05-2019-0168>
- Sammalisto, K., Sundström, A., & Holm, T. (2015). Implementation of sustainability in universities as perceived by faculty and staff – a model from a Swedish university. *Journal of Cleaner Production*, 106, 45-54. <https://doi.org/10.1016/j.jclepro.2014.10.015>
- Saunders, M., Lewis, P., & Thornhill, A. (2023). *Research Methods for Business Students*. Pearson Education.
- Sekhar, C., & Raina, R. (2021). Towards more sustainable future: assessment of sustainability literacy among the future managers in India. *Environment, Development and Sustainability*, 23(11), 15830-15856. <https://doi.org/10.1007/s10668-021-01316-0>
- Shafieieh, M., Oztüren, A., Rezapourghadam, H., & Karatepe, O. M. (2024). Does critical thinking mediate the relationship between sustainability knowledge and tourism students' ability to make sustainable decisions? *Sustainability*, 16(13), 5655. <https://doi.org/10.3390/su16135655>
- Sheldon, P. J., Fesenmaier, D. R., & Tribe, J. (2011). The Tourism Education Futures Initiative (TEFI): Activating change in tourism education. *Journal of Teaching in Travel & Tourism*, 11(1), 2-23. <https://doi.org/10.1080/15313220.2011.548728>
- Sibbel, A. (2009). Pathways towards sustainability through higher education. *International Journal of Sustainability in Higher Education*, 10(1), 68-82. <https://doi.org/10.1108/14676370910925262>
- Sundermann, A., & Fischer, D. (2019). How does sustainability become professionally relevant? Exploring the role of sustainability conceptions in first-year students. *Sustainability*, 11(19), 5155. <https://doi.org/10.3390/su11195155>
- Tarrant, M., Schweinsberg, S., Landon, A., Wearing, S. L., McDonald, M., & Rubin, D. (2021). Exploring student engagement in sustainability education and study abroad. *Sustainability*, 13(22), 12658. <https://doi.org/10.3390/su132212658>
- Tavitiyaman, P., & Zhang, X. (2022). Sustainability issues and higher education in hospitality and tourism: Stakeholders' perspectives. *Journal of Hospitality & Tourism Education*, 36(2), 85-98. <https://doi.org/10.1080/10963758.2022.2123339>
- Tulyakul, P., & Meepring, S. (2020). Ethical issues of informed consent: Students as participants in faculty research. *Global Journal of Health Science*, 12(3), 86. <https://doi.org/10.5539/gjhs.v12n3p86>
- Uleanya, C., Ilesanmi, K. D., Yassim, K., Olumuyiwa Omotosho, A., & Kimanzi, M. (2024). Sustainability consciousness of selected university students in South Africa. *International Journal of Sustainability in Higher Education*, 25(9), 505-521. <https://doi.org/10.1108/IJSHE-01-2024-0046>
- Vermolen, N. (2025). Reconceptualising success in hospitality internships: a new perspective on students' achievement factors. *Research in Hospitality Management*, 15(1), 42-46. <https://doi.org/10.1080/22243534.2025.2466696>
- Vicente-Molina, M. A., Fernández-Sáinz, A., & Izagirre-Olaizola, J. (2013). Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries. *Journal of Cleaner Production*, 61, 130-138. <https://doi.org/10.1016/j.jclepro.2013.05.015>
- Wals, A. E. J. (2014). Sustainability in higher education in the context of the UN DESD: a review of learning and institutionalization processes. *Journal of Cleaner Production*, 62, 8-15.
- Weybrecht, G. (2021). How management education is engaging students in the sustainable development goals. *International Journal of Sustainability in Higher Education*, 22(6), 1302-1315. <https://doi.org/10.1108/IJSHE-10-2020-0419>
- Wilson, E., & von der Heidt, T. (2013). Business as usual? Barriers to education for sustainability in the tourism curriculum. *Journal of Teaching in Travel & Tourism*, 13(2), 130-147. <https://doi.org/10.1080/15313220.2013.786337>
- Žalėnienė, I., & Pereira, P. (2021). Higher education for sustainability: A global perspective. *Geography and Sustainability*, 2(2), 99-106. <https://doi.org/10.1016/j.geosus.2021.05.001>
- Zamora-Polo, F., Sánchez-Martín, J., Corrales-Serrano, M., & Espejo-Antúnez, L. (2019). What do university students know about Sustainable Development Goals? A realistic approach to the reception of this UN Program amongst the youth population. *Sustainability*, 11(13), 3533. <https://doi.org/10.3390/su11133533>
- Zhang, X., & Tavitiyaman, P. (2022). Sustainability courses in hospitality and tourism higher education: Perspectives from industry practitioners and students. *The Journal of Hospitality, Leisure, Sport & Tourism Education*, 31, 100393. <https://doi.org/10.1016/j.jhlste.2022.100393>
- Zizka, L. (2022). Sustainability in top hospitality/leisure management programs: Teaching for a sustainable future? *Journal of Hospitality & Tourism Education*, 34(1), 57-65. <https://doi.org/10.1080/10963758.2020.1868316>
- Zwicle, A., M. Koontz, T., M. Slagle, K., & T. Bruskotter, J. (2014). Assessing sustainability knowledge of a student population: Developing a tool to measure knowledge in the environmental, economic and social domains. *International Journal of Sustainability in Higher Education*, 15(4), 375-389. <https://doi.org/10.1108/IJSHE-01-2013-0008>
- Zwolinska, K., Lorenc, S., & Pomykala, R. (2022). Sustainable development in education from students' perspective – Implementation of sustainable development in curricula. *Sustainability*, 14(6), 3398. <https://doi.org/10.3390/su14063398>