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INTEGRATING SUSTAINABILITY INTO EDUCATION AND MANAGEMENT: A SYSTEMATIC REVIEW OF PRACTICES ALIGNING WITH THE SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

The integration of sustainability into management and educational practices was examined in this systematic literature review, with an emphasis on how these practices help to achieve the Sustainable Development Goals (SDGs) of the UN. The study examined 26 peer-reviewed scholarly publications from SCOPUS and Web of Science using the PRISMA approach. Three main themes came to light: sustainability education and awareness, sustainable development goals (SDGs) in practice and sustainable management practices. The evaluation emphasizes the value of multidisciplinary teaching methods and the part management plays in advancing sustainable development. The study provides important insights into how well sustainability programs shape professional practices and educational frameworks by combining several research approaches. The findings offer practical solutions for educators, managers and policymakers looking to match their practices with global sustainability goals.

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INTRODUCTION

The UN's Sustainable Development Goals (SDGs) are mostly unachievable due to the integration of sustainability into management and educational institutions. Although the necessity of sustainable development is widely acknowledged, there is still variation in how it is actually implemented in management practices and educational curriculum. The lack of a sustainability mindset, the exclusion of environmental viewpoints from decision-making processes, and gaps in knowledge management have all resulted from this inconsistency (Leal Filho et al., 2019).

Building future leaders with the ability to tackle environmental, social, and economic issues requires a strong foundation in sustainability capabilities. Nevertheless, there isn't much consensus on the most effective pedagogical strategies to develop these competences, despite a lot of attempts. Measuring their total impact on sustainability results has proven challenging due to variations in management tactics and instructional techniques. As a result, trying to match programs with the SDGs presents serious difficulties for both legislators and educators (Ceulemans et al., 2015).

The goal of this systematic evaluation of the literature is to compile the body of knowledge regarding the incorporation of sustainability into management and education. It attempts to uncover major themes, obstacles, and creative solutions that can direct the creation of more potent plans for accomplishing the SDGs by examining 26 chosen studies. The review adds to the expanding corpus of knowledge by providing perspectives that guide future research in these important areas as well as policy and practice. By contextualising the problem of sustainable integration, identifying the gap in present practices, and articulating the goal and contribution of the review, this introduction sets the setting for the review.

Problem Statement

The Sustainable Development Goals (SDGs) of the United Nations represent the essence of sustainable development, and their implementation in educational and management systems is still largely lacking despite widespread agreement on this point (Leicht et al., 2018). The goal of the systematic literature review is to address the issue of how to successfully integrate sustainability into different organizational and educational frameworks to improve knowledge management techniques, cultivate a sustainability mindset, and guarantee that environmental viewpoints are taken into account during decision-making. Due to conflicting yet interrelated social, environmental, and economic goals, integrating sustainability is difficult (Kitsios et al., 2020).

There is not much agreement on the best pedagogical practices to develop sustainability-oriented competencies, despite tremendous efforts to advance sustainability through education (Wiek et al., 2011). Diverse management strategies and instructional models assert to promote sustainability, but evaluating their combined effects is challenging due to the differences in methodology. There are gaps in the sustainability-related managerial decision-making processes as well as student results as a result of the uneven integration of sustainability into professional practices and curricula (Cebrián et al., 2015).For educators and officials hoping to match their programs with the global Sustainable Development Goals, this discrepancy poses a problem.

The purpose of the review was to determine the current status of sustainability integration in management and education by synthesizing various research methodologies, such as mixed, qualitative, and quantitative approaches. Through a thorough screening and eligibility process, 26 scientific publications were chosen for analysis. The review's mission is to identify essential themes, difficulties, and creative solutions that might direct the creation of more successful plans for accomplishing sustainable development goals.

The problem statement emphasized the importance of having a thorough awareness of the condition of sustainability in management and education today, as well as the real-world difficulties and achievements encountered in putting the SDGs into practice. The goal of the review was to add to the body of knowledge by offering perspectives that can guide practice, policy, and future study in these important fields.

Research Objectives

The research objectives of this systematic literature review are:
1. To identify and evaluate the best teaching practices that support sustainability competencies.
2. To examine how sustainability fits into management procedures, with an emphasis on incorporating the concepts of sustainable development.
3. To assess how well these practices are working to achieve the Sustainable Development Goals of the United Nations in a variety of fields, especially management and education.
4. To compile the data demonstrating how sustainability education affects the skills and decision-making processes of upcoming leaders.

LITERATURE REVIEW

Sustainability Education and Awareness

The issue of sustainability awareness and education looks at how different teaching strategies affect students' attitudes, behaviors, and competencies in a variety of professions.

Numerous studies emphasize how crucial education is in fostering sustainable thinking and pro-environmental behaviors (PEBs). For instance, Wang et al. (2022) discovered that inclusive pedagogies have a good impact on students' attitudes toward sustainability, and students at a Dutch university demonstrated a link between these attitudes and their pro-environmental behavior (Wang et al., 2022). Similarly, Poto and Murray (2024) stress ecological literacy as critical to environmental sustainability, especially in legal studies, and call for a multidisciplinary approach to sustainability education (Poto & Murray, 2024). Baber et al. (2024) investigated the function of sustainability education in forming entrepreneurial aspirations. They observed that sustainability education impacts the tendency to create sustainable firms by influencing personal and subjective norms. Furthermore, Yli-Panula et al. (2022) research highlighted the importance of teachers' ideas and values in incorporating Climate Change Education (CCE) into the curriculum, despite ongoing hurdles like a diversity of student opinions.

The perception survey revealed that the learning objective of developing a sustainable decision-making layout has been widely acknowledged as a means of fostering the development of decision-making and sustainable thinking competencies. The performance assessment revealed that most students exhibited higher-order cognitive skills. Research by (García-Segura et al., 2020)may serve as a paradigm for how engineering education might promote sustainable practices. A multicourse effort that used design thinking as a problem-solving method to increase students' knowledge of environmental challenges. Students studying product design and marketing research were able to gain an understanding of macro-level sustainability issues through the design and implementation of this cross-course experiential learning initiative, while students studying environmental policy were able to recognise the importance of marketing research in the creation of land use plans (Manna et al., 2022).

All things considered, research shows that education from early childhood to higher education—has a big impact on people's attitudes, practices, and knowledge about sustainability.

Sustainable Development Goals (SDGs) in Practice

The Sustainable Development Goals (SDGs) are an important global framework. Several studies examine the practical applications of the SDGs in various areas.

According to Bisogno et al. (2024),when a municipality's financial viability is assured, they are more likely to invest in SDGs for social and economic development in Italy and Spain. Furthermore, Andreoni and Richard's (2023) 2030 SDGs Game has garnered attention as a cutting-edge resource for interdisciplinary education. This game is an effective teaching tool because it lets players investigate how the SDGs are related to one another and fosters cooperation and problem-solving abilities (Andreoni & Richard, 2024).Rosak-Szyrocka and Tiwari's

research from 2023 highlights the importance of ongoing education in promoting sustainable development. According to their research, universities have a critical role in fostering economic growth and sustainable innovation (Rosak-Szyrocka & Tiwari, 2023).Zahrani (2022) investigated how Saudi Arabian sustainability education encourages an entrepreneurial mindset among college students. According to Zahrani's (2022) research, sustainability education plays a crucial role in fostering the next generation of entrepreneurs who will make sustainable development contributions.

Environmental attitudes have a significant role in improving environmental behaviours and can impact people's decision-making processes on environmental protection. The farmers' attitudes towards environmental protection were positively influenced by their economic orientation. Farmers' attitudes towards the environment were also significantly and favourably impacted by environmental concern, environmental ethical commitment, and environmental awareness (Yaghoubi Farani et al., 2021).According to (Durmaz & Akdoğan, 2024), environmental responsibility has a significant impact on consumers' intentions to consume sustainably as well as their level of environmental care.

Collectively, these studies highlight the diverse strategies needed to implement the SDGs, with financial sustainability, interdisciplinary education, and entrepreneurial culture serving as important catalysts.

Sustainable Management Practices

The integration of sustainability principles into economic, organizational, and educational systems is the focus of sustainable management practices.

Klingenberg and Rothberg (2020)stated that DCA knowledge management model emphasizes the necessity for enhanced knowledge management procedures to hasten the SDGs' accomplishment. The concept is centred on helping organizations identify, acquire, and use sustainable knowledge (Klingenberg & Rothberg, 2020). In a similar vein, Fritz and Cordova (2023)discussed supply chain management sustainability and note that there is frequently a discrepancy between stated and implemented corporate sustainability policies. They contend that further in-depth reflection and corporate behavior congruence is crucial (Fritz & Cordova, 2023). Additionally, Macagno et al. (2024) incorporate transformational learning and design thinking into their sustainability education program. According to Macagno et al. (2024), their study showed how students acquire the attitudes and abilities needed to become change agents for sustainability.

Lengyel (2023)presented the idea of Thinking-Attitude-Behavior (TAB) priorities, which include reducing consumption and changing one's thinking. The research highlighted the critical role that certain groups play in promoting more general social sustainability changes. Most importantly, it highlighted possible misalignments between the Sustainable Development Goals (SDGs) and the sustainability priorities of stakeholders, highlighting the necessity of more discussion and ongoing study to achieve alignment.

In conclusion, knowledge management, supply chain sustainability, and creative pedagogies must all be integrated into sustainable management practices to support the larger objectives of sustainable development.

METHODOLOGY

Using the PRISMA Framework by Moher et al. (2010), the Systematic Literature Review process entails a thorough examination through three key steps that are outlined in subsections Identification, Screening, and Eligibility. Data Abstraction and Analysis, which follows the data formation, explains the PRISMA Framework-based assessment.

Identification

Three crucial steps are involved in the systematic review technique that is used to choose a set of relevant research for this investigation. The first step involves identifying keywords and investigating related, similar terms by using lexicons, thesauri, encyclopedias, and previous academic studies. Once all relevant

keywords had been identified, search strings were created to query the databases of Scopus and WoS as shown in Table 1. This research successfully collected 210 scholarly papers from the two databases for the systematic review project's first phase.

Table 1
Search String

Database	Search String
Scopus	("sustainable thinking" OR "sustainability mindset" OR "sustainable mindset" OR "environmental thinking" OR "eco-conscious thinking") AND ("critical thinking" OR "systems thinking" OR "problem-solving" OR "decision making" OR "ethical thinking") AND ("sustainability education" OR "environmental education" OR "STEM education" OR "education for sustainability" OR "sustainable development goals (SDGs)")
WoS	("sustainable thinking" OR "sustainability mindset" OR "sustainable mindset" OR "environmental thinking" OR "eco-conscious thinking") AND ("critical thinking" OR "systems thinking" OR "problem-solving" OR "decision making" OR "ethical thinking") AND ("sustainability education" OR "environmental education" OR "STEM education" OR "education for sustainability" OR "sustainable development goals (SDGs)")

Screening

It is important to eliminate any unnecessary papers at the first screening stage. This comprehensive literature review contained no duplicate publications.

As a result, the 210 scholarly publications might be the subject of the second screening stage. The 210 publications were evaluated during the second screening step using a set of inclusion and exclusion criteria that academics had developed. The nature of the literature was the main criterion used, with research papers being the primary source of useful insights. This also included excluding conceptual papers, book series, book chapters, reviews, systematic reviews, proceeding papers, and non-open access publications that did not correspond with the most recent findings. It is important to note that this selection procedure was restricted to works published in the English language and concentrated on the previous five years, from 2020 to 2024. 140 scholarly publications in all were disqualified based on these specific standards.

Eligibility

A total of 70 scholarly articles were gathered for the eligibility assessment phase, which is the third stage. To ensure that these papers fulfilled the inclusion requirements and complemented the current study goals, a thorough assessment of their titles and core contents was conducted. Therefore, 44 papers that did not fit certain criteria—such as having an abstract unrelated to the review goal, being out-of-field reports, or not being focused on research contexts—were eliminated from consideration for the assessment. Lastly, Table 2 indicates that 26 scholarly articles are available for review after the screening and eligibility steps were done.

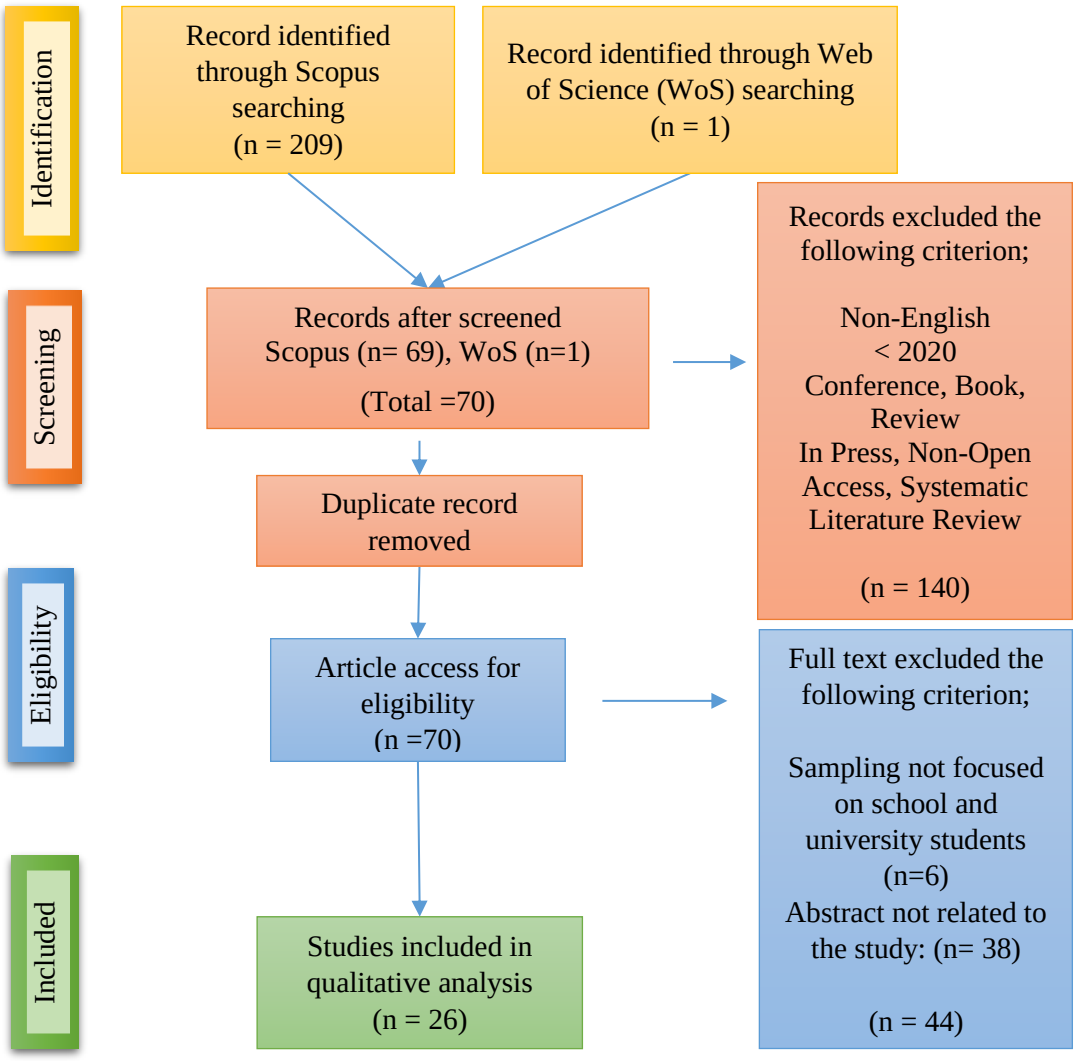
Table 2
The selection criterion for searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2020-2024	< 2020
Literature type	Journal (Article)	Conference Proceedings, Book Chapters, Book Series, Literature Review Paper
Publication Stage	Final	In Press

Data Abstraction and Analysis

In this study, an integrative analysis approach was employed to amalgamate diverse research methodologies, encompassing qualitative, quantitative as well as mixed methods. The principal aim was to ascertain pertinent topics and subtopics of sustainability in the context of management and education, as well as the implementation of sustainable development goals. The data collection process involved a meticulous review of 26 scholarly publications, extracting pertinent information for the study's topics. Three key themes emerged: “Sustainability Education and Awareness”, “Sustainable Development Goals (SDGs) in Practice” and “Sustainable Management Practices” which were further developed along with associated themes and ideas through collaboration among the authors. Table 3 illustrates how all 26 articles were categorised based on these three themes. A comprehensive record was consistently kept during the data analysis process to record analyses, discoveries, inquiries, and any pertinent details. The authors also engaged in discussions to address any inconsistencies in the theme development process, ensuring the themes' coherence. The analysis was reviewed by two experts in Sustainable Thinking/Environmental Sustainability and STEM (Science, Engineering, Mathematics, and Technology) Education to establish domain validity, ensuring significance, clarity as well as the suitability of every sub-theme. The expert review phase involved incorporating feedback and professional judgments into the analysis, leading to adjustments to enhance the study's validity and reliability. Figure 1 explains the process implemented under the PRISMA Framework:

Fig 1. Flow chart for the proposed research study



Reviewing pertinent literature is the primary methodology used in this investigation. The review of the literature was completed by document analysis from earlier research projects. The first phase involved reviewing relevant literature on sustainability in the context of management and education, the implementation of the sustainable development goals in education and management as well as Education in Sustainable Development (ESD).

Relevant publications were found throughout this procedure in databases including SCOPUS and Web of Science (WoS). Some of the journals that have been downloaded and evaluated include the International Journal of Engineering Education, Frontiers in Environmental Science, European Journal of Sustainable Development, and International Journal of Sustainability in Higher Education. During the article search process, keywords including "sustainable thinking", "environmental thinking", "critical thinking", "sustainable development goals" and "environmental education" were used. As a consequence of these efforts, 210 articles were found. Only 70 articles were chosen for qualifying purposes following the next screening round. After screenings for titles and abstracts were carried out, only 26 scholarly articles total were considered in this qualitative analysis of this systematic literature review.

Table 3

Classification of 26 articles based on three themes

Authors	Title	Abstract	Year	Theme
Savelyeva T.	The influence of education and family systems on the sustainability values of Hong Kong University students	In Hong Kong, which transitioned from a colonial to post-colonial One Country-Two Systems structure, sustainability implementation rests on two institutional pillars: education, which drives the city,Äôs knowledge-based economy, and family system. In light of the recent policy demands to strengthen higher education and family systems by capitalizing on the unique advantages of the post-colonial era, the purpose of this study was to: (1) describe and analyze sustainability values of the first-year university students; and (2) investigate roles of family and educational systems in the process of their formation. The mix-method study stressed the importance of discerning and analyzing sustainability value formation in order to create in-depth understanding of the curricular adjustments that align the sustainability mindset of Hong Kong students in the context of the One Country-Two Systems under the pressing demands of global economy. The study relied on the use of two systems theoretical frameworks employed within sustainability education (Sterling, 2003) and family (Bowen, 1957/1974) fields. Data sources included questionnaires of 4985 Hong Kong first-year university students; and 31 semi-structured interviews of Liberal Studies teachers. The quantitative findings showed that 85% of the students believed that their family influenced their environmental values; reported a significant negative coefficient (,àí0.044) between the two student cohorts in relation to family influence; and showed that family influence on students,Äô sustainability values differed by gender. The qualitative results revealed the overarching themes of Family Income, Role Modeling, and Shared Responsibility as three major descriptors of family influences on sustainability values of Hong Kong students. ¬© 2022, Education Research Institute, Seoul National University.	2022	Sustainability Education and Awareness
Cengizo*f*ülu S.; Olgan R.; Teks√∂z G.	Preschool children,Äôs perceptions on human,Äìenvironment relationship: follow-up research	In the current study, we focus on how the early childhood education for sustainability (ECEfS) program develops the perceptions of preschool children about the human,Äìenvironment relationship. The sample of the study consisted of preschoolers aged 60,Äì66 months in Ankara, Turkey.	2022	Sustainability Education and Awareness

		The data were collected through the drawings of children on the topic of ‚Äòhuman‚Äìenvironment‚Äô and interviews on drawings obtained before and after the program. The findings revealed that children perceive their environment as a peaceful and gentle place. Furthermore, children conceptualized the environment through unusual and fantastic elements and they described the environment through secondary sources. There was a shift in descriptions in the post- and follow-up drawings including proposing recycling as a way of reconstructing the human‚Äìenvironment relationship, with making connections between global issues. In parallel to post findings, follow-up drawings gained after 10-month of the implementation highlights children‚Äôs own solutions for a sustainable future. ¬© 2020 Informa UK Limited, trading as Taylor & Francis Group.		
Saari U.A.; Ojasoo M.; Venesaar U.; Puhakka I.; Nokelainen P.; M√§kinen S.J.	Assessing engineering students‚Äô attitudes towards corporate social responsibility principles	Ethical and sustainable thinking is an important competence in the engineering education to support students‚Äô abilities to act and perform in a responsible manner in corporate contexts, and consequently contribute to a sustainable future. This paper investigates engineering students‚Äô attitudes towards ethical and sustainable thinking focusing on the corporate social responsibility (CSR) principles in the context of entrepreneurship courses as a part of larger research project. Engineering students from a Finnish and an Estonian university (N = 342) responded to a self-assessment survey. The students‚Äô attitudes towards CSR principles were assessed both on the enterprise level and the individual level as expectations of potential future employees. The findings indicate that engineering students acknowledge the need to take into account responsible thinking and that it is important for enterprises to be both socially and environmentally responsible in their activities. The self-assessment tool of ethical and sustainable thinking associated with the entrepreneurship competence model and CSR principles can be helpful in practice when university teachers wish to support and assess their students‚Äô attitudes towards CSR principles among other entrepreneurship competencies when creating new course content. ¬© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.	2024	Sustainability Education and Awareness
Li S.; Tang S.; Geng X.; Liu Q.	Constructing a critical thinking evaluation framework for college	Introduction: Education for sustainable development (ESD) has focused on the promotion of sustainable thinking skills, capacities, or abilities for learners of different educational stages. Critical thinking (CT) plays an	2022	Sustainability Education and Awareness

	students majoring in the humanities	important role in the lifelong development of college students, which is also one of the key competencies in ESD. The development of a valuable framework for assessing college students,Äô CT is important for understanding their level of CT. Therefore, this study aimed to construct a reliable self-evaluation CT framework for college students majoring in the humanities. Methods: Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and Item analysis were conducted to explore the reliability and validity of the CT evaluation framework. Six hundred and forty-two college students majoring in the humanities were collected. The sample was randomly divided into two subsamples (n1 = 321, n2 = 321). Results: The Cronbach,Äôs alpha coefficient for the whole scale was 0.909, and the values of the Cronbach,Äôs alpha coefficients for individual factors of the scale ranged from 0.724 to 0.878. Then CFA was conducted within the scope of the validity study of the scale. In this way, the structure of the 7-factor scale was confirmed. Results indicated that the constructed evaluation framework performed consistently with the collected data. CFA also confirmed a good model fitting of the relevant 22 factors of the college students,Äô CT framework (œá2/df = 3.110, RMSEA = 0.056, GFI = 0.927, AGFI = 0.902, NFI = 0.923, and CFI = 0.946). Discussion: These findings revealed that the CT abilities self-evaluation scale was a valid and reliable instrument for measuring the CT abilities of college students in the humanities. Therefore, the college students,Äô CT self-evaluation framework included three dimensions: discipline cognition (DC), CT disposition, and CT skills. Among them, CT disposition consisted of motivation (MO), attention (AT), and open-mindedness (OM), while CT skills included clarification skills (CS), organization skills (OS), and reflection (RE). Therefore, this framework can be an effective instrument to support college students,Äô CT measurement. Consequently, some suggestions are also put forward regarding how to apply the instrument in future studies. Copyright ¬© 2022 Li, Tang, Geng and Liu.		
Poto M.P.; Murray E.M.	Achieving a Common Future for all Through Sustainability-Conscious Legal Education and Research Methods	This contribution explores ecological literacy as a critical facet of legal inquiry, focusing on expanding knowledge and practices oriented towards nature protection. Evolving to encompass interdisciplinarity and a systems-thinking approach, ecological literacy is crucial for achieving environmental sustainability. The study argues that integrating an	2024	Sustainability Education and Awareness

		approach promoting eco-responsible behaviors is essential for sustainability-centered legal research and education. This necessitates a shift in foundational pillars of legal methodology, moving beyond conventional dogmatic approaches and embracing a participatory and active dimension. The study provides a theoretical foundation for future applications for rethinking legal methodology to implement ecological literacy effectively.¬† ¬© 2024 the author(s), published by De Gruyter, Berlin/Boston.		
Yang C.; Ivanova E.; Hufnagel J.	Using contemplative photography in transformative sustainability management education: Pedagogical applications in the United States, Russia, and Germany	Developing a sustainability mindset requires a transdisciplinary approach to business education that integrates a rational-analytic mode of thinking and an emotive-holistic understanding of the human mind. In order to cultivate the sustainability mindset of business students, we have designed a contemplative art-based project involving the creation of an electronic portfolio which consists of a student's digital photographs. We have integrated it into our teaching of management courses in the United States, Russia, and Germany, respectively. The project aims to enable business students to become more visually attentive and environmentally conscious, so that they will pay close attention to the process of building more sustainable relationships within their natural and social environments. From the interpretative phenomenological perspective, we have analyzed the students' e-portfolios in order to understand how business students make sense of environmental and human sustainability. While envisioning more transformative sustainability management education, we have also discussed the pedagogical implications of making the e-portfolios for enhancing the students' understanding of the sustainability mindset. ¬© 2021 Elsevier Ltd	2021	Sustainability Education and Awareness
Wang Y.; Sommier M.; Vasques A.	Sustainability education at higher education institutions: pedagogies and students‚Äô competences	Purpose: This study aims to examine whether the development of students‚Äô sustainability competences is dependent on how courses are delivered at higher education institutions (HEIs). It further investigates to what extent such competences can affect students‚Äô belief in the new environmental paradigm (NEP) and pro-environmental behaviors (PEBs). Design/methodology/approach: The data was collected through an online survey conducted in 2021 among the students of an international research university based in The Netherlands. The final sample (N = 262) consisted of all the students who completed the survey and claimed that they had taken at least one course that addressed	2022	Sustainability Education and Awareness

		sustainability. Linear regression models were used to examine the relationship of sustainability education and students,Äô competences, as well as their pro-environmental attitudes and behaviors. Findings: The findings reveal that the strength of universal, broadly applicable pedagogies is positively related to the development of students,Äô sustainability mindset/framework as well as their sustainability action/communication. The results also reveal that developing students,Äô competences on sustainability mindset/framework is directly related to their belief in the NEP and PEBs. Originality/value: To develop an integrative pedagogical approach requires understanding how a HEI,Äôs engagement in sustainability can impact students,Äô attitudes and behaviors, but little research has actually measured the development of students,Äô competences. This study fills this gap through empirically testing how different pedagogical approaches can affect students,Äô sustainability competences differently. This has important implications for systematically linking pedagogical approaches to teaching practices or concrete learning objectives. ¬© 2022, Yijing Wang, M√©lodine Sommier and Ana Vasques.		
Baber H.; Fanea-Ivanovici M.; Sarango-Lalangui P.	The influence of sustainability education on students,Äô entrepreneurial intentions	Purpose: This study aims to examine the influence of sustainability education in 15 Indian universities and the mediating role of the theory of planned behavior in predicting students,Äô intentions to start an enterprise supporting sustainability. Design/methodology/approach: The data, which consists of 422 samples, was collected from 15 universities in India. It was analyzed through partial least squares structural equation modeling, which is frequently used for prediction models. The model was further checked for goodness-of-fit using Amos. Findings: The results suggested that personal and subjective norms play a mediating role in shaping the intentions of students to choose entrepreneurship in the sustainability field. Education on sustainability has a significant influence on personal and subjective norms, and these norms further help to develop entrepreneurial intentions. Practical implications: The study will be helpful for researchers and universities in understanding the importance and stake of including courses on sustainability. Social implications: As the results suggest, social norms play a significant role in determining entrepreneurial intentions; therefore, the study will develop a societal culture of start-up education and ethos. Originality/value: The research is	2024	Sustainability Education and Awareness

Ruhanen L.; Bowles L.	Student Perspectives of Responsible Tourism Behaviour: The Role of Tourism Education	original and one of the first to examine the mediating role of the theory of planned behavior on the relationship between education and intentions to start a sustainable enterprise. ¬© 2023, Emerald Publishing Limited. Education is increasingly recognized as an important tool that can be used to support sustainability action and change. With more than one billion people traveling internationally each year, it is essential we develop effective ways to educate and encourage these travelers to adopt more responsible and sustainable long-term behaviors when traveling. As students studying tourism are the ‚Äúnext generation‚Äù of the travel and tourism workforce, they arguably play an integral role in affecting such collective changes in travel behavior. This paper reports on how the Education for Sustainability approach is being applied in an Australian university undergraduate course in an attempt to foster a greater stewardship toward responsible and sustainable tourism. The paper also seeks to empirically understand the assumption that education is key to changing tourist attitudes toward sustainable and responsible travel. ¬© 2019 The International Council on Hotel, Restaurant, and Institutional Education.	2020	Sustainability Education and Awareness
P√©rez D.R.; Freire L.M.	Restoration-based education: a brief overview of a field under construction	Education and restoration belong to fields that are profuse in academic production, are integrated into politics and governmental decision-making, are present in business sectors, and have gained the public interest and the participation of civil society. Therefore, it might seem relatively easy to integrate both spheres of social and environmental interest. However, both sciences and practices belong to traditions of human and natural sciences, cultures whose conceptual and methodological articulation have not been easy throughout history. This article argues that for true integration of education in ecological restoration the following conditions are required: (1) a defined positioning about sustainable development and the purpose of the ecological restoration, (2) recognition of the complexity of the environmental education field, and (3) knowledge of the main postulates of the ‚Äúrestoration-based education‚Äù (RBE). Based on selected RBE cases, we discuss the possibilities of putting into practice theoretical postulates of this transdisciplinary field of work. ¬© 2023 Society for Ecological Restoration.	2024	Sustainability Education and Awareness

Yli-Panula E.; Jeronen E.; M√§ki S.	School Culture Promoting Sustainability in Student Teachers,Äô Views	School culture includes values, principles, and criteria. It is an integral part of sustainability education, of which climate change education (CCE) is seen as a way to improve students,Äô ability to take action to mitigate climate change. This survey aimed to investigate Finnish student teachers,Äô views of factors important in implementing CCE in school culture and their abilities as teachers to promote CCE. Thirty-six student teachers wrote essays regarding the implementation of school culture and responded to a questionnaire concerning their ability to act as climate change (CC) educators and the challenges they identified in teaching and learning about it. Inductive content analysis was used to study the essays. In student teachers,Äô answers, six themes to implement in school culture were identified: elements, work community, teacher,Äôs impact, students in the centre, actors outside the school, and challenges. The student teachers highlighted challenges, such as views that deny CC and challenge the transformation of school culture to support sustainable development. The suggested ways to support CCE in daily school life that were very concrete, such as recycling and food education. Student teachers found their own ability to act as climate educators to be relatively good. They identified challenges, especially in motivating students to learn about CC and to participate and take action towards a climate-friendly lifestyle. Students,Äô conflicting attitudes, values, and beliefs related to CC, reinforced by their inner circle, were seen as challenges in teaching and learning about CC. Despite these challenges, transforming a school culture to support CCE should be the goal of every school. ¬© 2022 by the authors. Licensee MDPI, Basel, Switzerland.	2022	Sustainability Education and Awareness
Yusif S.; Cao Y.; Eissa A.; Elzaki E.; Khalil A.	A Measurement of Perceptions of the Forest Ecosystem among Visitors to the AL-Sunut Forest Reserve in Khartoum, Sudan	The present study aimed to understand visitors,Äô perceptions of the ecosystem service functions of the AL-Sunut Forest Reserve, as well as their recreational activities. Here, the impact of respondents,Äô socioeconomic status on visitors,Äô perceptions was statistically analyzed by t-tests and ANOVA (SPSS software v26). Meanwhile, multiple regression analysis was conducted to identify the relationships between factors shaping respondents,Äô perceptions of the AL-Sunut Forest during recreational activities. A total of 441 visitors were randomly selected and questioned through a questionnaire survey during February and March 2020. The results showed that visitors believed the recreational forest site was important and valuable and were willing to	2024	Sustainability Education and Awareness

		revisit it. Visitors also demonstrated a particular understanding of the ecosystem services provided by the forest ecosystem. There were significant differences in perceptions of ecosystem services among visitors of different backgrounds. The findings indicated that 79% of participants responded positively towards the importance of environmental education compared with any other education. In addition, 90% of respondents believed that habitats and natural resources such as forests must be protected. The results of the recreational activities of visitors showed that they acquired the most benefits when experiencing picturesque scenery and walking. Overall, the present findings can pave the way for decision-makers to develop a unique plan focusing on forests to implement an exhaustive approach to assessing the value of ecosystem services while emphasizing the general public,Äôs welfare. The study,Äôs results can also contribute to the future management of the AL-Sunut Forest. ¬© 2024 by the authors.		
Quadrado J.C.; Galikhanov M.F.; Zaitseva K.K.	Sustainable development principles for engineering educator	This paper focuses on the justification and incorporation of sustainable development course into the certified training of engineering educators. Under the ERASMUS+ Project ENTER, a consortium was set up to build the capacity of engineering HEIs by strengthening engineering educators,Äô preparation by an innovative kind of engineering pedagogy. One of the project tasks is to create a novel multicultural and international approach for formal post-graduate professional and pedagogical education of engineering educators. After a thorough educational market analysis, study of HEIs requirements and educators,Äô needs, a formal training program was designed. One of the core courses of that program is the course on Sustainable Development. The main aim of this course is to help educators to develop a strategy how to integrate sustainable development principles into engineering education at large. ¬© 2020 Moscow Polytechnic University. All rights reserved.	2020	Sustainability Education and Awareness
Danaher M.; Wu J.; Hewson M.	Sustainability: A regional australian experience of educating secondary geography teachers	The United Nations Sustainable Development Goal (SDG) number four seeks an equitable and widespread education that enables an outcome of sustainable development by 2030. Intersecting the studies of society and earth processes, a geographical education is well placed to make cohesive sense of all the individual knowledge silos that contribute to achieving sustainability. Geography education is compulsory for the first three years of the secondary education curriculum in Australia; however,	2021	Sustainable Development Goals in Practice

		research has shown that many geography teachers are underprepared and report limitations in their teaching of sustainability. This article engages with this research problem to provide a critical reflection, using experiential knowledge as an analytical lens, on how tertiary level geography training at one Australian regional university can equip undergraduate teacher education students with the values, knowledge, and skills needed to develop their future students,Äô understanding and appreciation of the principles of sustainability. The authors unpacked a geography minor for a Bachelor of Secondary Education degree at Central Queensland University and, deploying content analysis, explain how three units in that minor can develop these students,Äô values, knowledge, and skills through fostering initiatives and activities. The analysis was framed by elements of pedagogy that offer learners a context for developing active, global citizenship and participation to understand the interdependencies of ecological, societal, and economic systems including a multisided view of sustainability and sustainable development. The study concluded that the three geography units engage student teachers in sustainable thinking in a variety of ways, which can have a wider application in the geography curricula in other teacher education courses. More importantly, however, the study found that there is a critical need for collaboration between university teachers of sustainability content and university teachers of school-based pedagogy in order to maximise the efficacy of sustainability education in schools. ¬© 2021 by the authors. Licensee MDPI, Basel, Switzerland.		
Fleaca, B; Fleaca, E; Corocaescu, M	Reshaping Teaching for Sustainability in Business Engineering - A Pilot Study on Students' Outlooks and Learning Expectations	In the context of the rapid pace of technological advance, increasing technological interconnection and the shift toward sustainable economies, education is required to provide graduates with knowledge and skills to address the complex challenges posed by the fast-moving, globalized and interconnected world. Engineering education has gained particular importance, going beyond the technical knowledge and preparing students for entrepreneurial actions through the acquisition of hands-on, operative capabilities to drive new business models, integrating complex issues of technological change and digitization, environmental and socio-economic concerns. The authors have undertaken a quantitative survey aiming at investigating the students' outlook on modern sustainable development concerns and collecting relevant learning needs	2022	Sustainable Development Goals in Practice

		in a wide range of sustainability-related directions. The survey results stressed improvement solutions to augment teaching for sustainability in the case of business engineering areas such as a) embedding interdisciplinary topics into existing curricula linked to SDGs instead of creating new disciplines; b) developing and leveraging core shared values of citizenship for further learning across the entire curriculum and emphasizing the interrelatedness of knowledge, skills, attitudes and values; c) facilitating interdisciplinary knowledge for understanding and solving complex business and engineering problems; d) enhancing students' intellectual maturity and critical thinking to act in responsible ways, coping with new realities and demands. The Finally, the authors shared their views on the need to provide tailored content and quality information with differentiated knowledge about topics from different areas which might induce transformational change in local curricula to foster a sustainable mindset of graduates.		
Zahrani A.A.	Promoting sustainable entrepreneurship in training and education: The role of entrepreneurial culture	The main purpose of this research was to investigate how universities may help Saudi Arabian students who are planning to become entrepreneurs promote sustainability development goals. The intersection of ecological development and entrepreneurship is referred to as ‚Äúsustainable entrepreneurship.‚Äù Entrepreneurs want to provide practical educational solutions. Thus, this study seeks to fill this gap by developing a new model for measuring the relationships between entrepreneurial culture, sustainability training, and sustainability education in Saudi Arabia. A quantitative research ‚Äúsurvey questionnaire‚Äù found in the human relations theory of sustainable entrepreneurship was used to collect data. This study looked at the impact of three dimensions connected to the role of entrepreneurship in higher education using AMOS and Structural Equation Modelling (SEM). The data (n = 252) was examined using AMOS and SEM. Therefore, this study specifies 37 items, three of which are the most important. 1) a sustainable entrepreneurial culture, 2) sustainability training, and 3) sustainability education. The findings imply that a sustained entrepreneurial culture has a good influence on training and education. Furthermore, sustainability training has a good influence on sustainability education. As a result, this research supports the extended human relations theory of the function of a sustainable entrepreneurial culture by	2022	Sustainable Development Goals in Practice

		indicating that the model anticipates university students increasing their entrepreneurial culture via training and education in higher education. Copyright ¬© 2022 Zahrani.		
Andreoni V.; Richard A.	Exploring the interconnected nature of the sustainable development goals: the 2030 SDGs Game as a pedagogical tool for interdisciplinary education	Purpose: The purpose of this paper is to present the 2030 SDGs Game as a pedagogical tool for the promotion of interdisciplinary education. Based on the simulation of possible world outcomes for the year 2030, the game induces participants to reflect on the socioeconomic and environmental consequences of actions and facilitate the exploration of the interconnected nature of the Sustainable Development Goals. Design/methodology/approach: Starting with a review of the main benefits and constraints of interdisciplinary learning approaches, this paper discusses how pedagogical attitudes have change over time and suggests the use of the 2030 SDGs Game as a powerful tool for sustainability education. Composed by a set of cards with different projects and goals, the game connects participants to the principles of the Agenda 2030 and is suitable for a wide range of educational settings. In the case study presented in this paper, the game was played by 20 students from five different faculties of the University of Liverpool (UK). Findings: The participatory nature of the game, where players learn through the experience of play, is functional to support the co-creation of knowledge of the ‚Äúactive-learner-centred‚Äù approach, and facilitate the development of problem-solving attitudes, soft skills and team-working abilities. Originality/value: To the best of the authors‚Äô knowledge, this paper presents, for the first time, the 2030 SDGs Game as a pedagogical tool for interdisciplinary sustainability education. The game is relatively easy to play and is suitable to be used in a wide range of educational settings. ¬© 2023, Emerald Publishing Limited.	2024	Sustainable Development Goals in Practice
Garc√≠a-Segura T., Phd; Montalb√°n-Domingo L., Phd; Sanz M.A., Phd; Lozano-Torr√≥ A.	Sustainable Decision-Making Module: Application to Public Procurement	Universities are preparing future professionals to face real problems. Sustainable development is a challenge that requires particular attention from educational programs. In their profession, civil engineers address many decisions that can compromise the sustainability of infrastructure. This paper proposes a sustainable decision-making module to promote student competencies relevant to solving real engineering decision-making problems while meeting sustainability criteria. The module is tested in a project management course for a master's in Planning and Management in Civil Engineering program. Students were placed in a	2020	Sustainable Development Goals in Practice

		procurement process scenario with the objective of designing a sustainable decision-making layout for selecting the best construction company to construct a highway. The assessment of the student performance revealed that most students acquired higher-order cognitive skills, and the perception survey showed that this learning method has been widely accepted for developing competencies related to both decision-making and sustainable thinking. This study could serve as an example for engineering education to promote sustainable practices through the active exploration of decision-making in real professional situations. ¬© 2020 American Society of Civil Engineers.		
Bisogno M.; Cuadrado-Ballesteros B.; Manes-Rossi F.; Pe√±a-Miguel N.	Financial Sustainability and Sustainable Development in Local Governments: Empirical Insights	This study investigated if and how financial sustainability affects the ability of local governments to meet the 17 Sustainable Development Goals (SDGs) established by the United Nations. Two samples consisting of Italian and Spanish local governments were analyzed for the analysis. These municipalities were selected, as they provide many essential services largely linked with several SDGs. Findings show that local governments with better financial conditions devote more effort to achieving the SDGs connected with the biosphere, as well as social and economic development. Our results can stimulate politicians and managers to fight against tax evasion to increase their resources. ¬© 2024 Taylor & Francis Group, LLC.	2024	Sustainable Development Goals in Practice
Rosak-Szyrocka J.; Tiwari S.	Structural Equation Modeling (SEM) to Test Sustainable Development in University 4.0 in the Ultra-Smart Society Era	Sustainability has a significant role in the reputation and status of a higher education institution. Universities have a part in ‚Äúforming the values of society,‚Äù through educating the present and future generations of decision makers. Universities can help with economic and sustainable development (SD) in several ways, including mediating social conflicts and educating the public on scientific and technological issues. This study aimed to evaluate the students‚Äô agreement level (as a latent construct) to examine the causal relationship between predictors (Skills and activities, Behavioral dissemination, Society 5.0 and Industry 4.0), mediating (Education and Community Awareness) and outcome (Sustainable Development) variables, the multivariate statistical method; as a result, Partial Least Square Structural Equation Modeling (PLS-SEM) was performed. In order to characterize potential links, a dependency model in the form of structural equations was built based on the classification of the questions. The correlations between the various	2023	Sustainable Development Goals in Practice

		parameters were then confirmed using statistical techniques. The authors used SEM structural equations, which enabled them to ascertain the relationships between the overlapping parts in the subsequent step to identify potential connections between the survey,Äôs questions. Research has shown that education and sustainable development have a close connection. And it is especially important to stay alert and pick up information throughout the study. This study provides new information on sustainable development in modern Universities 4.0 and Society 5.0. This study adds empirical evidence of factors that influence the sustainability of universities as a driver of innovation and economic growth. This study also provides practical implications for the development of universities,Äô competitiveness. ¬© 2023 by the authors.		
Fritz M.M.C.; Cordova M.	Developing managers,Äô mindset to lead more sustainable supply chains	Supply chains,Äô broad operational capacity and their integrative potential are too relevant to be ignored. However, they are sometimes pursued with limited care for global sustainability concerns. This research paper argues how comprehensive the incorporation of sustainability in supply chain management is, discussing the importance of promoting supply chains rooted in a sustainability mindset, which employs a systems perspective to contribute to the Sustainable Development Goals. Using four cases from the electronics sector, the study proposes a framework that could be used to assess the sustainability within supply chain management as an alternative for the traditional TBL perspective, analyzing the sustainability mindset dimensions: ,ÄúKnowing,Äù and ,ÄúDoing,Äù. Also, the paper emphasizes the gap between what companies,Äô supply chains declare and what they actually would do towards sustainability, proposing that the ,ÄúBeing,Äù dimension of the sustainability mindset is still missing. ¬© 2023 The Authors	2023	Sustainable Management Practices
Klingenberg B.; Rothberg H.N.	The status quo of knowledge management and sustainability knowledge	The United Nations (UN) 2030 agenda for sustainable development issues an urgent call to transition to sustainable business models and life styles. Outlining seventeen concrete sustainable development goals (SDGs), organizations and individuals are encouraged to actively participate (United Nations, 2015). However, as of the 2019 report on the SDGs, progress is slow. Organizations that aspire to be economically viable as well as socially and environmentally responsible global citizens, need to understand what sustainability means and how to institutionalize	2020	Sustainable Management Practices

		its principles. This paper posits that some of the underlying reasons for slow progress are lack of full understanding of the required knowledge and its systemic nature, as well as potentially insufficient knowledge management processes. It proposes that sustainability knowledge learning should include three "DCA" steps: 1) What to know: Identify which knowledge is needed (DEFINE); 2) How to learn : Develop strategies to identify sources and learning strategies for the requisite sustainability knowledge (COLLECT); 3) How to use sustainability knowledge: Develop knowledge management practices that enable absorption and institutionalization (ACT). Comparing the DCA model to other sustainability knowledge management models reveals that internal processes are emphasized (ACT). Fewer models consider the second step, COLLECT. The necessity to identify knowledge needs, DEFINE is almost entirely absent. Given the complex nature of sustainability knowledge, it appears that currently, knowledge management practices may be inadequately designed to support organizations in their transformational change towards sustainability and in the development of required stakeholder partnerships. Said systemic nature is also ill reflected in knowledge management research for sustainability. Further limiting is a lack of a clear definition of sustainability knowledge. This paper is a call for research to establish a clear view of what sustainability knowledge is, and based on that, a more detailed development of effective knowledge management strategies. ¬© 2020 Academic Publishing International. All rights reserved.		
Molderez I.; Baraniuk D.; Lambrechts W.	The Role of Poetry in Promoting a Sustainability Mindset: Walter Benjamin as a Guide Toward a Slow Journey	The emergence of highly complex sustainability challenges in modern society has led to the necessity of searching for more effective approaches to education for sustainable development. Research has shown that reflection leads toward more profound levels of engagement with respect to sustainable actions. Therefore, higher education has a role to play in stimulating reflection in light of sustainability. Art-based techniques, which have not been included alongside traditional teaching methods, have begun to gain the attention of researchers and teachers in higher education as they produce a deeper impact and involvement and can have a positive influence on the minds and hearts of the students. The aim of this paper is to demonstrate that poetry can contribute to integrating the arts and humanities in management education. The potential effect of	2021	Sustainable Management Practices

		poetry on business management majors is being explored as a part of their Corporate Social Responsibility course. Poetry has considerable potential as an innovative approach to teach sustainability, but it is rather unusual in business education. Poetry was chosen as an enabler for reflection and emotions. This original teaching project was followed by a research project relying on reflective assignments. A rereading of Walter Benjamin's Illuminations from the perspective of sustainability studies was a source of inspiration, in particular ,ÄúTheses on the Philosophy of History,,Äù ,ÄúThe Storyteller,Äù and ,ÄúUnpacking My Library.,Äù The paper assumes that Benjamin's ideas relate to a slow journey involving ,Äúawakening,,Äù ,Äúwisdom,Äù and ,Äúin a process,,Äù three elements that are at the core of promoting a sustainability mindset. The research project consisted of four reflection assignments students had to comply with: reading and interpreting poetry; searching for a poem which would be most appropriate for the discussed sustainability topic; creating their own poem and reflecting on the whole task. The research took place in the second semester of 2020 and first semester of 2021, all in COVID-19 pandemic context. Students' participation was not mandatory, but the majority joined. Their perceptions and impressions reinforce the existing knowledge about the emotional power of poetry to encourage reflection. The results show that poetry plays a relevant role in encouraging future managers to develop a frame of mind that incorporates sustainability and responsibility. Business students are open to this approach because it adds a new and unexpected dimension to their studies. Despite the urge to integrate reflections, this is still an exception for the majority of management courses. The results suggest that poetry is a relevant instrument to promote a more sustainable mindset among future managers. Paradoxically, by emphasizing a slow journey, i.e., allowing time for integrating reflective practices, a transition toward sustainability in daily managerial processes can be accelerated. Copyright ¬© 2021 Molderez, Baraniuk and Lambrechts.		
Macagno T.; Nguyen-Quoc A.; Jarvis S.P.	Nurturing Sustainability Changemakers through Transformative Learning Using Design Thinking: Evidence from an Exploratory Qualitative Study	Globally, society faces significant problems, from climate crisis to persistent poverty. Education for Sustainable Development offers an approach to achieving a sustainable society. The challenge is creating changemakers with the knowledge, mindset, and competencies to innovate. Teaching sustainability tends to be discipline-specific, taught	2024	Sustainable Management Practices

		content-heavy via ‚Äúspoon-feeding‚Äù and neglecting student agency changes. To overcome these challenges, we developed a programme to ‚Äúteach‚Äù innovation for sustainability that combines transformative learning and design thinking as the pedagogy. Classes were anchored by solving a real-world sustainability challenge, facilitating experience transformation into new knowledge. Design Thinking is a transdisciplinary methodology that helps different disciplines collaborate on addressing complex problems. However, there is limited empirical evidence to support the effectiveness of this transformative pedagogy in sustainability education. What is the value of combining Design Thinking and Transformative Learning as a pedagogy in sustainability education? Based on the University College Dublin Innovation Academy‚Äôs Professional Diploma of Innovation for Sustainability, we address this research question by exploring the impacts of the programme design. Data were collected during and after the programme through students‚Äô reflections and observation field notes of teaching sections. Findings show that the programme design supported developing a sustainability mindset, sustainability literacy, and creative confidence. All characteristics support becoming a changemaker. ¬© 2024 by the authors.		
ƒÜwikla M.; G√≥ral A.; Bogacz-Wojtanowska E.; Dudkiewicz M.	Project-based work and sustainable development-A comparative case study of cultural animation projects	Currently, a growing interest in the issues related to sustainable development can be observed, with the role of culture in stimulating this development increasing simultaneously. Nevertheless, the function and meanings of culture for sustainable development, as well as culture in the context of sustainable development, have so far remained under-emphasised and under-theorised. For this reason, in this paper we will look at practical examples of culture and sustainable development combined. The undertaken research problem explores the project-based work in the field of cultural animation, and its impact on the pursuit of the objectives of sustainable development at the local level. Two case studies of Polish organisations involved in cultural animation activities have been analysed herein. Based on the research results, we showed that cultural animation is an important tool for enabling local communities to achieve sustainable development. What is also important is the fact that cultural animation activities often take the form of project-based work, which significantly affects the methodology and extent of their	2020	Sustainable Management Practices

Khalili Ardali Z.; Amirnejad H.; Mohammadi Limaei S.; Salehi S.	Assessment of Recreational Value in a Protected Forest Area Considering the New Environmental Paradigm (Case Study: Helen Forest, Southwestern Iran)	implementation. Therefore, in this article we also point to the relationship between the management of animation projects and the idea of sustainable development, emphasising both advantages and disadvantages thereof. ¬© 2020 by the authors. This study investigates the recreational value of the Helen protected forest area, incorporating the new environmental paradigm into economic valuation. Visitors‚Äô willingness to pay and its association with scores reflecting the new environmental paradigm were assessed through contingent valuation and a dual-dimensional questionnaire. Two models are employed: a base model with socio-economic variables and a model integrating new environmental paradigm. Results indicate that 83.04% of visitors are willing to pay for recreational use. The proposed amount, visit frequency, new environmental paradigm, age, gender, education, and income were found to significantly influence the acceptance of willingness to pay. Results indicated a strong positive correlation exists between new environmental paradigm and willingness to pay, highlighting the influence of environmental perspective. Average willingness to pay per household per visit is IRR 190,390.4 (USD 0.53), translating to an annual recreational value of IRR 22,629,264,215 (USD 64,088) for the entire Helen forest. The average new environmental paradigm scores for visitors stand at 57.36, with the statement ‚Äúplants and animals have similar rights to humans‚Äù receiving the highest score of 28.4. These findings emphasize the importance of considering environmental perspectives in managing recreational sites. Integrating a new environmental paradigm into valuation methods can inform sustainable management strategies that balance economic development with environmental conservation and social well-being. ¬© 2024 by the authors.	2024	Sustainable Management Practices

RESEARCH FINDINGS

Sustainability Education and Awareness

The theme of Sustainability Education and Awareness was explored across multiple studies, each contributing unique insights into how education impacts sustainability competencies, behaviors, and attitudes.

Wang et al. (2022) found that students' sustainability thinking and action/communication are favorably correlated with broadly applicable pedagogies at a Dutch international research institution. Additionally, they discovered a clear connection between students' pro-environmental behaviors (PEBs) and sustainability attitude and their acceptance of the New Environmental Paradigm (NEP). Poto and Murray (2024) argued for multidisciplinary and systems-thinking methods to attain environmental sustainability while discussing the significance of ecological literacy in legal inquiry. They make the case for a change in legal methodology that embraces active and participatory elements, offering a theoretical framework for reconsidering approaches to legal research and education. Baber et al. (2024) reported theirstudy on how Indian university students' inclinations to start their businesses were affected by sustainability education. They discovered that the association between entrepreneurial intentions and sustainability education is mediated by subjective and personal norms, with sustainability education having a major impact on these norms.

Finnish student teachers were surveyed by Yli-Panula et al. (2022) found out how they felt about including Climate Change Education (CCE) in the school curriculum. Six themes were found in the study, which also emphasized difficulties including students' divergent perspectives and ideals. The student teachers maintained their belief that changing school culture is crucial to promoting CCE despite these obstacles. Three dimensions were identified by Li et al. (2022) in their development of a critical thinking evaluation framework for humanities students: discipline cognition, critical thinking disposition, and critical thinking skills. It was discovered that the framework was a legitimate and accurate tool for assessing critical thinking skills. The use of Education for Sustainability in an Australian university course, to encourage responsible and sustainable tourism behaviors, was documented by Ruhanen and Bowles (2020). The focus of the research is on how education might influence travelers' perceptions of environmentally friendly travel.

The impact of family and educational systems on the sustainability values of Hong Kong university students was examined by Savelyeva (2022).According to the study, family has a big impact on students' environmental values, albeit there are variations depending on the gender and cohort. Using a fresh multicultural and international approach for engineering educators, Quadrado et al. (2020) concentrated on incorporating sustainable development principles into engineering education. Engineering students' attitudes toward Corporate Social Responsibility (CSR) concepts were evaluated by Saari et al. (2024). They discovered that students value responsible thinking and anticipate that businesses will follow socially and ecologically responsible business practices.

Preschoolers' perceptions of the relationship between humans and the environment were examined by Cengizoğlu et al. (2022). Following participation in an early childhood education for sustainability program, children began to propose recycling and made connections to global issues in their descriptions of the environment. To foster a sustainability attitude, Yang et al. (2021) investigated the application of contemplative photography in business education. They integrated the project into management courses in Germany, Russia, and the United States. To comprehend how students understood environmental and human sustainability, the study examined their electronic portfolios.

When Yusif et al. (2024) surveyed to gauge how visitors felt about the AL-Sunut Forest Reserve in Khartoum, Sudan, they discovered that they appreciated the recreational forest site and were aware of its ecological functions. The significance of environmental education and the public's desire to preserve natural resources were also mentioned in the report. Over one billion people go abroad each year, and education is a key instrument for encouraging sustainable and responsible behavior among them, according to Ruhanen & Bowles (2020). The next generation of workers in the travel and tourism sector will be composed mostly of students in these programs, and they will be crucial in influencing the sector's move towards sustainability. The goal of the study

is to create a sense of responsibility for sustainable tourism practices by using the Education for Sustainability approach in an undergraduate tourism course at an Australian university.

Together, these studies highlight the diverse ways that education can promote sustainable behaviors and knowledge in a variety of settings and fields.

Sustainable Development Goals (SDGs) in Practice

The topic of "Sustainable Development Goals in Practice" is examined in several studies, each of which offers a distinctive perspective on how to promote and implement the Sustainable Development Goals (SDGs) of the United Nations.

The potential of local governments to accomplish the SDGs and their financial sustainability were both studied by Bisogno et al. (2024). Their research, which focused on municipalities in Italy and Spain, discovered that local governments are more inclined to devote funds to SDGs about social and economic development as well as the biosphere when their financial situation is better. This implies that achieving financial sustainability is essential to the goal of local sustainable development. The 2030 SDGs Game was presented by Andreoni and Richard (2024) as a teaching aid for multidisciplinary instruction. The game encourages players to investigate the interconnectedness of the SDGs and to think about the socioeconomic and environmental ramifications of their choices. It is aimed to replicate world outcomes in 2030. A case study involving University of Liverpool students showed how the game fosters teamwork, problem-solving abilities, and co-creation of information, showing its potential as an important teaching tool for sustainability.

In the framework of University 4.0 and Society 5.0, Rosak-Szyrocka & Tiwari (2023) looked into the role of universities in fostering sustainable development. They investigated the causal links between numerous predictors, mediators, and outcomes related to sustainable development using partial least square structural equation modeling (PLS-SEM). Their study highlights the interdependence of education and sustainable development, underscoring the significance of ongoing education and consciousness. To ascertain students' perspectives and expectations for their education in the subject of business engineering, Fleaca et al. (2022) administered a survey. According to their findings, integrating multidisciplinary subjects into the current curriculum, fostering civic engagement, and strengthening critical thinking are crucial for equipping graduates to take on the intricate problems associated with sustainable economies.

The focus of Danaher et al. (2021) was on secondary geography teacher education in remote Australia. They examined a geography minor for a Bachelor of Secondary Education degree, finding ways that particular courses can enhance students' sustainability-related beliefs, understanding, and abilities. To improve the efficacy of sustainability education in schools, the study emphasizes the necessity of collaboration between university instructors of sustainability content and pedagogy. The significance of entrepreneurial culture in encouraging sustainable business among Saudi Arabian university students was investigated by Zahrani, (2022). The study found a favorable correlation between sustainability education, sustainability training, and sustainable entrepreneurial culture using structural equation modeling (SEM) and a quantitative survey. According to the research, students may be inspired to engage in entrepreneurial endeavors that support sustainability objectives by providing them with training and instruction that cultivates a sustainable entrepreneurial culture. A sustainable decision-making module for civil engineering students was proposed by García-Segura et al. (2020) and evaluated in a project management course. The goal of the curriculum was to improve students' ability to make sustainable decisions in practical engineering situations. The evaluation demonstrated that students gained higher-order cognitive abilities and had a good attitude towards the teaching approach, suggesting that it has the potential to support environmentally friendly engineering education practices.

In conclusion, these studies show how many methods can be used to incorporate sustainable development into a range of professional and educational settings. To advance the SDGs in practice, they emphasize the significance of financial sustainability, multidisciplinary learning, continuing education, and entrepreneurial culture.

Sustainable Management Practices

Numerous studies that stress the significance of incorporating sustainability into organizational and educational frameworks investigate the issue of sustainable management practices. A holistic approach to knowledge management, the importance of culture and the arts in fostering sustainability, and the cultivation of a sustainable mentality in managers and students are all highlighted by the research included in the publications.

According to Klingenberg and Rothberg (2020), inadequate knowledge management procedures and a lack of awareness of sustainability issues are to blame for the United Nations' Sustainable Development Goals (SDGs) being achieved slowly. They put forth a "DCA" model for knowledge learning that is sustainable and comprises three steps: identifying knowledge needs, gathering knowledge, and putting it to use using knowledge management techniques. This model places a strong emphasis on the internal workings of knowledge management and the need for more study to define sustainability knowledge precisely. Ćwikla et al. (2020) examine the effects of cultural animation initiatives on local sustainable development through a comparative case study. They discover that cultural animation—which is frequently carried out via project-based work—is an important instrument for helping local communities realize sustainable development. The paper outlines the benefits and drawbacks of the relationship between project management and sustainable development.

Molderez et al. (2021) look into how poetry might help business students develop a sustainable mindset. During the COVID-19 epidemic, they performed a study on the issue of sustainability through reflection tasks that featured poetry. According to the research, poetry might promote introspection and emotional involvement in aspiring managers, helping them to develop a sustainable attitude. In their 2023 article, Fritz and Cordova present a paradigm for evaluating supply chains' sustainability with an emphasis on how to integrate sustainability into supply chain management. They point out a discrepancy between corporate statements and real sustainability initiatives, suggesting that the "Being" aspect of the sustainability attitude is frequently disregarded.

An exploratory qualitative study on a program that teaches innovation for sustainability by fusing design thinking and transformational learning is presented by Macagno et al. (2024). Students who participate in the curriculum, which tackles real-world sustainability issues, have been demonstrated to acquire a sustainability attitude, literacy, and creative confidence, positioning them to become change agents. Last but not least, taking into account the new environmental paradigm, Khalili Ardali et al. (2024) evaluate the recreational value of the Helen protected forest in Iran. The relevance of incorporating environmental viewpoints into the management of recreational places is shown by their finding that there is a significant positive link between willingness to pay for recreational use and environmental perspective.

To summarise, the research about Sustainable Management Practices advocates for a comprehensive strategy to integrate sustainability into diverse facets of management and education. This entails developing a sustainability mindset in business education, incorporating sustainability into supply chain management, utilizing cultural and artistic tools for engagement, implementing clear knowledge management strategies, and taking environmental viewpoints into account when valuing natural resources. Achieving sustainable development objectives and striking a balance between social progress, environmental preservation, and economic growth need certain behaviors.

DISCUSSION

Sustainability Education and Awareness

Early childhood education in Turkey aids preschoolers in understanding the relationship between humans and the environment, according to research by Cengizoğlu et al. (2022). According to the study, kids started to perceive the environment as tranquil and came up with ideas for sustainable solutions like recycling, Li et al. (2022) emphasized the value of critical thinking in teaching sustainable development by creating a framework to assess critical thinking in humanities students. The framework encompasses abilities such as drive and receptivity. Yusif et al. (2024) investigated how tourists viewed a Sudanese forest reserve. Emphasizing the value of ecosystem services, the majority of visitors appreciated environmental education and supported the

preservation of natural resources. Pérez and Freire (2024) talked about how to combine ecological restoration and education. They stressed the importance of environmental education and having a thorough understanding of sustainable development.

Savelyeva (2022) investigated how Hong Kong's family and educational systems mold students' beliefs towards sustainability. The study discovered that these values are highly influenced by role modeling and family income. The goal of Quadrado et al. 2020) was to integrate sustainable development into engineering curricula. To assist instructors in incorporating sustainability principles into their instruction, they created a course. The impact of sustainability education on students' aspirations to launch sustainable firms was examined by Baber et al. (2024). According to the study, social and personal norms are quite important. Poto and Murray (2024) examined how ecological literacy may be included in legal education and argued for a change in legal procedures that are more environmentally conscious and participative.

Engineers' views on corporate social responsibility were evaluated by Saari et al. (2024). According to the survey, pupils understand the value of moral and environmentally friendly corporate activities. The opinions of Finnish student teachers on climate change education were investigated by Yli-Panula et al. in 2022. They noted difficulties with resolving conflicting beliefs and inspiring students. Yang et al. (2021) improved business students' sustainability education through the use of photography. The project's goal was to use visual attention to cultivate a sustainable attitude. The impact of various teaching approaches on students' sustainability competencies in higher education was examined by Wang et al. (2022). They discovered that universal pedagogies have a favorable effect on students' attitudes and actions toward the environment. According to Ruhanen and Bowles (2020), education plays a critical role in encouraging ethical tourism behavior, which is essential for the travel sector to be sustainable. The writers concentrate on a university course in Australia that employs the Education for Sustainability methodology to encourage students, who will comprise the industry's future workers, to take responsibility for the environment and make sustainable decisions. The study also looks into how well education works to shift travelers' perceptions about environmentally friendly travel.

From creative teaching strategies to the influence of family and societal norms on the development of sustainable behaviors, these studies jointly emphasize the significance of incorporating sustainability into many educational environments.

Sustainable Development Goals (SDGs) in Practice

Fleaca et al.2022) examine the significance of transforming business engineering education to tackle sustainability issues. They propose integrating SDG-related multidisciplinary subjects into current curricula, encouraging civic virtues, and improving critical thinking. Rosak-Szyrocka and Tiwari (2023) investigate the variables impacting sustainable growth in contemporary universities using structural equation modeling (SEM). They discover a strong link between learning and sustainable development, highlighting the part that academic institutions play in fostering innovation and economic expansion. Public procurement is the main emphasis of García-Segura et al. (2020) proposed a sustainable decision-making program for civil engineering students. The skills that students get from this curriculum in sustainable thinking and decision-making are critical for handling engineering problems that arise in the real world.

The capabilities of local governments to accomplish the SDGs and their financial sustainability are examined by Bisogno et al. (2024). They discover that governments are more inclined to fund SDGs about social and economic development as well as the biosphere when their financial situation is better. The 2030 SDGs Game is offered by Andreoni and Richard (2023) as a teaching aid for multidisciplinary instruction. By simulating global events in 2030, this game encourages players to reflect on their choices and investigate how the SDGs are interconnected. Danaher et al. (2021)consider how Australian geography education may give teachers the principles, information, and abilities they need to teach sustainability. They draw attention to the necessity of cooperation between pedagogy-focused academics and university instructors with expertise in sustainability content. The study conducted by Zahrani (2022) aims to examine how entrepreneurial culture influences Saudi

Arabian university students' pursuit of sustainable business. According to the study, sustainability education, training, and sustainable entrepreneurial culture are all positively correlated.

In conclusion, these passages highlight how important education is to achieving the SDGs. To prepare students for the difficult problems of sustainable development, they support multidisciplinary methods, useful resources like games and decision-making modules, and the incorporation of sustainability into curricula. To guarantee that educational establishments stay at the forefront of sustainable development initiatives, cooperation between educators, legislators, and students is essential.

Sustainable Management Practices

The authors of Klingenberg and Rothberg (2020) address the UN's Sustainable Development Goals (SDGs) and propose that insufficient knowledge of management methods and a lack of awareness are the main causes of the slow progress in fulfilling the SDGs. They put out a "DCA" model for managing knowledge related to sustainability, which entails identifying the knowledge that is required, gathering it, and taking appropriate action. This approach highlights the significance of internal procedures and the demand for a precise definition of knowledge about sustainability. The recreational value of Iran's Helen protected forest is evaluated by Khalili Ardali et al. (2024), which takes environmental viewpoints into account while valuing economic assets. According to the research, the majority of visitors are willing to pay for recreational use, and environmental viewpoints have a big impact on this readiness. The study emphasizes how crucial it is to include environmental values in economic appraisal to practice sustainable management. Ćwikla et al. (2020) use case studies of Polish organizations to investigate how cultural animation projects contribute to local sustainable development. It explores the relationship between project management and sustainable development, including its benefits and drawbacks, and demonstrates how cultural animation may be a tool for helping local communities achieve sustainable development.

Supply chain management should prioritize integrating sustainability, according to Fritz and Cordova (2023). They provide a methodology for evaluating supply chain sustainability that goes beyond the Triple Bottom Line (TBL) paradigm. The study highlights the disconnect between corporate sustainability claims and actions, contending that the "Being" aspect of the sustainability attitude is frequently disregarded. To solve practical sustainability concerns, Macagno et al. (2024) describe an educational curriculum that blends transformative learning and design thinking. The curriculum seeks to provide participants with the information, attitudes, and skills needed to become sustainable changemakers. The study offers factual proof of this pedagogy's efficacy in teaching sustainability. Molderez et al. (2021) investigate how poetry can help students studying business management develop a sustainable attitude. They contend that using art-based methods can encourage more in-depth contemplation and participation, both of which are essential for teaching sustainability. According to the study, poetry can be a useful tool for fostering in aspiring managers a more sustainable way of thinking.

To summarise, the aforementioned extracts shed light on the diverse methods of sustainability management and education, underscoring the necessity of inventive, introspective, and collaborative approaches in achieving sustainable development objectives.

CONCLUSION AND RECOMMENDATION

The results of this systematic research demonstrate how important it is to incorporate sustainability into management and educational strategies to meet long-term goals for global development. The development of sustainable attitudes and behaviors is mostly the result of education, and the SDGs cannot be implemented in the actual world without management techniques. The evaluation does, however, also point out deficiencies in both areas, such as uneven instructional strategies and a mismatch between business sustainability initiatives and policies. Interdisciplinary and cooperative strategies are required to promote sustainable development. For future leaders and managers to be prepared to handle environmental, social, and economic concerns, efforts must be made to match management methods and curriculum with sustainability goals.

The author recommends studies that integrate information from other domains, such as law, business, and environmental science, for further research. This facilitates more effective problem-solving of global sustainability issues. It is possible to create instruments to evaluate pupils' sustainability abilities, such as critical thinking and problem-solving. To determine what works best, test these tools in various situations and schools. It is also possible to do research on the subject of business-school collaboration on sustainability initiatives. Students will benefit from seeing how sustainability is used in the real world through this. Additionally, the researchers might investigate how various pedagogical approaches, such as experiential learning or creative thinking, support students' development of a sustainability perspective. Test these strategies across a range of nations and educational backgrounds. Researchers can also investigate how games and technology might improve the effectiveness and enjoyment of sustainability education for students of all ages. It is possible to carry out long-term research to find out how students' future jobs and leadership behaviour are impacted by sustainability education. It is also possible to concentrate on how sustainability education functions in other nations, taking into account regional politics, cultures, and economic conditions. This is crucial, particularly for nations facing particular difficulties. These suggestions are intended to direct future studies and instructional initiatives towards the development of more successful sustainability practices around the world.

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