Comprehensive literature review on international greening practices in higher education and adult learning

List of Authors (in alphabetical order)

Chiavarino, Claudia

Cittadini, Silvia

Fantasia, Antonio

Ioniță, Ruxandra

Manasia, Loredana

Mercan, Gamze

Merlin, Francesca

Panayi, Nicholas

Pârvan, Andrei

Reulens, Ann

Tornariti, Elena

Varol Selçuk, Zümrüt

Yaşar Akyar, Özgür

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Executive Summary

This report presents the findings of a comprehensive systematic literature review (SLR) examining international practices for integrating sustainability into higher education (HE) curricula. The study, conducted within the **GreenUS** project under the Erasmus+ KA220-HED framework, explores global efforts to green HE curriculum design, pedagogy, and institutional learning environments. Drawing from 195 peer-reviewed journal articles published between 1990 and 2024, the review provides an empirically grounded and thematically rich synthesis of curriculum transformation strategies aligned with UNESCO's (2024) Greening Curriculum Framework.

The review identifies a significant shift in sustainability education from content-based approaches to more holistic transformations that include pedagogical innovation and institutional engagement. The analysis is structured around three interrelated pillars of curriculum greening: **educational content**, **green pedagogies**, and **learning environments**. A combination of bibliometric mapping and qualitative synthesis was used to identify thematic categories within each pillar.

In terms of **curriculum content**, the findings underscore the dominance of systems thinking and sustainability competence development, alongside the emergence of transformative, value-based learning, applied and experiential strategies, the inclusion of local and indigenous knowledge, and the rise of technology-mediated content delivery. These categories represent a transition from knowledge transmission to the cultivation of critical thinking, ethical reasoning, and action-oriented learning.

The **green pedagogies** component highlights diverse teaching strategies such as experiential and place-based learning, critical and transformative approaches, interdisciplinary systems thinking, digital and hybrid formats, and co-constructive learning models. These pedagogies prioritize student agency, collaborative knowledge production, and alignment with real-world sustainability challenges, though institutional barriers—such as rigid curricula and lack of faculty training—remain prevalent.

The review also examines **learning environments**, identifying trends in community-based engagement, campus-as-laboratory approaches, and embodied, outdoor learning. These environments blur boundaries between classroom and society, facilitating civic participation and ecological awareness, but also require systemic institutional support.

Bibliometric analyses (via VOSviewer) revealed the conceptual density and dominant clusters in the literature, pointing to central themes like "curriculum," "competence," "systems," "technology," and "ethics." However, the maps also identified gaps, particularly around indigenous knowledge and social justice perspectives, suggesting an uneven integration of epistemic diversity.

The report is structured in three main parts:

1. **Bibliometric Analysis** – This section provides a quantitative mapping of the literature using co-occurrence analysis and visualizations derived from titles, abstracts, and keywords of selected SCOPUS and WoS papers. It outlines major trends, thematic clusters, and knowledge production dynamics in the field of sustainability education in higher education.

2. **Findings** – Organized into three analytical pillars:
   - *Green Curriculum Content*: This part examines how sustainability topics are framed, structured, and delivered in the curriculum, with a focus on systems thinking, competence-based education, and the integration of diverse knowledge systems.

- *Green Pedagogies for Sustainability Education*: This section explores pedagogical innovations, categorizing approaches such as experiential and place-based learning, critical and transformative pedagogies, systems-oriented instruction, digital and hybrid methods, and co-constructive learning strategies.
  - *Learning Environments*: The final component investigates how physical, virtual, and institutional spaces shape sustainability learning, identifying categories such as community-engaged settings, digital platforms, campus-as-laboratory models, and embodied, outdoor learning spaces.
3. **Discussion and Implications** – This section synthesizes cross-cutting insights, situates the findings within broader scholarly and policy debates, and offers implications for curriculum design, faculty development, institutional strategy, and educational research.

The report concludes with a forward-looking analysis, emphasizing that meaningful integration of sustainability into higher education demands systemic thinking, institutional courage, and sustained pedagogical innovation. This transformation must be anchored not only in knowledge transmission but in the cultivation of ethical responsibility, civic participation, and adaptive capacity—core competencies for navigating an uncertain and interdependent future.

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Introduction

The urgent need for integrating sustainability into education has become a key priority in higher education (HE) institutions worldwide. As the global community faces pressing environmental and social challenges, universities play a crucial role in preparing students to address these issues by embedding sustainable practices within curricula. This report presents a comprehensive systematic literature review (SLR) on international greening curriculum practices in HE, aiming to analyze current research trends, identify successful strategies, and highlight key challenges in implementing sustainability-driven education.

Greening the curriculum refers to the incorporation of environmental, social, and economic sustainability principles into higher education curricula, pedagogy, and institutional practices. This transformation extends beyond traditional environmental education to encompass systemic changes in course content, teaching methodologies, and university operations. A green curriculum integrates climate action, social responsibility, and sustainability competencies, fostering a holistic approach that engages students across cognitive, socio-emotional, and behavioral dimensions (*Greening Curriculum Guidance – Teaching and Learning for Climate Action*, 2024).

This study is conducted as part of the GreenUS project, a European initiative under the Erasmus+ KA220-HED Cooperation Partnerships in Higher Education framework. The project seeks to provide comprehensive guidance for integrating sustainability into HE curricula by examining global best practices and developing a structured framework for greening education. Specifically, this literature review aligns with Work Package 2 (WP2) of the project, which focuses on conducting a state-of-the-art review and documentation of greening education practices in HE and adult learning contexts.

Guided by the PICO framework, the study explores key research questions related to greening strategies, pedagogical innovations, and content integration in HE curricula. The primary research question driving this review is: *What are the strategies for greening the curriculum in higher education institutions?* This is further examined through sub-questions exploring climate justice, learning design principles, and curriculum content supporting sustainability integration.

The methodology of this review follows a systematic approach based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The study includes academic sources from Scopus and Web of Science, ensuring a broad and interdisciplinary perspective on curriculum greening. The review synthesizes findings across different institutional contexts to identify key trends, challenges, and innovative practices that contribute to embedding sustainability in HE curricula.

This report is structured as follows: following this introduction, the *Methodology* section outlines the study design, data collection, and selection criteria. The *Results* section presents key findings related to curriculum greening strategies, while the *Discussion* explores implications for HE institutions. The report concludes with recommendations for policy, practice, and future research directions to advance sustainability in education.

By offering an in-depth analysis of curriculum greening initiatives, this study aims to support HE institutions, policymakers, and educators in adopting and refining strategies for integrating sustainability into academic programs. Through this effort, we contribute to fostering an educational landscape that equips students with the knowledge and skills needed to drive meaningful environmental and societal change.

Understanding Greening Practices in Higher Education

In recent years, the effort to green higher education curricula has evolved from a peripheral concern into a central pedagogical and strategic priority. This shift is not only driven by the urgency of climate breakdown but also by the structural alignment of higher education institutions (HEIs) with global policy frameworks, notably the United Nations' Sustainable Development Goals (SDGs), particularly SDG 4.7. These frameworks call for education that fosters sustainable development, global citizenship, and cultural awareness. However, while sustainability is now frequently mentioned in policy statements, meaningful curricular integration remains uneven and contested.

What emerges from the literature is a broad, multifaceted rethinking of both **what** is taught and **how** education is delivered. Across disciplines, educators and institutions are reconfiguring teaching methods, content, and institutional roles to cultivate sustainability competencies such as systems thinking, ethical reasoning, and future-oriented decision-making. This transformation is characterized less by a single model and more by a growing **diversification of practices**—some innovative, others still nascent – see Figure 1.

A key tension lies in the gap between **policy vision and pedagogical reality**. While top-down initiatives increasingly call for comprehensive sustainability integration, educators often report a lack of support, time, and training to enact this shift effectively (Ade-Ojo, 2011; Zhao & Cheah, 2023). This disconnect underscores the need for co-designed curricular frameworks, where educational policy is informed by the lived realities of classrooms, disciplines, and learners.

Pedagogical innovation is central to greening the curriculum. Institutions are increasingly adopting **experiential, problem-based, and dialogic approaches** to foster engagement with real-world sustainability challenges. These practices move away from passive knowledge transfer toward active, participatory learning that emphasizes critical thinking and social responsibility (Jeronen, 2022; Martínez-Valdivia et al., 2021). Emerging models—such as flipped classrooms, maker education, and dialogic gatherings—aim to reconfigure the learning environment into a space where sustainability is practiced, not just taught.

At the same time, the integration of **digital and technological tools** is reshaping sustainability education. From AI-driven personalized learning systems to virtual labs and game-based modules, digital platforms are being used not only to increase access but also to introduce new modes of interaction and reflection (González-Muñoz et al., 2024; Singh et al., 2021) (Singh et al., 2022; González-Muñoz et al., 2024). In parallel, open educational resources and hybrid models are expanding the reach of sustainability education into rural and underserved regions, positioning digitalization as both a pedagogical and social justice tool.

Crucially, sustainability is no longer confined to environmental science or policy studies. There is a marked **disciplinary expansion** underway, with efforts to embed sustainability into architecture, business, tourism, engineering, education, and even technical and vocational training (Kang et al., 2024; Köhler et al., 2013). These efforts reflect a growing recognition that sustainability must become a transversal concern—one that reorients the entire knowledge ecosystem rather than being relegated to electives or extracurricular activities.

Yet, significant barriers remain. Across studies, faculty resistance, curriculum overload, fragmented institutional structures, and lack of consistent evaluation mechanisms are repeatedly cited as impediments to deep curricular transformation (Wilson & von der Heidt, 2013; Holdsworth & Thomas, 2016). Moreover, the assumption that the inclusion of sustainability content automatically leads to sustainability-oriented behavior is increasingly questioned. What is needed are not only better strategies for inclusion, but also sharper attention to **how students learn**, **what motivates them**, and **how institutional cultures shape outcomes**.

Indeed, new research suggests that **student-centeredness**, **expectation alignment**, and **intrinsic motivation** are crucial variables in the success of sustainability

education (Kocot et al., 2024; Van den Branden, 2015). The emphasis is shifting toward sustainability as not only a subject matter but as a **learning philosophy**—one that cultivates resilience, autonomy, and a sense of agency among learners.

More recent frameworks push even further, advocating for **epistemological and ontological shifts** in how sustainability is understood and taught. Posthumanist and multispecies approaches, for instance, challenge the anthropocentric assumptions underlying much of traditional education. These perspectives call for a radical decentering of the human, arguing that sustainability education must engage with ecological interdependence and ethical pluralism in deeper, more embodied ways (Kopnina, 2021; Lindgren & Öhman, 2019). Similarly, calls for "third-space" pedagogies and network science-based systems thinking reflect a broader ambition to equip learners not just to understand the world but to **reimagine their place within it** (Buttacavoli, 2024; Weber et al., 2021).

This evolution is also visible in institutional experiments that link sustainability with **community engagement**, **civic participation**, and **youth empowerment**. The role of HEIs as "green engines" for sustainable development—through research, outreach, and partnerships—is increasingly emphasized (Biancardi et al., 2023; Pocol et al., 2022). These efforts often blur the boundaries between curriculum, governance, and activism, suggesting that curriculum greening is as much a political and institutional project as it is a pedagogical one.

Therefore, the contemporary landscape of sustainability education in higher education is marked by both **momentum and fragmentation**. While experimentation and innovation abound, coherence and integration remain elusive. What is clear, however, is that greening the curriculum is no longer a technical task of content insertion. It is a structural, cultural, and philosophical transformation—one that demands rethinking not only what we teach, but how we learn, who we learn with, and what kind of future we are preparing for.

Methodology

The study design

This study employs a **systematic literature review (SLR)** methodology to explore the existing body of research on greening curriculum practices in higher education (HE). The research follows the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA** - Page et al., 2021) guidelines to ensure transparency and rigor in the identification, selection, and synthesis of relevant studies. The study aligns with **Work Package 2 (WP2)** of the GreenUS project, which aims to compile a state-of-the-art review on the integration of sustainability in HE curricula, including pedagogical strategies, institutional policies, and educational content.

Research Questions

Guided by the greening strategies proposed by UNESCO (2024), this systematic review addresses the following research questions:

- **RQ1:** What are the strategies for greening the curriculum in higher education institutions?

  - **RQ1.1:** How do greening curriculum practices advance climate justice (e.g., human rights, gender equality, inter-generational equity, and intra-cultural equity)?

     o **RQ1.2:** What pedagogies and learning design principles underpin greening initiatives in higher education?

     o **RQ1.3:** What educational content supports curriculum greening in HE?

These questions frame the investigation of curriculum greening from multiple dimensions, covering institutional, pedagogical, and content-level strategies.

The current review has been registered in the Open Science Framework which is a platform that supports the registration of protocols for systematic reviews (registration number: https://doi.org/10.17605/OSF.IO/2PGSW).

Eligibility criteria

    The eligibility criteria (see Table 1) for this systematic literature review on greening curriculum practices in higher education were designed to ensure the inclusion of high-quality, relevant, and methodologically sound studies. Studies were considered eligible if they explicitly addressed curriculum greening, sustainability education, or the integration of environmental principles into higher education curricula. The research had to focus on universities, colleges, or other higher education institutions, ensuring that primary and secondary education studies were excluded. Empirical research, case studies, systematic reviews, or robust theoretical frameworks were considered, provided they discussed specific curriculum strategies, pedagogical approaches, or institutional policies that contribute to sustainability education.

    To ensure academic rigor, only peer-reviewed journal articles were included, while conference proceedings, gray literature, and theses were excluded. The studies had to be published in English or have an available translation, and only those published between 1990 and 2024 were considered to maintain relevance and comprehensiveness. Articles were excluded if they lacked focus on higher education or did not specifically address curriculum greening. Studies that examined sustainability education broadly without application to curriculum development in HEIs were not included. Research that focused on sustainability initiatives unrelated to teaching and learning, such as campus greening projects or waste management programs, was also excluded. Opinion-based or editorial content without empirical evidence, studies with unclear methodologies, non-peer-reviewed sources, and articles without accessible full texts were removed from consideration.

Table 1
The inclusion and exclusion criteria

Inclusion	Exclusion
C1I Population – university faculty and students, HEIs	C1E The article does not refer to greening curriculum in higher education
C2I Intervention – changes to address greening that fall into the UNESCO framework	C2E The article refers to other forms of intervention in the community but not in HEIs
C3I Comparison – comparison of interventions in different regions of the world	C3E The article does not refer to strategies, practices, interventions
C4I Outcomes – effects on students, institutions, communities	C4E The paper is not available
C5I Context – Higher education	C5E The article is not peer reviewed
C6I Language: Studies published in English	C6E The study is not a journal article
C7I Time frame: studies published from the year 1990-2024	C7E The article is not written in English

Inclusion	Exclusion
C8I The article is peer reviewed, published in a journal (not a conference proceeding)	C8E The article does not refer to greening curriculum in higher education

The eligibility criteria were applied systematically across three screening stages. The title screening stage eliminated studies that were clearly unrelated to curriculum greening in HEIs. The abstract screening stage further refined the selection by ensuring alignment with the research focus. The full-text review phase involved a detailed assessment of the methodology, scope, and findings to determine final inclusion. These criteria were established to ensure that the included studies provide relevant insights into greening curriculum practices in higher education, are based on methodologically sound research, reflect a global perspective across different regions and institutional settings, and maintain academic rigor by including only peer-reviewed literature. By enforcing these criteria, the study guarantees a rigorous, focused, and high-quality review of research on sustainability integration in higher education curriculum.

Information sources

For the systematic literature review, we employed a search strategy using two academic databases: Web of Science (WoS) and Scopus. These platforms were selected due to their broad interdisciplinary coverage and high-quality indexing of peer-reviewed literature. The decision to use only Web of Science and Scopus ensured the inclusion of reliable, high-impact studies across educational, environmental, and interdisciplinary fields.

Search strategy

To ensure a systematic identification of relevant literature, we implemented a search strategy across two major academic databases: **Web of Science (WoS)** and **Scopus**. These databases were chosen for their multidisciplinary coverage, inclusion of high-quality peer-reviewed publications, and compatibility with systematic review protocols. The search process followed the **PRISMA** guidelines and focused on literature addressing curriculum greening in higher education.

The search was restricted to:

- **Years**: 1990–2024

- **Language**: English

- **Document type**: Peer-reviewed journal articles

- **Subject areas**: Education, Environmental Sciences, Social Sciences, and Multidisciplinary Studies

The search terms were based on combinations of keywords related to sustainable and environmental education, applied with Boolean operators. The following queries were used:

Web of Science Query: TS=("greening curriculum" OR "sustainable education" OR "environmental curriculum" OR "sustainability in curriculum") AND PY=(1990-2024) AND LA=(English) AND DT=(Article) AND WC=("Education & Educational Research" OR "Environmental Sciences" OR "Multidisciplinary Sciences")

Scopus Query: (TITLE-ABS-KEY ("greening curriculum" OR "sustainable education" OR "environmental curriculum" OR "sustainability in curriculum") AND PUBYEAR AFT 1989 AND PUBYEAR BEF 2024 AND LANGUAGE (english) AND DOCTYPE (ar) AND (LIMIT-TO

(SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "ENVI") OR LIMIT-TO (SUBJAREA, "MULT")))

The selected search terms focused on capturing studies that explore *what* is taught (curriculum content), *how* it is taught (pedagogical approaches), and *where* learning occurs (learning environments), in alignment with UNESCO's 2024 guidance on curriculum greening. The search was limited to English-language articles in academic journals to ensure relevance, accessibility, and the international applicability of findings.

Selection process & Data collection

The selection of studies followed a multi-phase screening and analysis process to ensure methodological rigor, consistency, and alignment with the objectives of this systematic literature review. The process comprised three main phases: (1) abstract and availability screening, (2) full-text screening and data extraction, and (3) qualitative data analysis.

Data extraction and deduplication process

Using the search strategies outlined above, a total of 467 articles were retrieved from the Web of Science database and 659 from Scopus ($n_{initial} = 1126\ papers$). To identify and remove duplicate records, we applied a formula-based approach using the Digital Object Identifier (DOI) as the unique identifier. Specifically, we used the following formula in Excel to detect duplicate entries between the two datasets: =IF(ISNUMBER(MATCH(B1, D:D, 0)), "Duplicate", "Unique")

This formula cross-referenced the DOI numbers across the two datasets, flagging any overlapping entries. When duplicates were identified ($n_{duplicates} = 404$), we retained the Web of Science entry and removed the corresponding record from the Scopus dataset to ensure consistency and avoid redundancy in analysis.

Following this deduplication process, all 467 Web of Science articles were retained, along with 262 unique articles from Scopus, resulting in a total of 722 (1126-404) unique studies included for further screening and analysis – see Figure 2.

Phase 1: Screening

Phase 1.1: Abstract-Based Screening. In the initial stage, a total of 722 articles from the Web of Science and Scopus databases were screened based on their abstracts. This step focused on assessing the relevance of each article to the scope of the review, which examines curriculum greening strategies in higher education. Studies that did not align with the research objectives or that addressed unrelated topics were excluded (n=277).

Phase 1.2: Availability-Based Screening. Following abstract review, the availability of each retained article was verified. Only studies with full-text access (i.e., those not behind paywalls without institutional access) were included. This criterion (C4E) was applied to ensure that all selected studies could be reviewed in full and analyzed in detail. 42 articles were excluded based on the C4E criterion.

Phase 2: Full-Text Screening and Data Extraction

In the second phase, the full texts of the 403 selected studies were reviewed against predefined inclusion criteria. Articles that meet the criteria proceed to the data extraction stage. **195 article met all the inclusion criteria.**

Data Extraction

For each eligible study, relevant information was systematically recorded in a dedicated sheet (see

). The following data points were extracted:

- **Type of Article**: Classified into categories such as empirical studies, mixed methods, conceptual articles, literature reviews, case reports, etc.

- **Field and Degree Course**: Identification of the academic discipline and degree program associated with the greening strategy (e.g., Teacher Training, Engineering, Environmental Science).

- **Main Objective and/or Research Questions**: Direct excerpts from the article to preserve accuracy.

- **Research Methodology**: Categorized as quantitative, qualitative, or mixed methods.

- **Research Sample**: Description of sample size, demographic information, and selection methods.

Phase 3: Data Analysis

The third phase involves a qualitative synthesis of the extracted data, recorded in the **"Data_analysis_sheet** in

table. Each study was analyzed along the following thematic categories:

1. **Content-Related Strategies**

   o Identification and summary of curriculum interventions, including design, goals, scope, and observed impacts.

2. **Pedagogical Approaches**

   o Documentation of teaching methods such as Problem-Based Learning, Gamification, Blended Learning, Experiential Learning, etc., and their role in promoting sustainability.

3. **Learning Environments**

   o Analysis of the educational settings, including online, hybrid, or community-based environments, and their contribution to learning outcomes.

4. **Other Strategies**

   o Inclusion of additional approaches to greening education or ESD that do not fall into the above categories.

Figure 2
The PRISMA flow diagram

Identification of studies via databases	

Identification	Records identified from*:
	   Databases (n = 2)
	   Total records (n=1126)
		→	Records removed *before screening*:
			   Duplicate records removed (n = 404)

Screening	Records screened (n = 722)	→	Records excluded (n = 277)
	Reports sought for retrieval (n = 445)	→	Reports not retrieved (n = 42)

	Reports assessed for eligibility
	(n = 403)
		→	Reports excluded (out of 722):
			   Reason 1 C1E (n = 327)
			   Reason 2 (n = 34)
			   Reason 3 (n = 114)
			   Reason 5 (n=7)
			   Reason 6 (n=0)
			   Reason 7 (n=2)
			   Reason 8 (n=1)

Included	Studies included in review (n = 195) Reports of included studies (n = 195)

Results

Bibliometric analysis

Before exploring the thematic findings of the reviewed literature, it is essential to first establish a broad empirical overview of the field through **bibliometric analysis**. This approach provides a macro-level understanding of the intellectual structure, key concepts, and emerging patterns within greening practices in higher education.

The bibliometric analysis was conducted using VOSviewer (version 1.6.20 for Microsoft Windows). The analysis focused on co-occurrence of terms drawn from the titles and abstracts of all articles included in the Web of Science and Scopus databases, as well as author keywords, to identify key themes and their interrelations.

Using VOSviewer's text mining functionality, both a term co-occurrence network and a keyword co-occurrence clustering were generated. A minimum threshold of three co-occurrences was set to ensure relevance and reduce noise. The resulting maps display how

frequently terms appear together and group them into clusters based on their contextual proximity, allowing for the identification of thematic concentrations across the field.

In total, three visualizations were created: (1) a cluster network showing the conceptual structure of the field based on title and abstract terms - Figure 3; (2) a heatmap visualizing term density and frequency - Figure 4; and (3) a keyword co-occurrence map highlighting dominant author-defined topics - Figure 8. Together, these visualizations offer a structured overview of how sustainability education is framed, which concepts dominate the discourse, and where gaps or peripheral areas may exist.

By analyzing the co-occurrence of terms from article titles and abstracts using VOSviewer, we generated a concept map (Figure 3) and a heatmap (Figure 4) that visualize the most salient topics and their interconnections. These maps serve as tools for guiding the qualitative synthesis that follows. In this way, the bibliometric mapping complements the systematic review methodology by anchoring the interpretative work in a robust and data-driven representation of the field's discursive landscape.

Figure 3
Co-occurrence map based on titles and abstracts
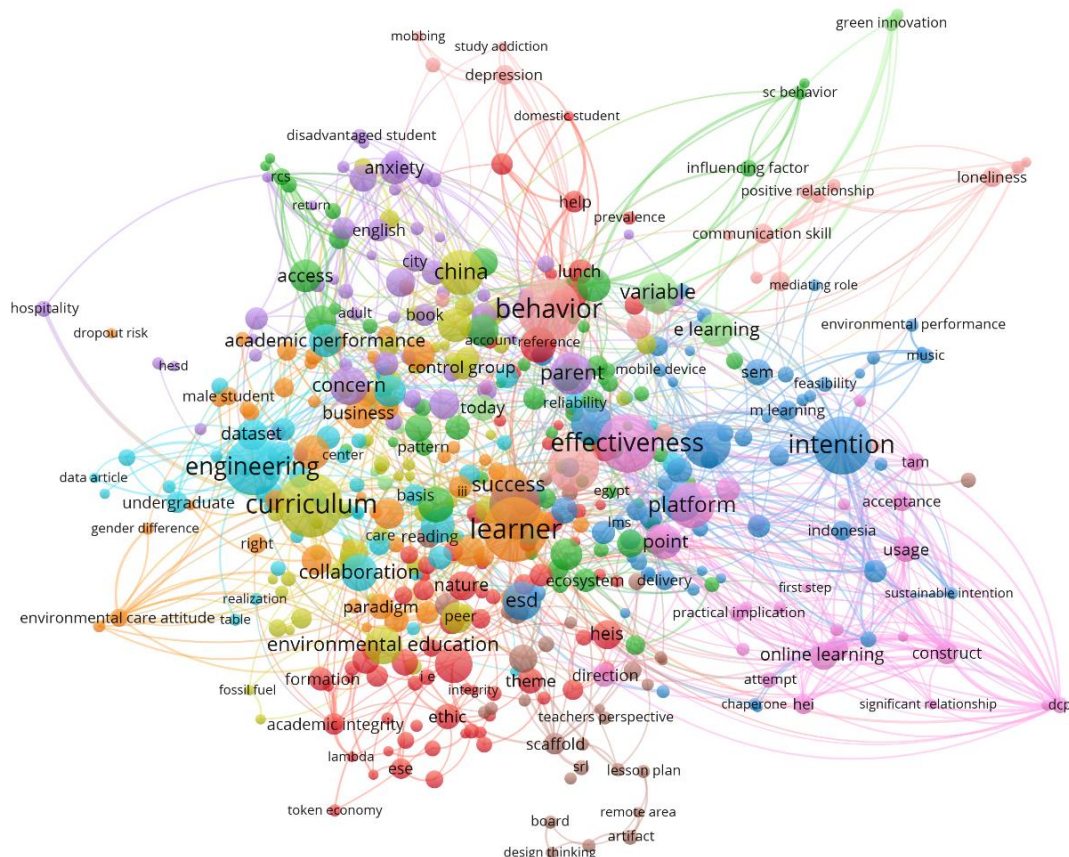
Note: Generated with VosViewer

The VOSviewer map generated from the titles and abstracts offers a compelling visual representation of the conceptual landscape shaping greening in higher education. It reveals clusters of interrelated concepts that co-occur across the literature, shedding light on both dominant thematic patterns and more emergent, peripheral topics.

At the center of the map lies a dense network anchored by terms such as "**curriculum**," "**learner**," "**collaboration**," and "**learning experience**." This nucleus reflects the centrality of pedagogical design and learner-centered approaches in the discourse. The prominence of "curriculum" suggests that questions of content organization, alignment, and

assessment continue to dominate sustainability education research. At the same time, the focus on "learner" and "collaboration" points to an enduring emphasis on student engagement, co-construction of knowledge, and participatory learning environments.

Surrounding this central core are several distinct clusters (visible in the heatmap in Figure 4 as well), each representing a particular thematic emphasis. One of the most prominent is a green-colored cluster organized around terms like "**behavio**r," "**intention**," "**effectiveness**," and "**platform**." This group captures a stream of research concerned with behavioral and attitudinal dimensions of sustainability, particularly in relation to digital and technology-mediated learning environments. Terms such as "**e-learning**," "**structural equation modeling**," and "**adoption**" indicate that many studies are focused on evaluating learner intentions and measuring pedagogical effectiveness through statistical modeling techniques. This suggests a strong presence of psychologically informed, outcomes-driven research within the field.

In contrast, a red cluster points to a different orientation—one that foregrounds **values, ethics, and identity in sustainability learning**. Terms like "ethics," "academic integrity," "justice," and "disaster" indicate a body of literature that draws from critical pedagogy, moral education, and transformative frameworks. This cluster reflects attempts to move beyond functionalist models of sustainability education, instead interrogating its normative foundations and its potential to shape learners' ethical and civic identities. These studies are less concerned with behavior change per se and more focused on cultivating critical consciousness and moral responsibility.

A large pink and blue area, dominated by terms like "intention," "online learning," "TAM" (Technology Acceptance Model), and "mobile device," signals the increasing attention paid to digital learning platforms and technology-enhanced pedagogies. These clusters reflect scholarship that evaluates the scalability, accessibility, and engagement potential of online and blended learning modalities in sustainability education. The density of this region suggests that the digitization of higher education is not merely a background condition but a primary field of pedagogical experimentation and inquiry.

The orange and brown clusters on the map represent more specific thematic directions. One focuses on environmental attitudes and affective learning outcomes, with terms like "environmental care," "attitude," and "education disparity," indicating interest in how learners develop environmental values and how these intersect with issues of access and equity. The other cluster is more design-oriented, with nodes such as "lesson plan," "artifact," and "design thinking," pointing to studies engaged in the development of instructional strategies and educational materials.

Figure 4
Heatmap of conceptual density and relative prominence of terms
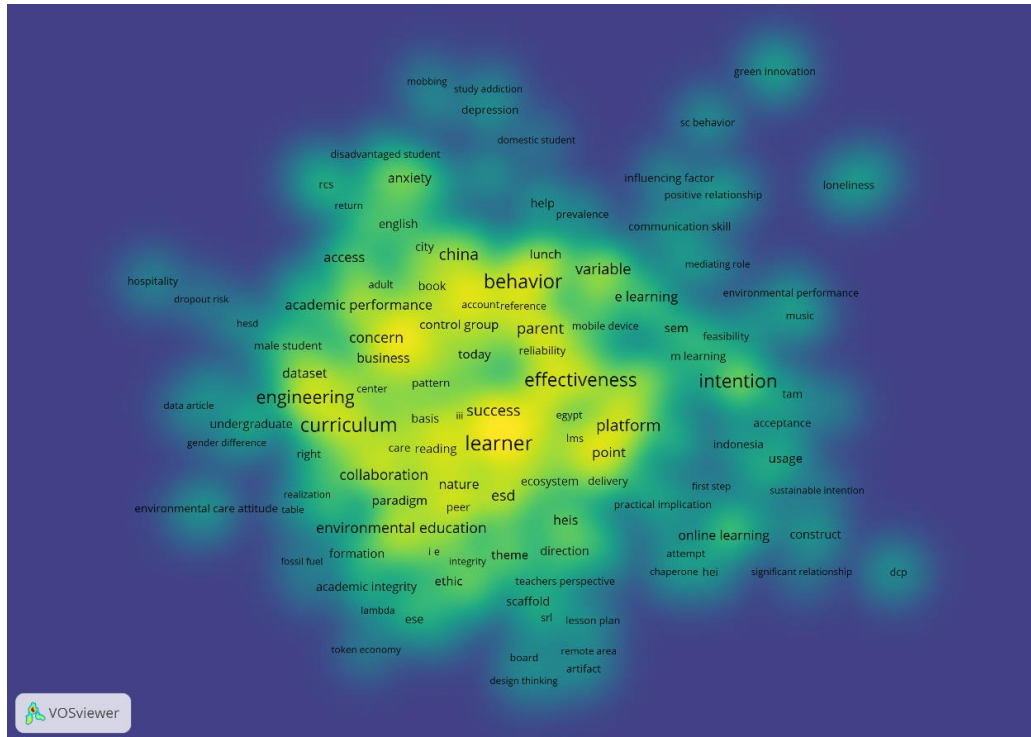
Note: Generated with VosViewer

Taken together, the maps reveal a field that is both diverse and uneven. Certain areas—particularly those related to digital learning, curriculum design, and behavioral intention—are highly concentrated and well-connected, suggesting mature, well-established lines of inquiry. Other regions, particularly those linked to ethics, decolonial perspectives, or the integration of indigenous knowledge, appear more marginal and fragmented. This asymmetry highlights the ongoing challenge of achieving a fully pluralistic, interdisciplinary sustainability pedagogy that embraces multiple ways of knowing and learning.

Ultimately, the VOSviewer map offers a valuable snapshot of the intellectual terrain currently shaping sustainability education in higher education. It validates many of the thematic categories identified in this review—such as technology-mediated content, critical and transformative pedagogies, and systems thinking—while also pointing to potential gaps and opportunities for further exploration. By visualizing the conceptual interdependencies among terms, the map reinforces the importance of relational, systems-based approaches not only in what we teach, but in how we understand the evolving discourse itself.

Systematic review

Study characteristics

This systematic review draws on 195 peer-reviewed journal articles published between 1990 and 2024, offering a comprehensive and global overview of the integration of sustainability into higher education curricula. The temporal distribution of the studies in Figure 5 shows a clear trajectory of increasing interest over time, with the majority of contributions

emerging after 2010 and a particularly notable spike following 2018. This pattern reflects the intensifying international focus on sustainability education, particularly in the wake of global policy developments such as the United Nations' Sustainable Development Goals. The prominence of SDG 4.7, which emphasizes education for sustainable development and global citizenship, is clearly mirrored in the scholarly landscape.

Figure 5
The evolution of the papers published between 1990-2024
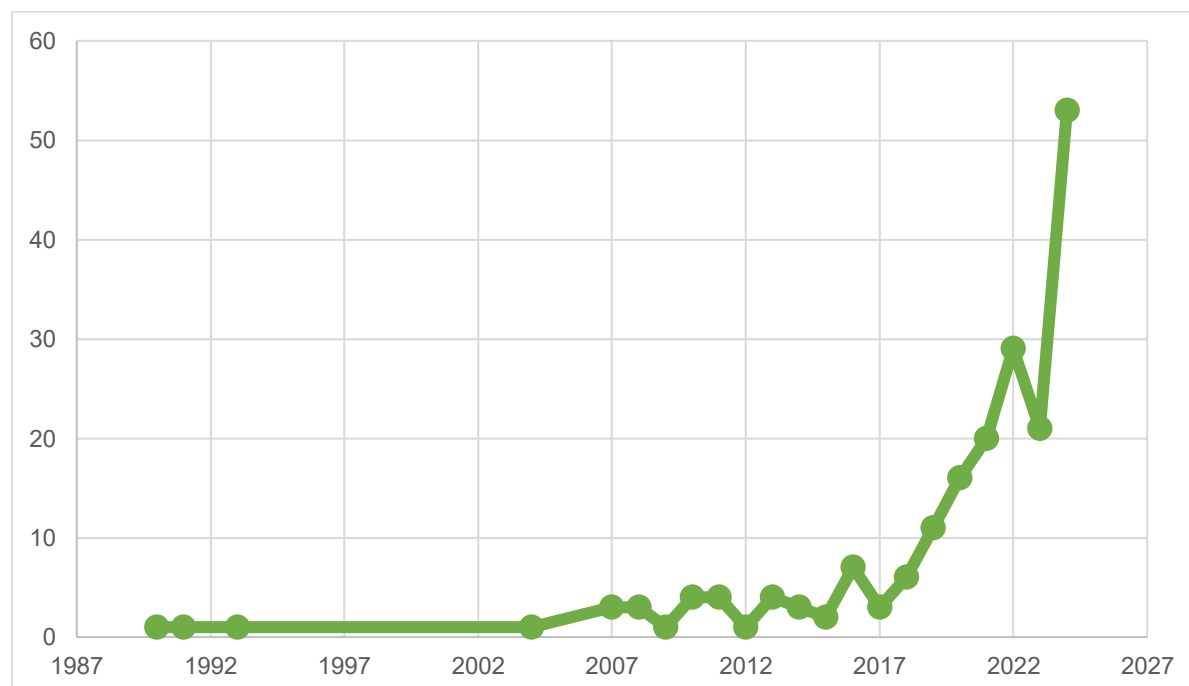
Note: Generated with VosViewer

The corpus of literature analyzed reveals a broad range of **methodological approaches** (see Figure 6). **Empirical studies** form the largest category, comprising over thirty percent of the sample. These articles typically apply quantitative or field-based data collection methods to evaluate the implementation and outcomes of greening strategies in academic settings. Another significant portion of the literature—approximately one quarter—employs **mixed methods designs**, combining qualitative and quantitative tools to provide deeper insight into the effectiveness, challenges, and stakeholder perspectives involved in curriculum transformation. **Conceptual articles** also make up a considerable segment of the dataset. These works often propose frameworks or models for understanding sustainability in higher education, offering theoretical scaffolding for future empirical work. In addition, **qualitative studies**, including ethnographic accounts, case studies, and reflective inquiries, provide valuable context-rich narratives on institutional change, educator experiences, and pedagogical practices. A smaller but important number of studies consist of **systematic reviews**, psychometric validations, and case reports, indicating growing interest in evaluating and standardizing sustainability education interventions.

The studies also vary considerably in their methodological orientation and data sources. Many adopt case study methodologies, often centered on single institutions or programs. These typically involve interviews with faculty, document analysis, and observations of curriculum delivery. Others rely on survey data to assess student attitudes, measure learning outcomes, or capture institutional capacity for sustainability. Action research and participatory designs also appear frequently, particularly in contexts where educators and

students co-design and implement sustainability initiatives. Framework development is another common theme, especially in studies that seek to align competencies, learning outcomes, and assessment strategies with broader sustainability goals.
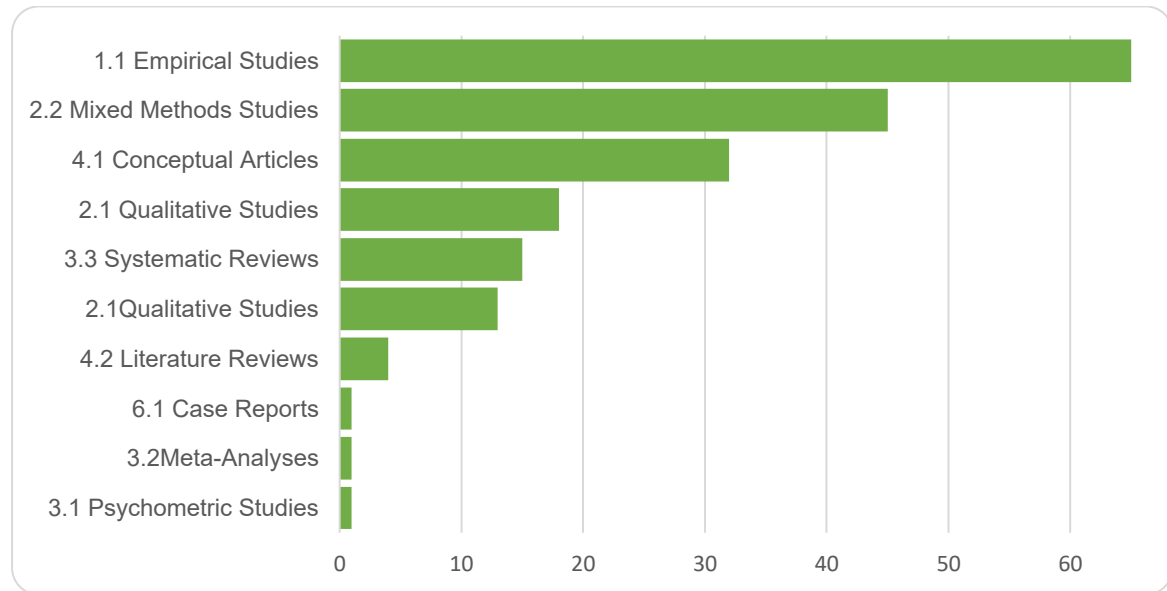
In terms of **disciplinary coverage** (see Figure 7), the reviewed literature highlights the cross-cutting nature of sustainability education. While environmental science and engineering are well-represented, a considerable number of studies emerge from fields not traditionally associated with environmental concerns. Teacher education, for instance, is a recurrent focus, often exploring the development of sustainability competencies in pre-service training programs. Business, management, and social sciences also feature prominently, as do interdisciplinary studies that span multiple faculties or address institutional-level strategies. Notably, several studies adopt a cross-curricular or university-wide lens, investigating how sustainability is embedded not only within academic programs but also through administrative policies, governance structures, and campus operations.

Figure 7
Disciplinary coverage of the analyzed papers
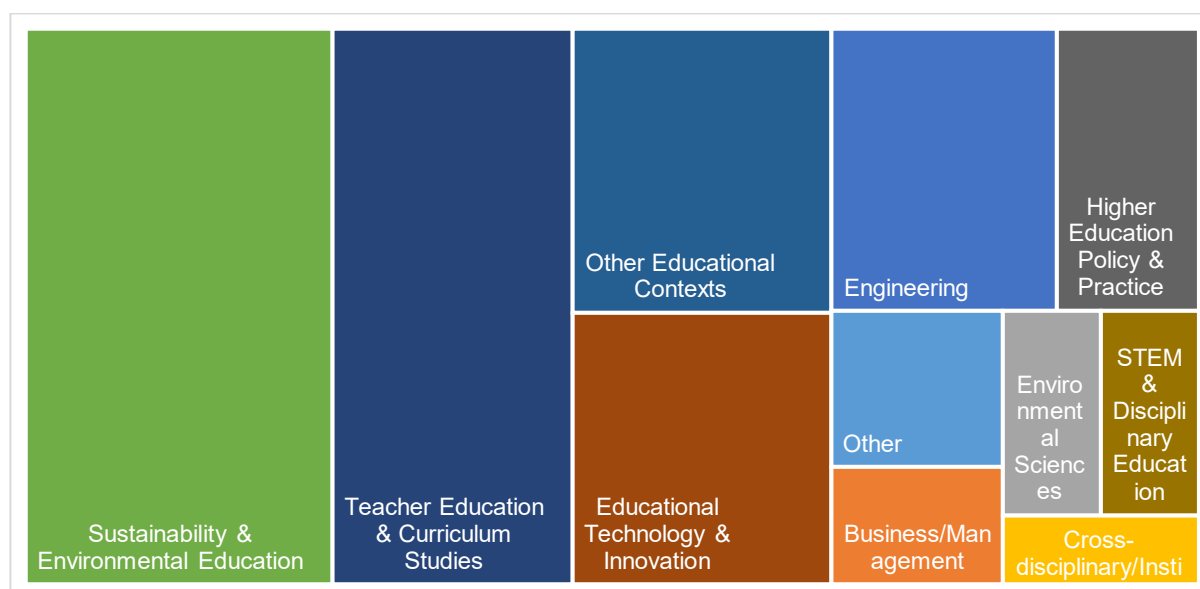
Although precise **geographic information** is not always uniformly reported, the journals and author affiliations suggest that the selected studies represent a diverse range of countries and educational contexts. Research from Europe, Asia, Africa, Latin America, and North America contributes to a global perspective on curriculum greening, allowing for comparative insights across different policy regimes, economic conditions, and cultural settings. This diversity enriches the analysis by demonstrating both the universality of sustainability challenges in education and the variety of localized responses.

Learning environments discussed in the literature range from traditional in-person settings to online and hybrid formats. Especially since the COVID-19 pandemic, there has been an uptick in studies examining digital tools and virtual learning environments used to support sustainability education. These include the use of simulations, gamification, AI-powered personalization tools, and remote collaborative platforms. In parallel, a number of studies emphasize community-based learning environments, where partnerships with local organizations and engagement with real-world sustainability challenges offer authentic, place-based learning experiences.

The **thematic aims** of the studies reflect the complex and multifaceted nature of curriculum greening. Many seek to explore the processes by which curricula are adapted to include sustainability content, either through course redesign or the introduction of new modules and programs. Others investigate the competencies that students develop as a result of these changes, such as systems thinking, ethical reasoning, and environmental awareness. Institutional dynamics are also a recurrent theme, with studies examining the role of leadership, policy frameworks, and organizational culture in enabling or impeding sustainability integration. In several cases, faculty attitudes and readiness for change are foregrounded, revealing both enthusiasm and resistance within academic communities. Importantly, a growing subset of the literature interrogates the philosophical and epistemological assumptions underlying sustainability education itself, calling for more inclusive, critical, and transformative approaches.

Analytic findings

To identify greening practices in higher education, each article was manually reviewed and summarized in a structured synthesis table (the file is available on the OSF platform), capturing variables such as publication metadata, disciplinary context, and methodological orientation. Central to this process was the categorization of curriculum strategies according to the UNESCO (2024) framework for greening education. Specifically, the summaries were structured around three guiding dimensions of the framework: **curriculum content** (what students learn), **pedagogies** (how they learn), and **learning environments** (where and through what conditions learning occurs). This alignment ensured that the review captured not just the presence of sustainability themes, but the pedagogical and institutional mechanisms that support their integration.

Following the summarization process, a keywords co-occurrence map was developed to identify the most recurrent terms and conceptual anchors in the "content-related strategies" field across the dataset. The VOSviewer output (see Figure 8) presents a clustered network of co-occurring terms derived from the full corpus of articles included in the review. Each term is assigned to a spatial position, cluster number, and frequency, indicating both its semantic proximity to other terms and its relative centrality within the field.

Figure 8

Keywords co-occurrence map[1]
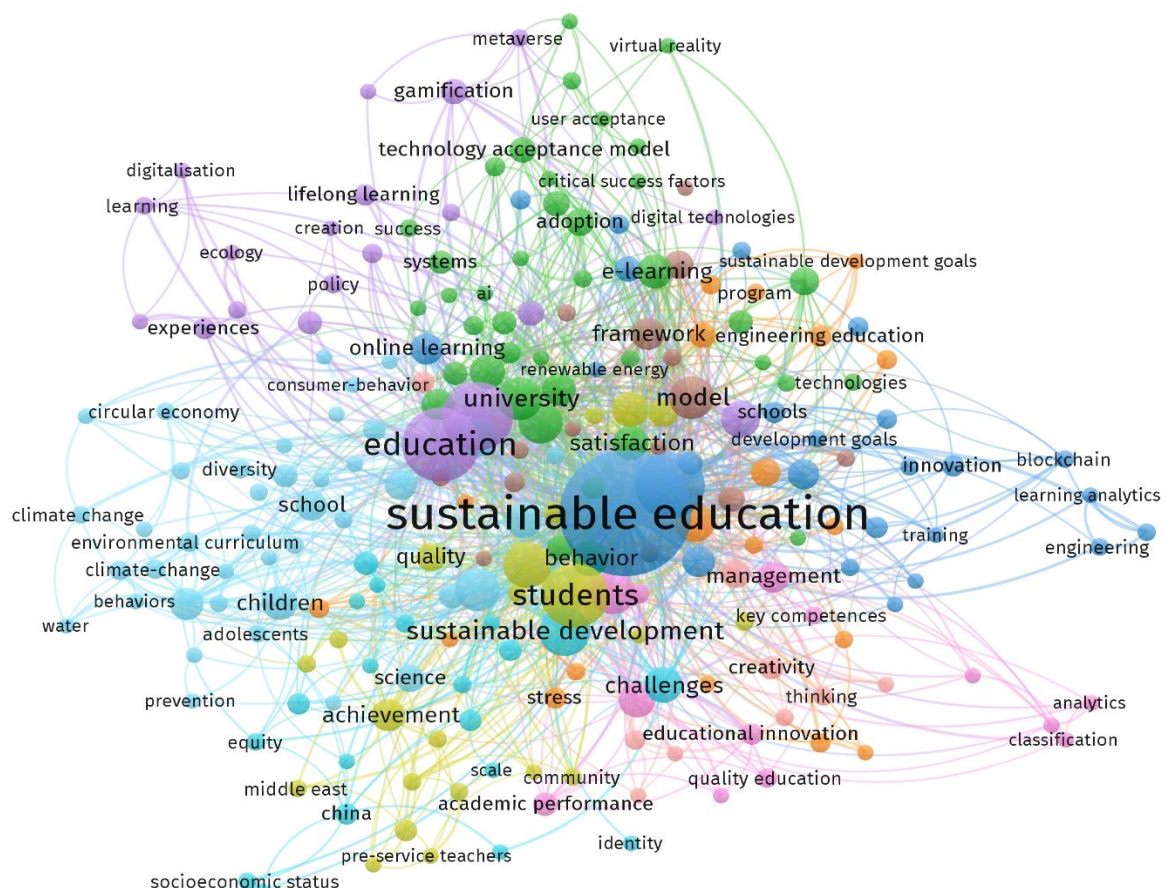
Note: Generated with VosViewer

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[1] Please note that this co-occurrence map is based on the summaries produced by the GreenUS consortium, not on the titles and abstracts (as the one in Figure 6, hence the differences).

From this visualization, we conducted a thematic translation exercise, in which emergent concept clusters were interpreted and restructured into **six analytically coherent content strategy categories**: systems and critical thinking, sustainability competence development, transformative or value-based content, applied and experiential sustainability, local and indigenous knowledge, and technology-mediated content.

Cluster 1, for example, is dominated by terms such as *learning*, *competences*, *knowledge*, *skills*, *teaching*, *learning outcomes*, *curriculum*, and *higher education*. These high-frequency and central concepts point clearly toward a competence-based approach to sustainability education. They emphasize the formal structuring of sustainability knowledge around measurable learning objectives and skill development, supporting our second thematic category: **Sustainability Competence Development**.

Cluster 3 groups terms such as *climate change*, *circular economy*, *environmental education, ecology*, *family*, *resilience*, and *health*. This grouping maps closely to curriculum content that foregrounds ecological and systemic literacy. These terms have been interpreted within the thematic frame of **Systems and Critical Thinking**, particularly as they emphasize interconnected systems, complex adaptive challenges, and planetary boundaries. In some cases, the proximity of terms like *resilience* and *family* also hints at relational and affective dimensions of learning, bridging into value-based education.

Another significant grouping, spanning Clusters 4 and 5, includes terms such as *transformative learning*, *values*, *ethics*, *justice*, *identity*, and *equity*. These terms formed the basis for our **Transformative or Value-Based Content** category. Articles contributing to this cluster generally move beyond cognitive learning to address students' personal worldviews, ethical reasoning, and socio-emotional development. The term *education for sustainability* also appears here, supporting the notion that transformation is a core goal of sustainability education rather than merely a methodological tool.

Clusters 6 and 9 contain a range of terms such as *project*, *collaborative learning*, *experiential learning*, *practice*, and *engagement*. These reflect an emphasis on applied pedagogies that embed learning in real-world or simulated contexts. They were consolidated into the **Applied and Experiential Sustainability** category. Such terms suggest pedagogical models that rely on lived experience, problem-based learning, or direct engagement with sustainability challenges.

The clusters also surface marginal but meaningful groupings, such as terms like *community*, *indigenous*, *local knowledge*, and *place-based education* (found in clusters with lower term frequency). These were synthesized into the **Local and Indigenous Knowledge** category. While not dominant in the frequency analysis, their appearance reflects growing scholarly attention to epistemic diversity and context-sensitive approaches in sustainability education.

Finally, Cluster 8 contains terms such as *technology*, *digital tools*, *AI*, *media*, *gamification*, and *online learning*. These terms are thematically coherent and form the basis for the **Technology-Mediated Content** category. Their presence across articles suggests increasing experimentation with hybrid, remote, or digitally supported formats in delivering sustainability content, even though they remain less conceptually central than other themes.

This analytical translation of the spatial and statistical structure of the VOSviewer map into thematic categories ensured that the framework remained both textually grounded and empirically robust. The resulting structure not only validated the six themes developed through qualitative synthesis, but also highlighted important trends within the field—particularly the dominance of competence-based and systems-oriented content. At the same time, it revealed underrepresented areas such as indigenous knowledge systems and justice-driven pedagogies, pointing to gaps in the current literature and opportunities for future curriculum development.

The next section unfolds the greening practices related to the six thematic categories.

Systems and Critical Thinking

A broad spectrum of literature positions systems thinking as a cornerstone of sustainability education. Within this body of work, systems thinking is not only treated as a critical cognitive skill but also as a structuring principle for curriculum design, interdisciplinary collaboration, and pedagogical innovation. The literature reflects a shift away from linear knowledge transmission toward fostering in students an understanding of dynamic relationships, causal feedback loops, and multi-scalar interactions across ecological, economic, and social systems (see Figure 9).

Figure 9

Dimensions of systems thinking in green education
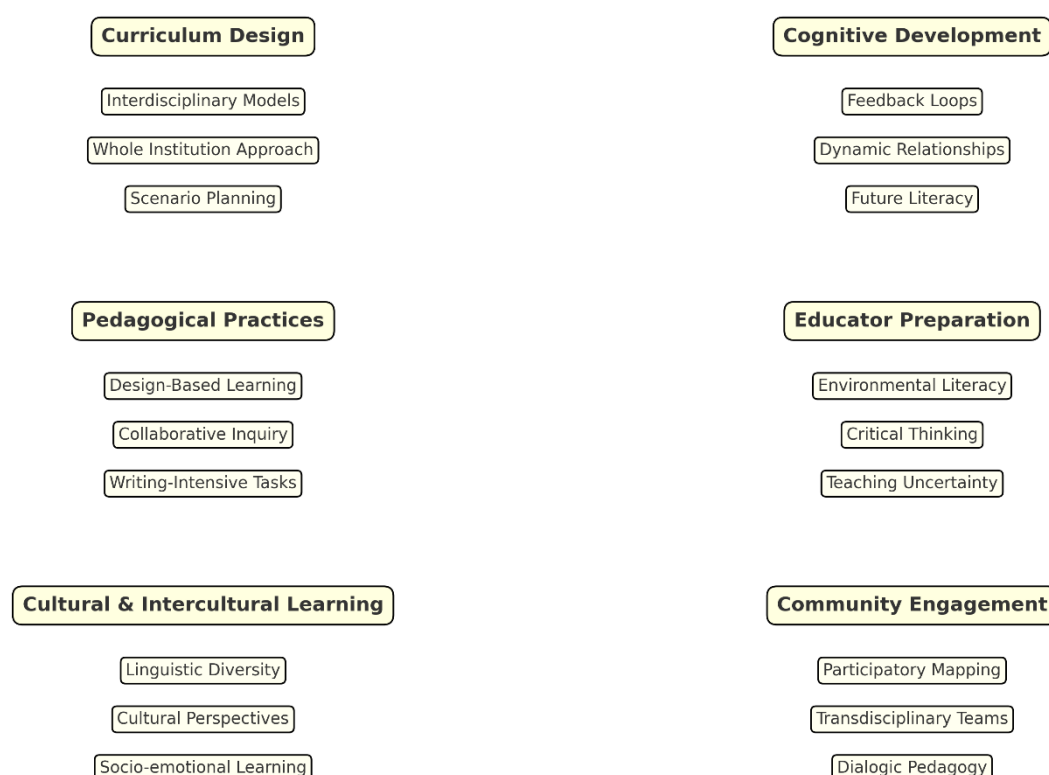
Source: Developed by the GreenUS consortium based on the keyword analysis

Several articles in the corpus frame systems thinking as essential to addressing complexity in real-world sustainability challenges. Zainal Abidin et al. (2024), for instance, implemented a design-based learning module in an engineering program, requiring students to simulate urban ecological systems and reflect on interdependencies. This pedagogical model strengthened students' capacity to map feedback loops and identify leverage points for sustainable intervention.

Beyond these explicit design interventions, other studies use systems thinking as a pedagogical anchor in interdisciplinary contexts. In Chaname-Chira et al. (2024), for example, critical thinking is embedded within a systems framework, asking students not only to analyze problems but to interrogate the structural assumptions that shape sustainability discourse. Powell et al. (2024) provide a university-level curriculum design model that conceptualizes higher education institutions as experimental ecosystems, highlighting the need to embed systems literacy across programs rather than confine it to isolated modules.

Fuller integration of systems thinking is also evident in approaches that combine curricular content with interdisciplinary and intercultural pedagogies. In Zaghoul (2024), high-impact educational practices (HIEPs) such as collaborative inquiry and writing-intensive assignments are used to engage students in metacognitive reflection. The curriculum encourages learners to understand sustainability not as a fixed domain of knowledge, but as a field shaped by intersecting systems, epistemologies, and interests. Similarly, Presi et al. (2024) underscore the importance of linguistic and cultural plurality in cultivating systems awareness. Thus, students develop the ability to analyze sustainability issues from multiple cultural and disciplinary perspectives, enhancing both analytical breadth and socio-emotional learning.

In the field of teacher education, another study (Li & Sindhuphak, 2024) introduces a **model for sustainable education** in which **systems thinking** is integrated into environmental literacy. The article emphasizes the preparation of future educators who can equip students with the skills to engage critically with uncertainty, risk, and transformation. This is echoed in Holdsworth & Thomas (2016), where a cross-disciplinary faculty collaboration designs sustainability modules that focus explicitly on complex problem-solving and scenario-based learning.

The significance of systems thinking is further reinforced by articles like Satalkina et al. (2024), which describe the implementation of **transdisciplinary learning environments** that emphasize collaboration between students, academics, and community actors. In this study, systems thinking is not limited to classroom exercises but is embedded in a broader framework of participatory knowledge production. Students engage in mapping sustainability challenges within their institutions and communities, co-developing responses that reflect both scientific analysis and local realities. This dialogic process reflects the transformative ethos of Freirean pedagogy and positions learners as agents within complex systems rather than passive recipients of predefined content.

Across these studies, systems thinking is portrayed as a value-laden orientation toward the world—an intellectual disposition that challenges reductionism and promotes holistic, anticipatory reasoning. In many cases, systems thinking supports the integration of other competencies, such as **future literacy**, **normative thinking**, and **collaboration**. It also serves as a gateway to interdisciplinarity, allowing sustainability education to transcend disciplinary silos and engage with the messiness of real-world problems.

At the same time, the literature reveals variability in how deeply systems thinking is embedded. While some studies, such as those by Zainal Abidin et al. (2024) and Powell et al. (2024), position systems logic as foundational to curriculum architecture, others incorporate it more instrumentally—as a conceptual tool to structure discrete classroom activities. This variance points to an ongoing challenge in higher education: translating the aspirational rhetoric of systems thinking into consistent pedagogical and institutional practice.

Nonetheless, the prominence of systems-related strategies across the reviewed literature suggests that sustainability educators increasingly recognize the inadequacy of linear, discipline-bound teaching models. Instead, they are turning to systems thinking to equip learners with the cognitive flexibility, ethical grounding, and interdisciplinary fluency needed to navigate the complex realities of sustainability transitions.

Sustainability Competence Development

Across the literature, **competence-based education** has emerged as one of the most widely adopted frameworks for embedding sustainability into higher education curriculum. Rather than presenting sustainability as a static body of knowledge, these approaches emphasize a set of dynamic, future-oriented competencies that prepare learners to think critically, act responsibly, and collaborate effectively in the face of complex challenges (Figure 10). Many programs draw from widely recognized models—such as UNESCO's key

competencies for sustainability and the European Commission's GreenComp (European Commission. Joint Research Centre, 2022)—while others develop context-specific frameworks aligned with institutional or disciplinary priorities.

One strong example is found in Anapey (2024), where an **Integrated Curriculum Model** was developed to operationalize green competencies across undergraduate programs. This approach embedded sustainability competencies—such as systems thinking, value-based decision-making, and civic responsibility—into both disciplinary and transdisciplinary learning experiences. The curriculum structure emphasized alignment between learning outcomes, teaching strategies, and assessment tools, ensuring that competencies were not abstract principles but measurable dimensions of student development.

Figure 10
Key elements in developing the sustainability competencies

Technical Competencies
- Life-cycle Analysis
- Sustainable Design
- Green Technologies

Transversal Competencies
- Teamwork
- Communication
- Interdisciplinary Thinking

Sustainability-Specific Competencies
- Systems Thinking
- Ethical Reasoning
- Climate Justice

Personalized Learning Approaches
- Digital Portfolios
- Self-Assessment
- Flexible Modules

Pedagogical Integration
- Scenario-Based Learning
- Real-World Projects
- Critical Reflection

Soft Skills Development
- Negotiation
- Leadership
- Value-Based Decision-Making

Source: Developed by the GreenUS consortium based on the keyword analysis

Innovation in competence modeling also appears in Embarak & Hawarna (2023), where the authors propose a "Theory of Maximization" that reconceptualizes sustainability competencies as deeply integrated with pedagogical content knowledge. This model suggests that true sustainability literacy requires not only domain-specific expertise but also the ability to translate that knowledge into socially and ethically relevant action. Competencies such as resilience, creativity, and ethical reasoning were infused into STEM-based courses through real-world design challenges, scenario development, and critical reflection activities.

Another contribution comes from Nguyen et al. (2023), which presents a **tripartite competency model** developed for application in environmental engineering programs. The model is structured around three core dimensions: technical competencies (e.g., life-cycle analysis), transversal competencies (e.g., teamwork, communication), and sustainability-specific competencies (e.g., climate justice, circular economy). These dimensions are reflected in course content, project-based learning formats, and assessment criteria, offering

a multidimensional approach that bridges technical rigor with ethical and collaborative capacities.

Some programs tailor competence development to institutional and student diversity. Dehtjare and Uzule (2023) advocates for a personalized human resource management approach to sustainability education. Rather than imposing a uniform set of competencies, the curriculum supports individualized learning pathways using digital portfolios, flexible modules, and self-assessment tools. This strategy allows learners to select and cultivate competencies aligned with their academic goals and career trajectories, while still maintaining coherence with institutional sustainability benchmarks.

Practical implementation also varies in terms of disciplinary integration. Maulana (2023) describes a model in which stand-alone soft skill courses focused on sustainability—such as negotiation, teamwork, and adaptive leadership—are embedded throughout the academic year, regardless of students' primary field of study. These competencies are scaffolded progressively, moving from basic awareness to critical application, and are assessed through case-based assignments and peer feedback.

While a strong consensus supports the value of competence-based education, several studies acknowledge persistent challenges. These include ambiguities in defining measurable outcomes, inconsistent training for faculty, and difficulties in translating generic frameworks into discipline-specific content. Nevertheless, competence development remains a powerful tool for aligning curriculum design with the long-term goals of sustainability education. It offers a common language across institutions and disciplines while allowing sufficient flexibility for contextual adaptation.

The reviewed studies consistently demonstrate that sustainability competencies are not limited to technical know-how, but span cognitive, affective, and behavioral dimensions. Programs that succeed in integrating these competencies provide students with more than knowledge—they foster the capacity to act with intention, collaborate across boundaries, and navigate uncertainty. In this way, competence-based education is not merely an instructional trend but a transformative pathway for rethinking the purpose and practice of higher education in the Anthropocene.

Transformative and Value-Based Content

A growing segment of the sustainability education literature emphasizes the importance of **values**, **ethics**, and **personal transformation** as foundational pillars of curricular design. In contrast to content that focuses primarily on cognitive learning outcomes, these approaches aim to shape learners' worldviews, sense of responsibility, and capacity for ethical reasoning. The inclusion of transformative and value-based content reflects an educational philosophy grounded in critical pedagogy, futures thinking, and post-normal science, where the focus is not only on knowledge acquisition but on inner change and societal relevance.

A recurring theme is the **role of reflective and affective learning** in shifting student identity and orientation toward sustainability. In Ashford et al. (2024), the authors describe a university-wide effort to implement Education for Sustainable Development (ESD) through transformative learning principles. The program incorporated **dialogic spaces**, **reflective writing**, and **community-based challenges** that prompted students to critically interrogate their personal values, cultural assumptions, and roles as change agents. The results indicated a marked increase in moral awareness and long-term motivation for sustainability action.

Marisa et al. (2024) present an innovative attempt to fuse artificial intelligence with values-based education. Particularly, the curriculum design used AI-driven personalization tools to support student reflection and self-evaluation, creating a feedback loop between ethical learning objectives and personalized learning paths. Rather than reinforcing

technocratic approaches to sustainability, the program emphasized relational and emotional intelligence, promoting agency and moral reasoning in technologically mediated contexts.

In Alshahrani (2023), a **Sustainable Blended Learning Model** was developed that integrated moral education, social responsibility, and cultural sensitivity into environmental studies. The program emphasized intercultural communication, empathy-building exercises, and exposure to global justice issues. Students were challenged to link sustainability with their own positionalities and ethical beliefs, demonstrating significant growth in both personal and collective efficacy.

Outdoor and place-based learning also featured prominently in transformative content strategies. Ameli (2022) describes a Nature and Outdoor Learning module that used embodied experiences—such as land stewardship, storytelling, and ecological rituals—to foster eco-literacy and spiritual engagement. Students reflected not only on sustainability challenges but on their relationship with the non-human world, framing learning as both cognitive and existential. The authors argue that transformative pedagogy must include multisensory and affective dimensions, especially when addressing **planetary boundaries** and **ecological grief**.

Another dimension of value-based learning appears in Ker & Van Gorp (2024), which discusses the implementation of the "Independent Learning Pathway" model within a national sustainability reform. In this context, students self-select values-based inquiry topics, co-create learning goals with mentors, and produce public-facing sustainability narratives. The project outcomes demonstrate enhanced agency, future orientation, and critical thinking, reinforcing the potential of student-led learning for cultivating ethical engagement.

Figure 11

Key elements in transformative and value-based sustainability learning

Pedagogical Foundations	Reflective Practices
Critical Pedagogy	Dialogic Spaces
Futures Thinking	Self-Evaluation
Post-normal Science	Values Inquiry

Emotional & Relational Learning	Modes of Delivery
Empathy Building	Outdoor Learning
Spiritual Engagement	Blended Learning
Relational Intelligence	AI-Personalized Pathways

Transformative Outcomes
Identity Shift
Agency
Ethical Reasoning
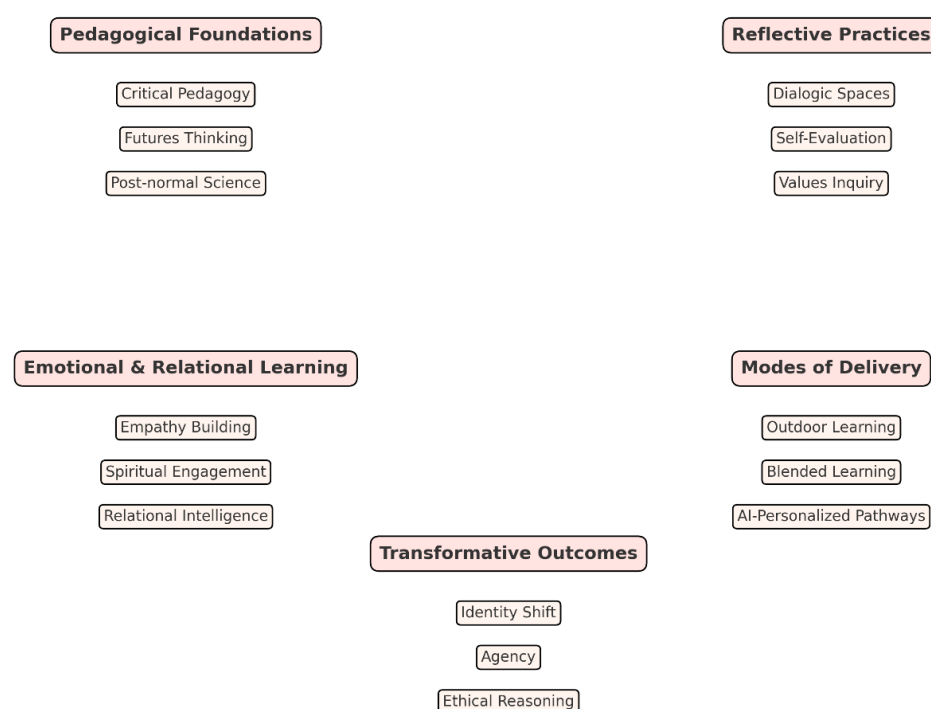
Source: Developed by the GreenUS consortium based on keyword analysis

Across these examples, **transformative learning** is rarely treated as a supplemental element. Rather, it is positioned as a central design principle, one that restructures the relationship between teacher and learner, problem and solution, knowledge and action. These approaches often invoke the work of Freire, Mezirow, or Sterling, emphasizing critical consciousness and reflexive praxis. Importantly, they challenge the instrumental logic of

traditional curricula, arguing that sustainability education must engage the whole person—intellectually, emotionally, ethically, and socially.

The reviewed literature also illustrates that **transformative content is often cross-cutting**. It complements systems thinking by adding normative depth, and it supports competence development by grounding action in values. However, implementation remains uneven. While many programs articulate values-based goals, fewer offer robust assessment tools or institutional strategies to support this work. Nonetheless, the inclusion of transformative and value-based content represents a vital evolution in sustainability education: one that aligns learning not only with knowledge systems, but with personal growth, civic responsibility, and social change.

Applied and Experiential Sustainability

Experiential learning continues to be a central strategy in embedding sustainability into higher education, enabling students to engage with complex sustainability problems in authentic contexts. By connecting learning to real-world environments—through partnerships, fieldwork, design challenges, or service-learning—these pedagogies allow students to move from passive knowledge acquisition to active problem-solving, ethical reflection, and civic participation. Across the literature, applied learning strategies appear not only as delivery tools but as epistemological commitments to learning through doing.

A notable example from Yu (2024), where sustainability is integrated into business modeling and entrepreneurship education through the lens of **green patent innovation**. In this study, students were tasked with analyzing real patent databases, identifying emerging green technologies, and applying them to sustainable business plans. The experiential process included stakeholder simulations, peer negotiation, and iterative feedback. By grounding sustainability in innovation ecosystems and entrepreneurial frameworks, the course not only built business literacy but also reinforced the importance of aligning economic activity with ecological and social constraints.

In Niemczyk (2022), applied sustainability education is embedded at the institutional level through project-based learning linked to the Sustainable Development Goals (SDGs). Students collaborated with municipal authorities to co-design interventions targeting local environmental and social issues. These projects required both systems understanding and interpersonal competence, emphasizing the intersection of technical and relational knowledge. Assessment was based not only on project outcomes but on students' reflection journals and stakeholder feedback.

Palma & Pedrozo (2022) offer a distributed model in which applied learning modules are deployed across disciplines. Students in economics, engineering, and literature all participate in community-anchored projects tailored to their fields, such as environmental accounting, sustainable design, or ecological storytelling. Despite disciplinary differences, the common denominator is real-world application: each project is grounded in a partnership with local actors, reinforcing the civic role of the university in sustainability transitions.

Several studies also demonstrate the power of **simulated or design-based experiential learning**. In Ma (2023), a sustainable fashion course uses complex case simulations to immerse students in ethically fraught decisions around supply chains, consumer behavior, and waste management. Students role-played different stakeholders in the fashion industry, balancing profitability with environmental justice and labor rights. This format deepened their systems thinking, while simultaneously enhancing ethical reasoning and negotiation skills.

Experiential models are not always confined to single courses. Volkova et al. (2019) describes a semester-long sustainability challenge embedded across three faculties, where transdisciplinary student teams addressed real briefs from NGOs and government agencies. The structure supported iterative prototyping, community interaction, and public presentation.

Feedback from practitioners provided a professional-level test of students' applied competencies, and the process fostered skills in leadership, adaptability, and collaborative design.

What emerges from these examples is a convergence around core **experiential learning principles**: immersion in authentic contexts, reflection as a driver of meaning-making, and collaborative knowledge construction. These approaches are often grounded in constructivist and humanistic pedagogies and intersect with the logic of civic engagement and action-oriented learning.

Moreover, experiential sustainability learning does more than bridge theory and practice—it reframes learning as transformation. Students are asked not only to understand sustainability problems but to act within them, often negotiating uncertainty, institutional constraints, and moral complexity. This pedagogical stance supports the development of agency, resilience, and commitment to long-term social and ecological well-being.

Figure 12
Key elements in experiential sustainability learning

Authentic Contexts

Community Projects

Fieldwork

Stakeholder Interaction

Interdisciplinary Learning

Cross-Faculty Modules

Thematic Challenges

Ecological Storytelling

Simulation & Case-Based Learning

Role Play

Scenario Design

Ethical Trade-offs

Institutional Integration

SDG Projects

Living Labs

Municipal Collaboration

Competence Outcomes

Agency

Negotiation

Leadership

Adaptability
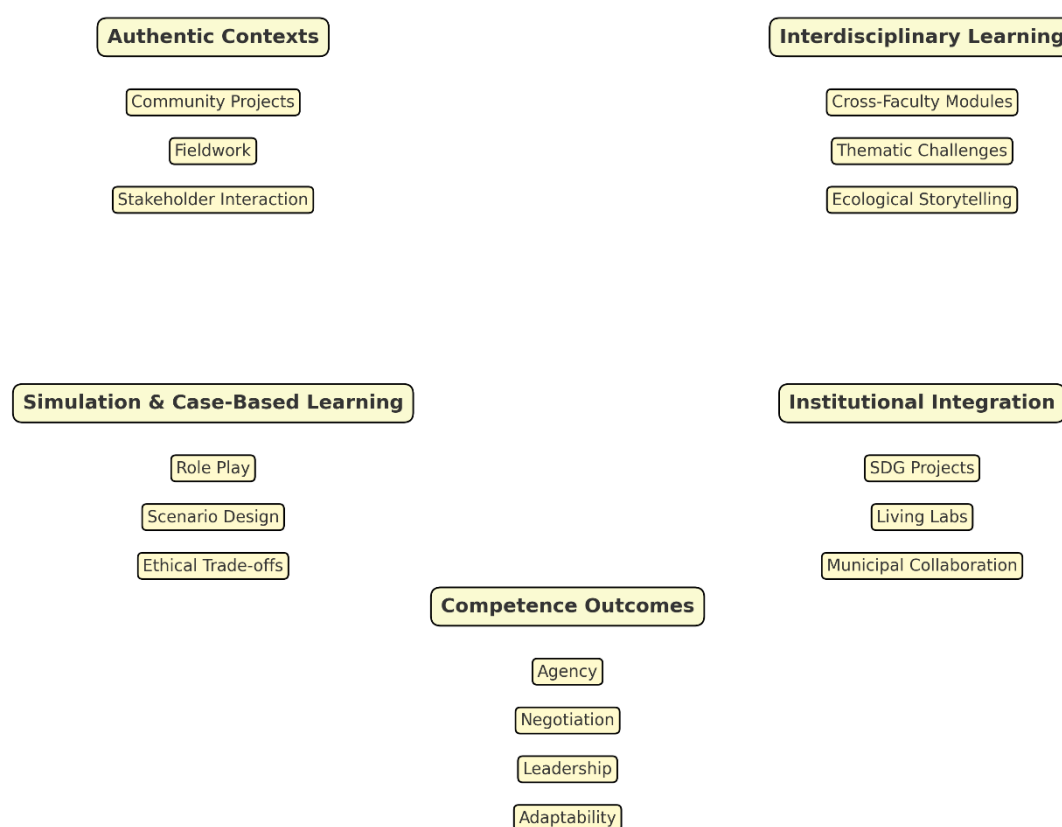
Source: Developed by the GreenUS consortium based on keyword analysis

As higher education institutions evolve toward third mission roles—beyond teaching and research to direct societal engagement—experiential sustainability strategies provide a mechanism for fostering deep learning while also addressing community and environmental needs. They transform the classroom into a laboratory for **sustainable futures**.

Local and Indigenous Knowledge

Although less frequently represented in the sustainability education literature, the integration of **local and indigenous knowledge systems** is emerging as a vital and theoretically rich area of curriculum innovation. These approaches challenge dominant

Western epistemologies by introducing relational, place-based, and culturally grounded understandings of sustainability (see Figure 13). Rather than treating indigenous knowledge as supplementary or anecdotal, these programs often position it as a central epistemological lens through which sustainability can be reimagined.

Several studies emphasize the importance of embedding eco-cultural relationships into curricular content and learning environments. In Ricket (2021), a core curriculum in environmental education was explicitly organized around the concepts of biophilia, ecological identity, and kinship with non-human species. Students participated in ritualized land engagement practices and reflective writing exercises, allowing them to explore their own embeddedness within local ecosystems. These pedagogical strategies aimed to cultivate not just knowledge, but a deeper emotional and ethical orientation toward the land.

Figure 13
Key elements in local and indigenous knowledge in greening education
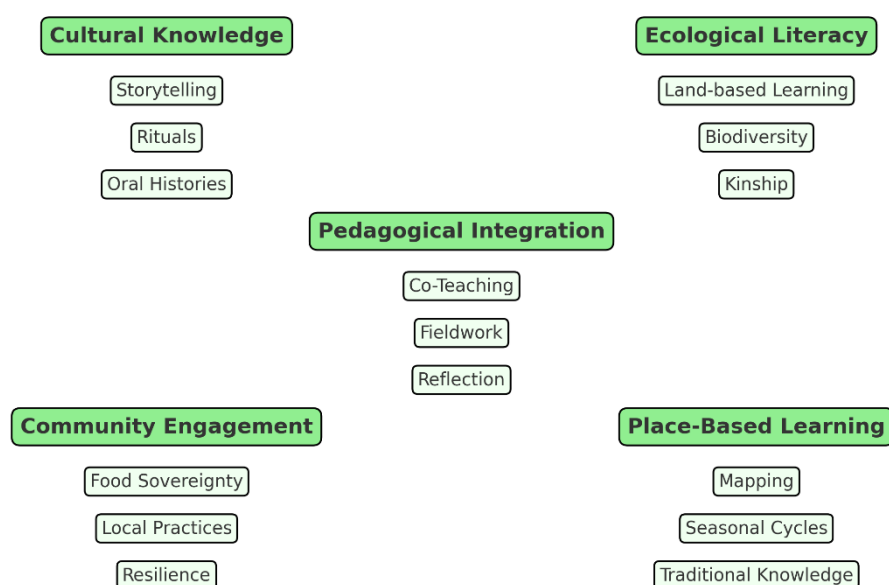
Source: Developed by the GreenUS consortium based on keyword analysis

Urban contexts can also serve as meaningful spaces for integrating local sustainability knowledge. MacKeen (2022) describes an urban gardening program implemented within vocational training schools in underserved communities. While not explicitly labeled as indigenous, the project leveraged intergenerational knowledge about food production, soil health, and ecological stewardship, emphasizing **community resilience** and **social cohesion**. Students actively contributed to food sovereignty initiatives within their neighborhoods, reinforcing the practical and cultural dimensions of sustainability education.

Even in contexts where local knowledge is not explicitly framed as "indigenous," the incorporation of **place-based and oral histories** can play a transformative role. In Eppinga et al. (2020), a four-week curriculum module challenged students to engage with local sustainability narratives through storytelling and community mapping. Participants were asked to identify and analyze sustainability practices rooted in cultural memory, such as water conservation rituals, seasonal migration patterns, or land-use customs. These stories were then linked to contemporary sustainability challenges, creating a dialogic learning experience that emphasized continuity, context, and ethical relevance.

The integration of local and indigenous knowledge also intersects with curriculum design at the institutional level. Wooltorton (2004) documents a whole-school sustainability initiative that embedded sustainability into the broader "school culture," drawing heavily from local values, customs, and vernacular ecological practices. The model was developed through participatory co-design with teachers, families, and community leaders, ensuring that curriculum reforms were rooted in local realities rather than imposed from external frameworks.

Across these studies, a common thread is the rejection of universalized models of sustainability education in favor of more situated, dialogical, and culturally respectful practices. These approaches seek not only to diversify content but to pluralize the very foundations of knowledge, acknowledging that sustainable futures cannot be built solely on Western scientific rationalism. They also promote relational learning—understanding sustainability not as a set of abstract competencies but as a deeply personal and collective commitment shaped by history, geography, and culture.

Several articles acknowledge the tension between institutional demands for standardized curricula and the inherently contextual nature of indigenous and local knowledge. There are also concerns about **tokenism**, where indigenous content is included superficially without genuine community involvement or epistemic respect. Still, the examples reviewed demonstrate that when meaningfully integrated, local and indigenous knowledge can deepen students' ecological awareness, foster intercultural dialogue, and inspire ethical, place-based action.

As sustainability education continues to evolve, the inclusion of local and indigenous frameworks offers a necessary corrective to technocratic and decontextualized approaches. It invites learners to understand the land not just as an object of study but as a teacher and relative—an epistemological shift essential for cultivating truly transformative sustainability learning.

Technology-Mediated Content

The integration of **digital tools**, **platforms**, and **virtual environments** into sustainability education is a rapidly evolving area of practice and research. While early implementations of educational technology focused largely on access and scalability, more recent developments emphasize interactivity, adaptive learning, and the simulation of complex systems. Across the reviewed studies, technology is increasingly positioned as an essential modality that can amplify experiential engagement, personalize content delivery, and support reflective, systems-oriented learning.

Several contributions demonstrate how digital platforms are being used to structure sustainability curricula in ways that align with both cognitive and affective learning goals. In Taboada-González and Aguilar-Virgen (2024), for instance, a structured learning management system was used to deliver sustainability knowledge while integrating embedded formative assessments and real-time feedback. Students engaged in digital self-assessments, scenario-based quizzes, and multimedia discussions that promoted systems thinking and strategic planning competencies. The use of platform analytics also enabled instructors to tailor content delivery and intervention strategies based on individual learner needs.

Vasudevan et al. (2024) introduces a model for sustainable online education in which pedagogical design is driven by both sustainability principles and digital affordances. The framework includes asynchronous video lectures, collaborative knowledge construction via forums, and reflection journals submitted through digital portfolios. This blended structure supports not only knowledge acquisition but deeper learner reflection and peer-to-peer dialogue. Notably, the model also incorporates **digital badges** tied to sustainability competencies, providing visible markers of achievement in areas such as ecological literacy, systems analysis, and ethical reasoning.

Simulated and immersive environments are another growing trend in technology-mediated learning. Buthelezi (2023) presents the Biomatrix Systems Thinking Model within a digitally facilitated learning context, where students interact with dynamic systems maps and decision-modeling tools. This approach is particularly effective for illustrating feedback loops, trade-offs, and long-term consequences of sustainability-related decisions. The model encourages students to test hypotheses and explore alternative future scenarios in a risk-free environment, making abstract systems concepts more tangible.

Meanwhile, Strielkowski et al. (2024) document the integration of geographic information systems (GIS) and interactive mapping tools in a sustainability-themed urban planning course. Students collected spatial data on green infrastructure, pollution, and housing equity, and then visualized their analyses using open-source mapping software. The technology not only enabled complex, place-based inquiry but also allowed students to share their findings with local stakeholders via web-based dashboards—bridging classroom learning with public engagement.

These diverse technological approaches reveal a common pedagogical thread: the use of digital tools to scaffold and deepen sustainability learning by enabling interactivity, personalization, and systemic complexity. Technology-mediated learning environments often support multimodal learning styles, allow for just-in-time feedback, and provide flexible pathways for learners with diverse backgrounds or access needs. Moreover, they create new possibilities for transdisciplinary exploration, such as combining environmental data with sociocultural mapping or integrating gamified decision-making with ethical reasoning tasks.

Figure 14
Digital tools in green education practices
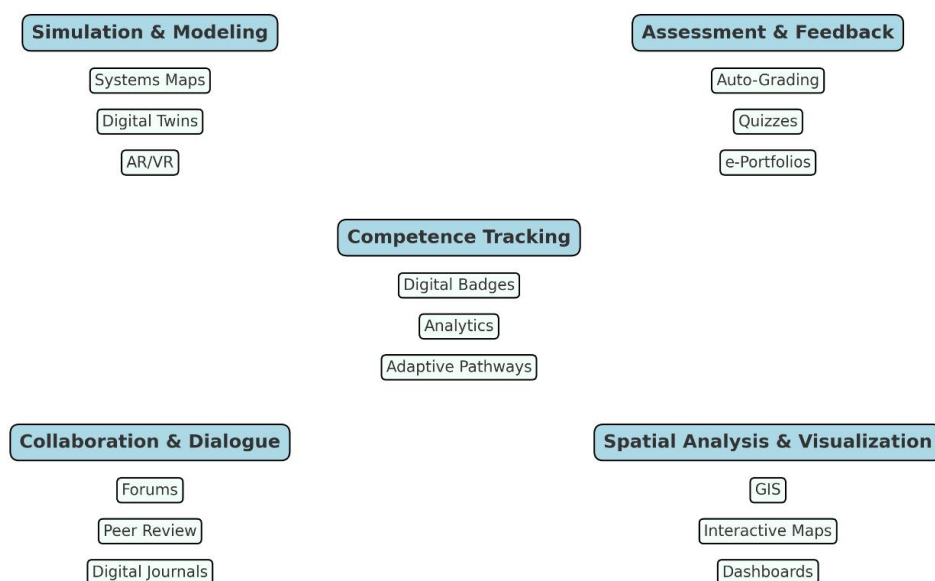
Source: Developed by the GreenUS consortium based on keyword analysis

Despite the pedagogical benefits of digital integration, several limitations persist within technology-mediated sustainability education. Issues such as digital fatigue, unequal access to technological infrastructure, and insufficient faculty preparedness continue to hinder widespread and equitable implementation. In response, contemporary frameworks are increasingly prioritizing inclusive, learner-centered design principles, emphasizing the development of low-bandwidth solutions and the adoption of open educational resources. Additionally, growing attention is being paid to the ecological footprint of educational

technologies themselves, prompting critical reflection on the material, energy, and policy dimensions of digital tool deployment in higher education.

Summary of Key Patterns

The synthesis of findings across the six thematic categories—systems and critical thinking, sustainability competence development, transformative and value-based content, applied and experiential learning, local and indigenous knowledge, and technology-mediated content—reveals several converging trends and persistent tensions that define the current landscape of sustainability curriculum design in higher education.

A first and highly salient pattern is the **prominence of systems thinking** and **applied learning** as the conceptual and operational backbone of sustainability education. Numerous programs across disciplines—from engineering to teacher training—foreground systemic reasoning and experiential strategies as essential to fostering learners' capacity to navigate complex sustainability challenges. Systems thinking is not only positioned as a discrete skill but as a pedagogical orientation that shapes curriculum architecture, interdisciplinary collaboration, and institutional design. Similarly, applied and experiential approaches, such as community-based projects, real-world design tasks, and scenario-based learning, reinforce the shift from transmissive to transformative education. This action-oriented framing reflects a broader trend in sustainability education: learners are increasingly expected not just to know about sustainability, but to act within it, interrogate its contradictions, and co-create solutions.

Second, the widespread adoption of **competence-based education** models marks a maturing of the field. Frameworks such as UNESCO's key competencies for sustainability and the European Commission's GreenComp have provided a shared vocabulary for defining, designing, and evaluating sustainability learning. Across the reviewed literature, competencies are deployed not only to inform learning outcomes but to scaffold interdisciplinary integration, support reflective assessment practices, and guide curricular reform. However, despite this conceptual clarity, challenges persist in translating competencies into measurable, discipline-specific instructional practices. Several studies note difficulties in aligning abstract competencies—such as ethical reasoning or future thinking—with concrete learning activities and assessments. There is also variation in institutional readiness to implement competence-based models at scale, with many examples concentrated in pilot programs or isolated course-level innovations.

A third pattern concerns the **uneven but growing integration of underrepresented epistemologies and delivery modalities**—specifically local and indigenous knowledge systems and digital technologies. While studies integrating indigenous or place-based frameworks are fewer in number, those that do exist often offer deeply reflective and context-sensitive approaches that challenge Eurocentric paradigms. These initiatives, grounded in storytelling, land-based learning, or community co-teaching, point to the need for more inclusive and pluralistic sustainability curricula. Similarly, the adoption of digital tools—ranging from GIS and simulations to AI-enhanced learning platforms—is on the rise, but not yet fully mainstreamed. Digital strategies are often confined to institution-specific innovations or technology-forward departments, rather than being integrated systematically across the curriculum. Moreover, sustainability concerns related to the use of digital technologies—such as energy consumption, platform ethics, and digital literacy—are only beginning to be addressed.

These patterns suggest that while sustainability education is undergoing significant innovation, the field is still grappling with how to scale and institutionalize many of its most promising practices. Future research and practice should focus on bridging these gaps by: (1) embedding systems thinking and experiential pedagogies across the curriculum; (2) operationalizing competence frameworks through actionable, discipline-specific guidance; and (3) expanding institutional support for inclusive epistemologies and technology-enhanced

learning environments. Importantly, there remains a critical need to evaluate how these content strategies impact long-term learning outcomes—such as learner agency, resilience, and civic engagement—and how they contribute to the transformation of higher education into a vehicle for sustainable futures.

Findings: Green Pedagogies for Sustainability Education

Experiential and Place-Based Pedagogies

Experiential and place-based pedagogies are among the most consistently cited and practically implemented approaches in the literature on sustainability education in higher education. These pedagogies emphasize active engagement with real-world sustainability challenges through structured immersion, field-based inquiry, and community collaboration (see Figure 15). Rooted in constructivist and humanistic educational theory, they aim to foster both cognitive growth and affective engagement, positioning students not as passive recipients of knowledge but as active participants in learning ecosystems.

Figure 15
Experiential and place-based pedagogies in sustainability education

Engagement Modalities
- Fieldwork
- Service Learning
- Community Partnerships

Reflective Components
- Learning Journals
- Ethical Reflection
- Peer Feedback

Contextual Anchoring
- Place-Based Cases
- Local Systems
- Geographic Relevance

Skills & Outcomes
- Agency
- Problem-Solving
- Sustainability Mindset

Design Structures
- Hybrid Models
- Project-Based Modules
- Blended Delivery
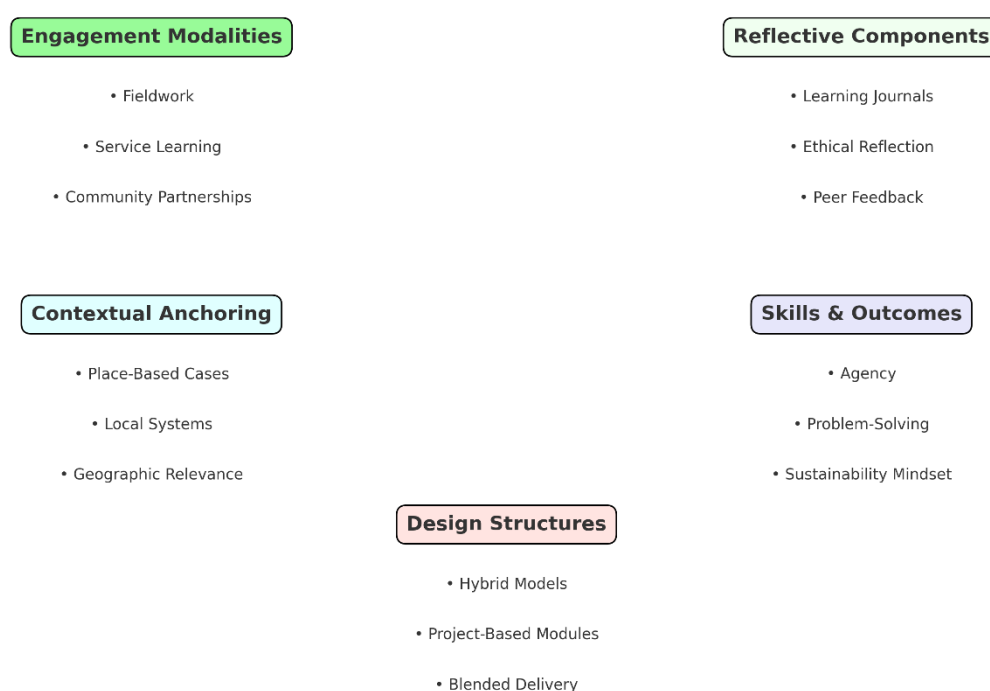
Source: Developed by the GreenUS consortium based on keyword analysis

In Yu (2024), Kolb's experiential learning cycle serves as the foundation for a sustainability module integrated into an entrepreneurship curriculum. The course requires students to explore green patent innovations and apply their findings to real-world business modeling. Through stakeholder engagement, peer critique, and iterative project development, learners develop critical competencies in systems navigation and sustainable innovation. This example underscores the alignment of experiential learning with future-oriented sustainability goals, particularly when innovation and application are tightly coupled.

Similarly, Xu (2024) describes a **hybrid pedagogy** where blended learning is supplemented by field-based projects. Students alternate between classroom engagement and immersive local engagement, including site visits, environmental audits, and problem-

solving workshops with community stakeholders. The reflective cycle—linking experience to ethical reasoning and decision-making—was seen as central to student development. The course's success hinged not only on active participation but on students' ability to narrate and reinterpret their field experiences in light of sustainability frameworks.

In Zainal-Abidin et al. (2024), an engineering course integrates design-based experiential modules focused on urban ecological planning. Students simulate environmental interventions and test sustainability outcomes, thereby developing systemic reasoning alongside technical design skills. Likewise, the paper by Ashford et al. (2024) incorporates service-learning through partnerships with NGOs working on food justice and resource distribution. Here, students are required to document, reflect, and present on their community involvement, connecting lived experience with theoretical perspectives on equity and ecological resilience.

Place-based learning—a subset of experiential pedagogy—adds another layer by explicitly anchoring sustainability education in geographic and cultural contexts (Ciolan & Manasia, 2024; Istance & Paniagua, 2019; Paniagua & Istance, 2018). It fosters students' relational understanding of the places they inhabit or study, making sustainability tangible and personally meaningful. While not always labeled as "place-based," many reviewed articles embedded location-specific case studies or invited learners to co-create solutions with local stakeholders. These practices enable students to link **macro-level sustainability concepts** with **micro-level realities**, cultivating both agency and contextual sensitivity.

Across all reviewed articles, **reflection** emerges as a pillar of experiential learning. Whether in the form of learning journals, oral debriefs, or structured peer feedback, reflective practice enables students to transform experience into insight. It supports ethical development, helps surface assumptions, and encourages long-term internalization of sustainability values.

Despite the strengths of these approaches, the literature also notes several **drawbacks**. These include logistical issues such as faculty workload, partnership maintenance, and equitable access to field opportunities. Moreover, there is often tension between academic structures (which favor formal assessments and controlled settings) and the open-ended, process-oriented nature of experiential learning. Addressing these tensions requires institutional support, flexible curricular frameworks, and a recognition of community partners as co-educators in the learning process.

Ultimately, experiential and place-based pedagogies provide fertile ground for cultivating sustainability mindsets. These pedagogies blur the boundary between learning and action, making sustainability a lived, relational, and transformative experience (Ciolan & Manasia, 2024).

Critical and Transformative Pedagogies

Critical and transformative pedagogies represent a foundational pillar of sustainability education, particularly in their capacity to foster **agency**, **ethical reasoning**, and **structural awareness** (Figure 16). Drawing heavily from Freirean traditions of dialogic education and critical consciousness, these pedagogical strategies aim to transform learners into reflective, empowered participants in sustainability transitions. In these approaches, students are invited to question dominant socio-ecological paradigms, engage in values clarification, and envision alternative futures rooted in justice and collective responsibility.

Across the reviewed literature, a recurrent theme is the integration of **dialogic and problematizing teaching** methods. In Presi et al. (2024), documentary-based learning is used to immerse students in complex socio-environmental issues, prompting them to critically analyze dominant narratives around sustainability. This pedagogical approach—anchored in critical media literacy and reflective discussion—encourages learners to grapple with ethical

dilemmas and systemic inequities, thereby fostering what the authors frame as **transformative awareness**.

Figure 16
Key characteristics of the critical and transformative pedagogies

Foundational Principles
- Critical Consciousness
- Ethical Inquiry
- Dialogic Learning

Learning Activities
- Debates
- Narratives
- Reflective Journals

Thematic Anchors
- Justice & Equity
- Coloniality
- Power Structures

Transformative Outcomes
- Agency
- Moral Reasoning
- Systemic Awareness

Pedagogical Conditions
- Safe Spaces
- Facilitated Reflection
- Interdisciplinary Dialogue
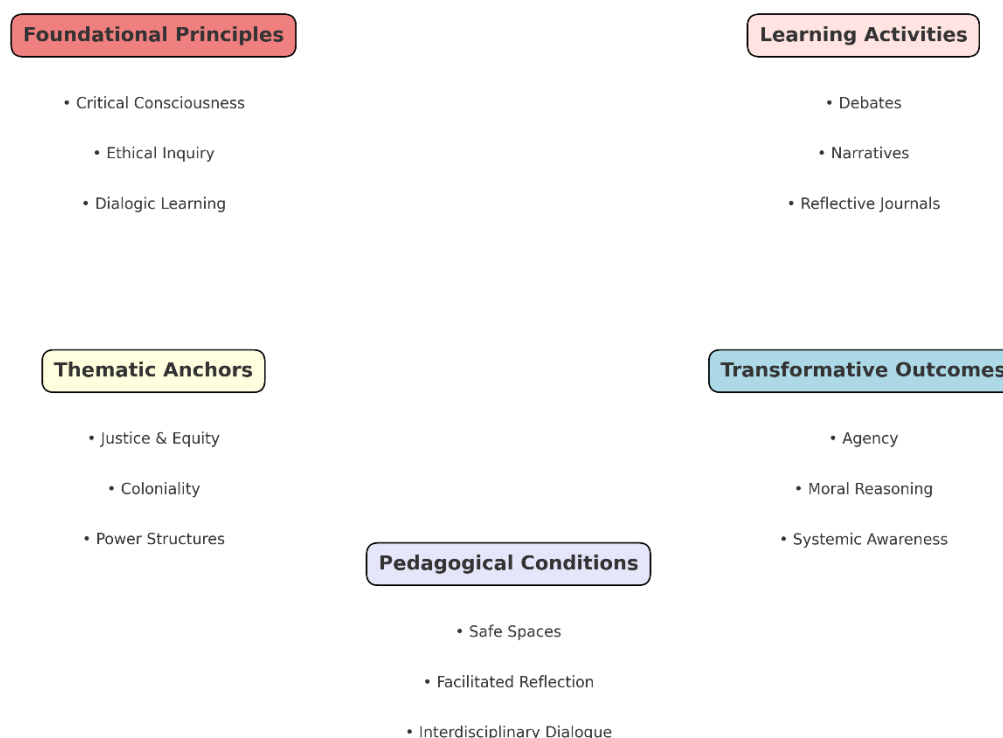
Suiçmez and Ozansoy (2024) propose an **using metaverse environments**, allowing students to explore socio-environmental challenges through role-play and scenario building. What distinguishes their approach is the embedded requirement for reflective journaling and facilitated ethical inquiry. Students were not merely navigating digital spaces but were prompted to reflect on privilege, marginality, and the social justice implications of sustainability decisions, anchoring their experiences in broader structural critiques.

A more explicitly ethics-centered curriculum appears in Kopnina (2022), which critiques mainstream sustainability discourse through the lens of posthumanism and biocentric ethics. Students are exposed to competing value systems—anthropocentric, ecocentric, and indigenous—and asked to apply these to case studies involving species extinction and intergenerational justice. This dialogic framework fosters ethical pluralism and relational accountability.

A related model appears in Chang and Nkansah (2024), where the authors emphasize inclusiveness and **multilingual literacy** as vehicles for sustainability. Their pedagogy promotes dialogic engagement with diverse epistemologies, encouraging students to consider sustainability not as a universal category but as contextually rooted in language, culture, and identity politics. The classroom becomes a site for ethical clarification and pluralistic meaning-making.

In addition, Zainal (2024) and Ashford et al. (2024) integrate reflective writing and positionality analysis into **service-learning initiatives**. Students collaborated on community-based sustainability projects, documenting not only the outcomes but also their own evolving perspectives, biases, and ethical tensions. These exercises encouraged learners to examine

their roles critically and to engage with sustainability as an arena of contested values and responsibilities.

Additionally, Chaname-Chira et al. (2024) link problem-based learning with evaluative rubrics for critical thinking. In the systematic analysis they conducted, in several interventions, students were asked to unpack the institutional, historical, and cultural systems that produce ethical dilemmas. This scaffolding cultivates metacognitive skills alongside civic engagement, positioning students as both analysts and agents of change.

Across these contributions, **reflection** is central—not as a solitary cognitive activity but as a social and discursive one. Whether through group debates, narrative essays, or ethics circles, reflection becomes a bridge between personal awareness and collective responsibility. The shared goal is to move beyond transmission models toward education as transformation: an ongoing process of questioning, relating, and reimagining futures.

Systems and Interdisciplinary Pedagogies

One of the strongest trends in the reviewed literature is the deliberate integration of **systems thinking and interdisciplinary learning models** into sustainability education. These pedagogical strategies move beyond compartmentalized knowledge, encouraging learners to analyze sustainability problems as complex, multi-scalar phenomena requiring both analytical rigor and collaborative reasoning.

A compelling case is presented by Kurent and Avsec (2024), who implement a systems-based learning framework supported by digital technologies. Their course design combines systems thinking with flow theory, using feedback-rich environments to help students simulate interconnections among social, economic, and ecological systems. Learners explore causal dynamics and resilience through visual mapping and scenario modeling tools, which both enhance conceptual understanding and promote learner autonomy.

Similarly, Vincent and Focht (2011) present a well-established interdisciplinary environmental education model, emphasizing "**field identity**" as a critical dimension of curriculum design. Their work reflects a commitment to structural integration, where core sustainability competencies—like systems literacy, anticipatory thinking, and problem-solving—are scaffolded across disciplines. Students are encouraged to traverse knowledge domains, moving fluidly between scientific, social, and ethical perspectives.

Holmberg et al. (2008) further highlight the institutional application of these pedagogies through case studies at European technical universities. Their findings demonstrate that collaboration between educators across departments, anchored in shared sustainability goals, can foster curriculum coherence and pedagogical innovation. Tools like life-cycle assessments and systems audits were used to engage students in problem-based assignments involving real institutional sustainability data.

Another example is found in Zaghloul (2024), who frames sustainability learning through High-Impact Educational Practices (HIEPs), using systems thinking as a transversal competence. Students were immersed in projects where media, education policy, and environmental ethics were linked, enabling them to visualize interdependencies using systemic flowcharts and decision matrices. This approach reinforced metacognitive skills while grounding learning in applied, real-world systems.

What unifies these models is their ontological stance: **knowledge** is viewed as **dynamic, situated,** and **relational**. Systems thinking provides a methodological and philosophical bridge that enables students to move from linear, siloed understandings of sustainability toward complex, adaptive reasoning. Interdisciplinarity becomes more than a curricular strategy—it becomes a way of knowing and navigating uncertainty (see Figure 17).

Figure 17
Key characteristics of systems and interdisciplinary pedagogies

Core Methods

- Systems Thinking
- Scenario Planning
- Causal Mapping

Learning Tools

- Digital Simulations
- Flow Diagrams
- Life Cycle Assessment

Interdisciplinary Anchors

- Social-Ecological Integration
- Ethics & Policy
- STEM-Humanities Fusion

Competencies Targeted

- Complexity Navigation
- Anticipatory Thinking
- Collaborative Problem-Solving

Institutional Models

- Cross-Faculty Curricula
- Real-World Projects
- Interdepartmental Collaboration

**Source**: Developed by the GreenUS consortium based on keyword analysis

These pedagogies also serve a democratic purpose. By modeling open-ended inquiry and collaborative knowledge construction, they prepare students to work across disciplinary and cultural boundaries. In turn, learners are better equipped to engage in participatory sustainability governance, stakeholder dialogues, and future-oriented planning.

However, several barriers to adoption persist. Studies highlight challenges such as curriculum rigidity, lack of faculty training, and the epistemological discomfort that interdisciplinary teaching can provoke. Nonetheless, as institutions seek to cultivate sustainability competencies in increasingly diverse student populations, the integration of systems thinking and interdisciplinary design remains one of the most promising pathways forward.

Digital and Technology-Enhanced Pedagogies

Digital and technology-mediated pedagogies are becoming increasingly prominent in sustainability education, offering innovative ways to personalize learning, simulate complex systems, and engage learners across geographic and disciplinary boundaries (Figure 18). These pedagogies encompass blended and hybrid formats, online learning platforms, AI-driven personalization, immersive virtual environments, and game-based simulations. Together, they support differentiated instruction and interactivity, enabling sustainability education to adapt to diverse learner needs and institutional settings.

Figure 18
Key characteristics of the Digital and Technology-Enhanced Pedagogies

Delivery Modes

- Blended Learning
- Hybrid Formats
- Asynchronous Courses

Learning Tools

- Simulations
- Gamification
- AI Tutors
- Digital Portfolios

Immersive Platforms

- Metaverse
- AR/VR
- Interactive Dashboards

Sustainability Focus

- Systems Thinking
- Ethical Reasoning
- Place-Based Learning

Equity & Impact

- Digital Divide
- Green IT
- Access and Inclusion

Source: Developed by the GreenUS consortium based on keywords analysis

A notable example of structured digital implementation is presented by Taboada-González and Aguilar-Virgen (2024), who employed a learning management system (LMS) to deliver sustainability content while embedding formative assessments, discussion forums, and feedback loops. The LMS allowed students to engage in scenario-based learning while instructors used data analytics to personalize support and scaffold cognitive development. Similarly, Vasudevan et al. (2024) developed a sustainability-focused online course structure that integrated video lectures, peer reflection tasks, and digital portfolios, with achievement tracked via competency-based digital badges.

Simulated and immersive tools are also being employed to convey systems thinking and long-term planning. Buthelezi (2023) introduced the Biomatrix Systems Thinking Model through an interactive online platform, allowing students to engage with decision-making tools and explore trade-offs in sustainability scenarios. This technology-rich environment supported hypothesis testing, scenario planning, and feedback analysis, promoting dynamic understanding of sustainability interdependencies.

Moreover, digital tools are increasingly used to support place-based learning. Strielkowski et al. (2024) documented the integration of GIS platforms in an urban planning course where students mapped sustainability indicators such as air quality, waste infrastructure, and housing density. Their outputs were published on web dashboards accessible to community partners, exemplifying the pedagogical value of digital-public interfaces in sustainability education.

In terms of emerging technologies, recent research articles have explored the potential of **metaverse environments**, artificial intelligence, and gamified platforms. Bobko et al. (2024) proposed the Edu-Metaverse as a scalable ecosystem for immersive sustainability education, offering learners virtual environments to experiment with sustainability scenarios

and interact with AI agents that guide ethical reasoning and strategic reflection. Meanwhile, Cernicova-Buca and Ciurel (2022) designed a game-based learning module to develop media literacy and critical thinking around sustainability issues, including disinformation and behavioral nudging.

Despite these innovations, significant barriers persist. Numerous studies report issues related to digital fatigue, uneven technological infrastructure, and faculty preparedness. Inclusivity remains a major concern, particularly in under-resourced contexts where bandwidth and device access are limited. Nusraningrum et al. (2024), for example, call for sustainable e-learning designs that incorporate green management practices and support environmentally responsible digital use.

There is also growing awareness of the ecological implications of digital learning itself. As highlighted in recent literature, the material footprint of educational technologies—including data storage, device production, and energy use—requires sustainability educators to reflect critically on the infrastructures that underpin digital pedagogies. This ethical dimension complicates the view of technology as a purely enabling force, urging a more nuanced integration aligned with environmental values and justice.

Collaborative and Co-Constructive Pedagogies

Collaborative and **co-constructive pedagogies** represent a distinct strand in sustainability education that prioritizes mutual learning, dialogic engagement, and shared ownership of knowledge creation. These approaches challenge traditional transmission models by repositioning learners as active participants—rather than passive recipients—in the educational process. The emphasis on collaboration not only fosters social and emotional skills such as empathy, negotiation, and team coordination, but also reflects a pedagogical commitment to democratic learning and epistemic plurality.

A strong example of this paradigm is found in Ciolan and Manasia (2024), who examine how participatory visual methods such as photovoice can be used to co-create sustainability narratives within higher education. Students collaboratively constructed meaning around sustainability challenges by collecting, sharing, and interpreting visual data in peer groups. The process, as the authors argue, enabled learners to integrate personal perspectives with broader systemic understandings while developing soft skills like reflection, public speaking, and ethical reasoning.

Similarly, Dehtjare and Uzule (2023) highlight how co-design processes can strengthen academic communities. In their study, sustainability themes were integrated into institutional human resource practices, with teaching staff and students co-constructing pedagogical priorities through roundtable discussions and feedback loops. The resulting curriculum placed equal weight on affective and cognitive learning outcomes, indicating that collaboration extends beyond the classroom and into the institutional ethos itself.

Other studies emphasize community-anchored collaboration. For instance, Eppinga et al. (2020) describe a sustainability initiative at a Caribbean university where students engaged directly with campus operations—such as waste auditing and biodiversity mapping—through stakeholder partnerships. These projects were not merely internships; they were co-learning environments where faculty, students, and administrative staff iteratively designed and evaluated sustainability actions. Such integrative designs blur the line between academic and operational domains, reinforcing the principle that universities can function as living laboratories for sustainability transitions.

Furthermore, Palma and Pedrozo (2022) present a distributed learning model where students from different disciplines participate in co-designed community projects ranging from **ecological storytelling** in literature to **environmental accounting in business**. Collaboration here operates at multiple levels—across disciplines, between students and

community members, and between learners and instructors—demonstrating the multiplicity of "co-" relationships within sustainability education.

Another key dimension of collaborative pedagogies is **dialogic peer learning**. Chaname-Chira et al. (2024) developed a curriculum module that fosters critical thinking through structured group discussions and peer-review processes. In this model, students assess each other's arguments, offer feedback, and refine their positions on sustainability dilemmas. Such peer engagement promotes intellectual humility, rhetorical clarity, and consensus-building—skills essential for participatory governance and deliberative democracy in sustainability contexts.

Figure 19

Key characteristics of the collaborative and co-constructive pedagogies

Collaborative Formats
- Peer Dialogue
- Team-Based Learning
- Interdisciplinary Projects

Co-Design Elements
- Student-Instructor Co-Creation
- Community Input
- Scenario Development

Stakeholder Engagement
- NGO Partnerships
- Campus Operations
- Policy Simulations

Skill Development
- Negotiation
- Ethical Reasoning
- Public Speaking
- Consensus Building

Pedagogical Foundations
- Democratic Learning
- Dialogic Practice
- Mutual Accountability
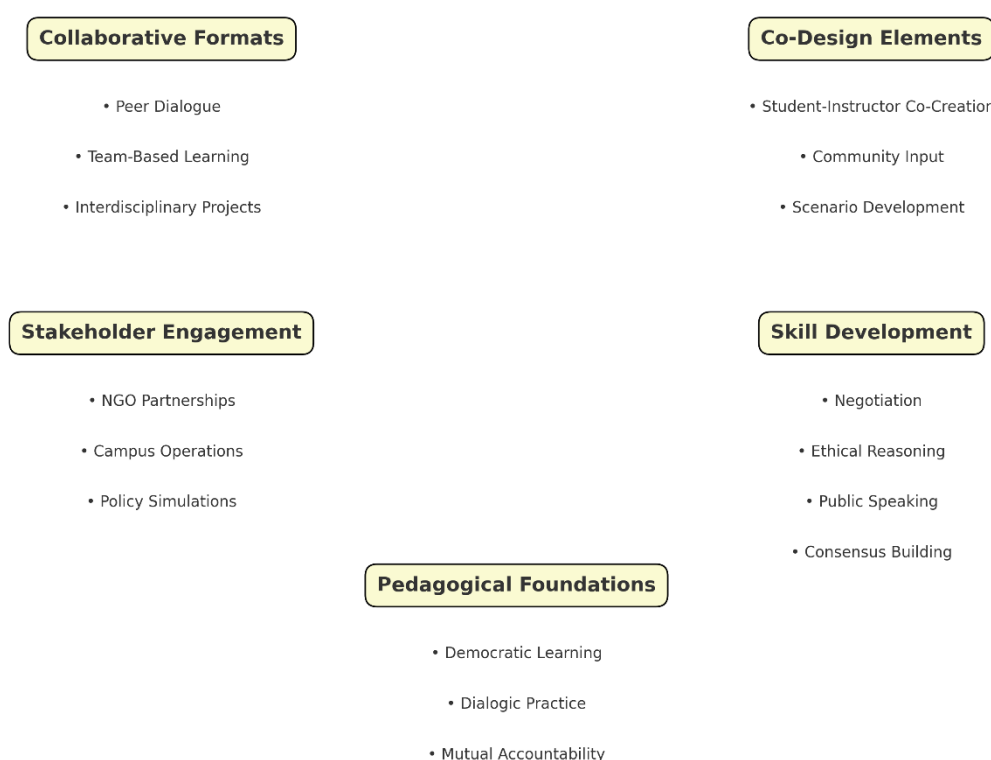
Source: Developed by the GreenUS consortium based on the keywords analysis

Furthermore, the use of **negotiation simulations** has become increasingly common as a way to simulate the complexity of sustainability policymaking. In Niemczyk (2022), students took on roles in simulated stakeholder dialogues to resolve real-world SDG-related problems. The co-constructive element was not limited to interaction; students were also involved in designing the scenarios, selecting the cases, and determining success criteria. This iterative, participatory approach reinforced both systems understanding and procedural agency.

Collaborative pedagogies also face challenges. They are often time-intensive, requiring skilled facilitation, flexible assessment models, and a culture of trust and openness. Moreover, group dynamics can produce uneven participation if not carefully scaffolded. Nonetheless, as these examples illustrate, the value of co-constructive learning lies in its capacity to reflect the very essence of sustainability itself: collective responsibility, plurality of perspectives, and shared action.

Summary of Key Patterns

The analysis of the green pedagogies in sustainability education reveals several consistent patterns across the literature. A primary observation is the shift away from traditional, lecture-based instruction toward more student-centered and participatory models. Experiential and place-based pedagogies are frequently applied, enabling students to engage with sustainability challenges in real-world contexts. These approaches support the development of applied knowledge, ethical reasoning, and reflection, and are often grounded in constructivist theories of learning.

A second pattern involves the use of critical and transformative pedagogies. These emphasize the development of students' capacity to question assumptions, understand power dynamics, and reflect on values. Rather than focusing solely on content delivery, these approaches aim to foster civic agency and ethical engagement. In many cases, reflection is used not only as a tool for learning but also as a way to support personal and social awareness.

The review also identifies a growing interest in systems and interdisciplinary pedagogies. These strategies promote understanding of complexity by encouraging students to work across disciplinary boundaries and consider interdependencies within social and ecological systems. Techniques such as scenario planning, systems mapping, and causal analysis are often used to help students grasp the interconnected nature of sustainability issues.

Technology-enhanced learning appears as another area of development. Digital platforms, simulations, and online collaborative tools are used to widen access and offer interactive learning experiences. However, the literature also notes challenges related to equity, digital fatigue, and the environmental impact of educational technologies themselves. These concerns suggest the need for more careful consideration of the design and implementation of digital pedagogies in sustainability contexts.

Collaborative and co-constructive pedagogies are also widely discussed. These emphasize group learning, peer engagement, and cooperation with community actors. Students often participate in group projects, simulations, or community-based learning, developing skills such as negotiation, communication, and shared problem-solving. Such approaches aim to reflect the collective nature of sustainability challenges and the need for cooperation in addressing them.

Across all pedagogical categories, reflection plays a central role. It is used to link theory and practice, support ethical awareness, and encourage students to examine their assumptions and learning processes. Despite the progress described in the literature, several barriers remain, including limited institutional support, time constraints, and a lack of training for faculty.

Findings: Learning Environments

Community-Engaged and Place-Based Learning Environments

One of the most compelling developments in sustainability education is the growing reliance on **community-anchored** and **place-based learning environments**. These pedagogical spaces seek to dissolve the conventional boundary between academic knowledge and civic life by embedding students in local sustainability contexts. Whether through service-learning, urban audits, municipal collaboration, or field-based ecological inquiry, these environments frame sustainability not merely as a topic of intellectual inquiry, but as a lived, negotiated, and relational challenge.

A notable contribution comes from Yu (2024), who integrates Kolb's experiential learning cycle into an entrepreneurship curriculum centered on green patent innovation.

Sustainability becomes tangible through student-led projects involving stakeholder simulations and community-driven feedback loops. These pedagogical interventions not only fostered critical systems competencies but also helped students navigate the tensions between innovation, equity, and environmental limits.

Similarly, Xu et al. (2024) designed a hybrid format that blended classroom instruction with site-based engagement in sustainability challenges, including environmental audits and local problem-solving workshops. These engagements enabled students to reinterpret abstract sustainability principles through the lens of local ecological realities. Reflection journals and ethical mapping exercises were essential components, reinforcing the personal and contextual dimensions of place-based learning.

In addition, Ashford et al. (2024) presents a case where partnerships with NGOs working in food justice were central to course design. Students engaged in resource distribution networks, conducted needs assessments, and contributed to logistical planning—all while maintaining structured reflection logs that connected these practices to broader themes of sustainability and justice. These projects illustrate how service learning, when embedded in equitable community partnerships, becomes a mechanism for systemic literacy and civic development.

Furthermore, the institutional learning environment at Ural Federal University, reported by Volkova et al. (2019), incorporated semester-long challenges co-developed with local NGOs and government entities. Students worked in transdisciplinary teams to address sustainability briefs through prototyping, stakeholder negotiation, and public dissemination. The real-world stakes and community presence gave these projects not only academic depth, but also social legitimacy and long-term relevance.

Place-based pedagogies are not only defined by geography but by epistemology. In these environments, knowledge is understood as co-created and situated, rather than as a universal abstraction (see Figure 20). This ontological shift positions students as both learners and contributors, capable of generating insights that are grounded in ecological intimacy and social responsibility.

However, some limitations have been reported. Several studies caution against assuming that experiential and community-embedded practices are universally accessible. Institutional structures often struggle to accommodate the logistical demands of field-based work, while partnerships require long-term cultivation and trust. Moreover, there is risk of instrumentalizing communities as "learning laboratories" unless ethical protocols and reciprocity frameworks are explicitly integrated.

However, the evidence across the reviewed literature confirms that community-engaged and place-based environments provide rich terrain for cultivating sustainability mindsets. They activate personal relevance, civic responsibility, and systems awareness, fostering learners who are prepared to "understand" sustainability and equipped to live it—with humility, creativity, and critical reflexivity.

Figure 20
Key characteristics of community-enhanced and place-based learning environments

Learning Modalities	Partnership Structures
• Fieldwork	• NGOs
• Service Learning	• Municipalities
• Community-Based Projects	• University-Community Hubs

Epistemic Approaches	Skills Developed
• Co-Creation of Knowledge	• Civic Engagement
• Lived Experience	• Reflection
• Contextual Ethics	• Systems Awareness

Challenges and Considerations

• Scalability

• Ethical Reciprocity

• Institutional Flexibility

Source. Generated by the GreenUS consortium based on keywords analysis

Digital, Virtual, and Hybrid Learning Environments

Digital and hybrid learning environments are becoming indispensable components of contemporary sustainability education, offering not only practical solutions for access and flexibility but also new ways of conceptualizing how sustainability knowledge is constructed, disseminated, and applied. These pedagogical spaces are increasingly mediated by learning technologies, from learning management systems (LMS) and asynchronous video platforms to virtual reality (VR), gamification, and artificial intelligence (AI) applications. In these environments, technology is not merely a delivery tool—it is integral to how learners experience complexity, build sustainability competencies, and engage with global and local challenges.

A range of empirical studies demonstrates the value of blended and online modalities in creating inclusive and interactive sustainability curricula. Taboada-González and Aguilar-Virgen (2024) designed a digitally structured sustainability course delivered through an LMS platform that supported formative feedback, peer discussion, and scenario-based learning. By combining system analytics with adaptive scaffolding, the course allowed for personalized instruction based on learners' engagement and progress, thereby reinforcing cognitive and metacognitive growth.

Similarly, Vasudevan et al. (2024) offer a model for sustainability learning grounded in asynchronous and hybrid learning. The program integrated modular video lectures, collaborative forums, and digital portfolio assignments aligned with predefined competencies. The use of digital badges to signal learning outcomes in ecological literacy, ethical reasoning, and systems mapping illustrates a growing trend toward outcome-based digital credentialing in sustainability education.

More immersive technologies also play a vital role in enhancing systems understanding. In Buthelezi (2023), students interacted with a dynamic web-based version of the Biomatrix Systems Thinking Model. They constructed decision paths and ran simulations

of policy outcomes in hypothetical sustainability scenarios, thus practicing hypothesis testing and long-term reasoning in a risk-free digital environment.

Strielkowski et al. (2024) further illustrate how geospatial technologies can be integrated into sustainability pedagogy. Using GIS platforms in an urban planning course, students conducted air quality and infrastructure audits, then translated their findings into open-source visualizations accessible to municipal partners. These tools not only supported place-based inquiry but also created channels for civic engagement through data sharing.

The review also reveals consistent attention to the social justice dimensions of digital education. Nusraningrum et al. (2024) raise concerns about digital inequality, particularly in under-resourced institutions where bandwidth, devices, and digital literacy are lacking. Their work calls for sustainable instructional design principles—such as low-bandwidth delivery, mobile accessibility, and open educational resources—as vital components of equitable digital sustainability education.

Figure 21
Key characteristics of the digital, virtual and hybrid learning environments

Modes of Delivery

• Blended Courses

• Asynchronous Learning

• Hybrid Modules

Digital Tools

• LMS Platforms

• AI Tutors

• VR Simulations

• GIS Mapping

Pedagogical Functions

• Systems Modeling

• Scenario Planning

• Competency Badging

Equity & Accessibility

• Low-Bandwidth Design

• Mobile Access

• Open Resources

Emerging Issues

• Digital Fatigue

• Ecological Footprint

• Faculty Preparedness
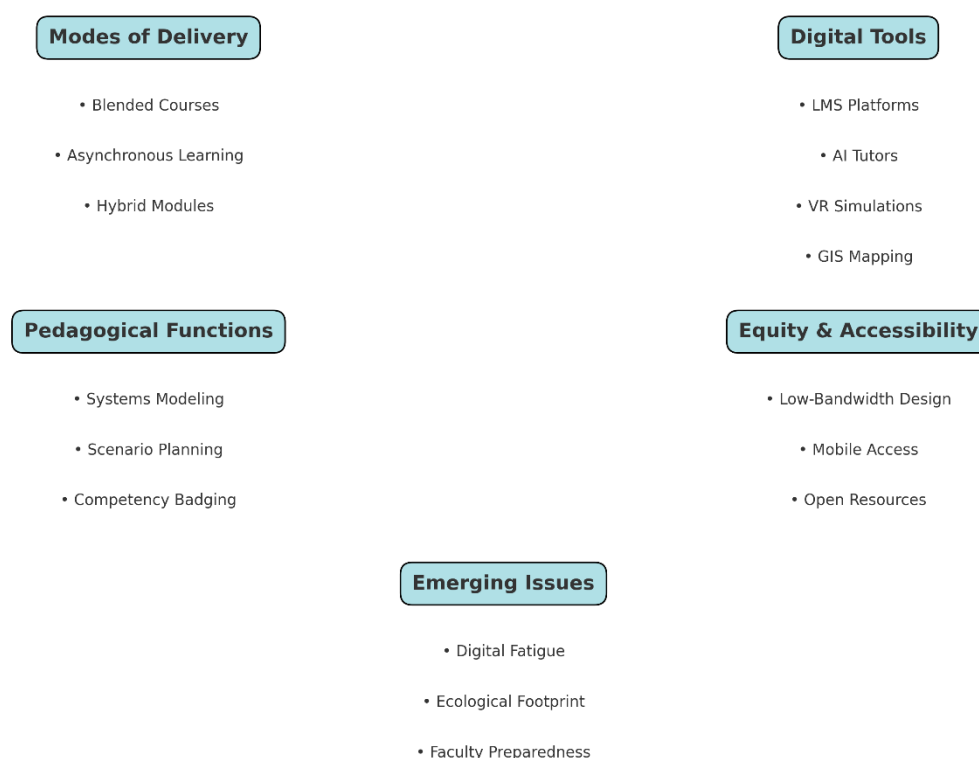
Source: Developed by the GreenUS consortium based on the keywords analysis

Crucially, digital learning environments have their own ecological footprints, a tension increasingly discussed in the literature. The infrastructure behind e-learning—from server storage and device manufacture to energy consumption—raises questions about whether sustainability education delivered through unsustainable digital practices might undermine its own goals. These critical reflections are shaping a more nuanced pedagogy—one that also interrogates technology.

Despite challenges related to faculty preparedness and pedagogical continuity, digital and hybrid environments are transforming the landscape of sustainability learning. They offer scalable and adaptive pathways for interdisciplinary knowledge integration, collaborative inquiry, and real-time systems modeling. When embedded within thoughtfully designed

curricula, these environments can reinforce learner agency, cognitive flexibility, and future-oriented thinking—all crucial elements of education for sustainability in the digital age.

Campus-as-Laboratory and Institutional Learning Spaces

The growing commitment of higher education institutions to sustainability is not only reflected in formal curriculum but also in the **transformation of the campus itself** into a living laboratory. This model reconceptualizes university operations as educational resources, where the physical infrastructure, administrative practices, and sustainability initiatives become tools for experiential and inquiry-based learning.

The literature reveals a variety of approaches to campus-as-lab learning environment. In one compelling example, Eppinga et al. (2020) document a Caribbean university's integration of applied research projects directly into campus operations. Students from various disciplines were involved in biodiversity mapping, energy audits, and waste stream assessments, with their findings feeding directly into institutional planning. This not only enhanced student engagement and systems thinking but also ensured that campus sustainability strategies were informed by empirical, student-led research.

Similarly, Holmberg et al. (2008) present case studies from three European technical universities where interdisciplinary teams of students and staff collaborated to embed sustainability principles into engineering and infrastructure curricula. These collaborations extended beyond classroom instruction to include participation in the design of green buildings, transportation systems, and energy-use frameworks. The studies highlight how embedding sustainability into the operations of the university fosters real-world, cross-disciplinary problem-solving and helps close the loop between learning and implementation.

The **STARS (Sustainability Tracking, Assessment & Rating System) framework** is also emerging as a pedagogical scaffold. Maragakis and Van Den Dobbelsteen (2017) demonstrate how this framework can serve not just as an institutional benchmarking tool, but as a student learning mechanism. By involving students in collecting and interpreting sustainability data related to food systems, water use, and carbon emissions, STARS becomes a structured entry point for inquiry-based learning that aligns with both academic and institutional sustainability goals.

Another powerful example of this integrated model comes from Gilroy-Scott, Chilton, and Goodhew (2013), who analyze the Wales Institute for Sustainable Education as a case of whole-institution sustainability. The physical construction of the building was used as an educational tool, with students participating in lifecycle assessments and material sourcing decisions. This design-build approach provides rich opportunities for metacognitive learning, as students reflect on the embodied carbon implications and social ethics of their choices.

Dzelzkaleja and Sen (2018) focus on curriculum integration through the use of institutional spaces like libraries, cafeterias, and maintenance services. Students are encouraged to analyze these everyday settings through a sustainability lens and propose evidence-based interventions. These activities are structured through semester-long action research projects, linking curriculum content to campus needs and fostering both technical competence and civic responsibility.

Despite these innovations, barriers persist. Many institutions struggle to institutionalize such models due to siloed operations, budget constraints, or lack of alignment between academic and facilities management. Faculty buy-in, time investment, and administrative coordination are critical success factors. Furthermore, while these initiatives often generate high-impact learning outcomes, their scalability and replicability across diverse institutional contexts remain uncertain.

Nonetheless, as the boundary between classroom and campus blurs, the campus-as-lab model presents a promising pathway for embedding sustainability into the lived

experience of students. It supports the development of competences in real-world systems and fosters a culture of inquiry, accountability, and innovation.

Figure 22
Key characteristics as the campus-as-laboratory and institutional learning spaces

Learning Activities

- Energy Audits
- Waste Assessments
- Lifecycle Analysis

Institutional Integration

- Operations-Teaching Link
- STARS-Based Projects
- Green Building Engagement

Student Roles

- Applied Researchers
- Sustainability Designers
- Institutional Advisors

Outcomes

- Systems Thinking
- Real-World Problem Solving
- Civic Responsibility

Challenges

- Siloed Structures
- Faculty Buy-in
- Scalability

Multisensory, Outdoor, and Embodied Learning Spaces

The incorporation of **multisensory**, **outdoor**, and **embodied experiences** into sustainability education reflects a growing awareness of the affective, physical, and relational dimensions of learning. This subcategory emerges in the literature as a counterpoint to the disembodied, abstract forms of instruction that have historically dominated higher education. Instead of focusing solely on cognitive assimilation, these approaches aim to re-engage the body, the senses, and the emotional self in the educational process, fostering deeper ecological empathy and sustainability consciousness.

One example is found in the work of Ameli (2022), who analyzes a Nature and Outdoor Learning module in higher education through the lens of multispecies ethnography. The course featured immersive experiences such as **storytelling circles**, **ecological rituals**, and **land stewardship** practices designed to cultivate students' sensory engagement with the non-human world. The pedagogical goal was to transform learners' ontological orientation—to enable them to perceive themselves as part of complex ecological relationships rather than external observers of environmental systems.

Similarly, the program described by Ker & Van Gorp (2024) integrates **embodied** and **reflective elements** within a student-led sustainability initiative. Students designed personalized inquiry paths centered on sustainability values, and these paths included outdoor observation, artistic expression, and guided contemplative walks as methods for investigating

ecological ethics. The results indicated increased self-awareness, future-oriented thinking, and a broadened understanding of sustainability as a lived, moral commitment.

Place-based and embodied learning practices also intersect with emerging interests in **ecological grief**, **resilience**, and **planetary health**. In courses discussed by Ricket (2021) and cited across several case studies, students engaged in "eco-rituals" such as seasonal ceremonies, gratitude meditations, and reflective field journaling to process feelings of loss and anxiety associated with environmental decline. These emotional and spiritual registers are rarely addressed in conventional sustainability curricula, yet they are essential for cultivating what many authors refer to as "**sustainability mindsets**" or "**relational literacies**".

While such pedagogies often take place in forests, gardens, or open urban spaces, they also rely on well-crafted facilitation and curriculum design. Despite their rich potential, these pedagogies face practical challenges, including access to green spaces, institutional skepticism, and the dominance of standardized assessments that undervalue affective and experiential learning. Nonetheless, the reviewed literature strongly supports their transformative potential. By activating bodily perception, emotional reflection, and ecological imagination, these approaches engage the whole learner. They create conditions for students to move beyond detached environmental concern and into embodied responsibility, empathy, and long-term engagement with sustainability.

Figure 23
Key characteristics of the Multisensory, outdoor, and embodies learning spaces

Learning Modalities
- Outdoor Observation
- Storytelling Circles
- Artistic Expression

Pedagogical Tools
- Eco-Rituals
- Field Journaling
- Photovoice

Cognitive & Affective Outcomes
- Ecological Empathy
- Reflective Thinking
- Ethical Awareness

Spaces & Settings
- Forests and Gardens
- Urban Green Areas
- Cultural Landscapes

Implementation Challenges
- Access to Nature
- Assessment Constraints
- Institutional Support

These learning environments are pedagogically radical in their redefinition of what it means to learn—and to be—in the Anthropocene. They invite educators and learners alike to listen, feel, and act with integrity in a world that is complex, interdependent, and imperiled.

Summary of key findings

The analysis of learning environments within sustainability education highlights a clear progression toward diversified, embedded, and contextually responsive spaces of learning. Across the reviewed literature, four prominent and often overlapping types of

environments emerge: **community-engaged** and **place-based learning contexts**, **digital and hybrid platforms**, **campus-as-laboratory frameworks**, and **multisensory or embodied settings**. Each of these reflects a broader pedagogical shift—away from compartmentalized instruction and toward more integrated, reflective, and relational approaches to education.

Community-engaged and place-based learning environments are particularly prominent, offering students the opportunity to interact with sustainability issues in real-world, often local, contexts. These settings promote experiential learning through partnerships with municipalities, NGOs, and community groups. Such environments do more than enhance cognitive skills; they foster civic engagement, systems literacy, and social accountability. Studies illustrate how sustainability becomes meaningful when students are asked to address complex challenges that affect their own communities. However, challenges persist in ensuring access, sustaining equitable partnerships, and aligning institutional structures with the demands of field-based education.

Digital, virtual, and hybrid environments are equally relevant, reflecting the growing integration of technology in higher education. These platforms offer flexibility, scalability, and opportunities for personalized and interactive learning. From gamified systems thinking modules to GIS-based environmental audits, digital tools are used to simulate real-world complexity and support the acquisition of diverse competencies. Nevertheless, concerns about digital equity, infrastructure limitations, and the environmental impact of e-learning systems raise important questions about the sustainability of sustainability education itself. The literature calls for more critical engagement with the ethical and ecological dimensions of digital pedagogy.

The **campus-as-laboratory model** reflects a structural innovation in how institutions approach learning. Here, university infrastructure—its buildings, operations, and governance—becomes a site for applied learning. This approach aligns institutional sustainability commitments with pedagogy, allowing students to engage with material sustainability practices and data in situ. The review identifies multiple examples where students contribute to waste audits, energy planning, or campus greening strategies, often within interdisciplinary teams. However, these approaches require significant coordination between academic and operational units, and their scalability remains limited by organizational complexity and resource constraints.

Multisensory, outdoor, and embodied learning environments offer a distinct contribution by engaging learners through affective, physical, and reflective experiences. These pedagogies challenge traditional cognitive hierarchies and reintroduce the role of emotion, perception, and embodied presence in learning. Whether through nature-based rituals, contemplative walks, or ecological journaling, such practices foster empathy, ecological sensitivity, and moral imagination. While less prevalent, they are increasingly recognized as important counterpoints to digitally mediated and assessment-heavy models of education. Their success, however, depends heavily on intentional design, facilitator expertise, and institutional openness to non-standard learning methods.

The reviewed literature suggests that learning environments in sustainability education are becoming more participatory, situated, and relational. They increasingly recognize students not just as learners but as contributors to sustainability transformations—within institutions, communities, and ecosystems. The shift in focus from abstract knowledge to lived, embodied, and socially embedded learning reflects a broader understanding of education as a relational and ethical practice. While the operationalization of such environments faces practical and institutional barriers, their pedagogical value lies in their capacity to connect knowledge with responsibility, reflection with action, and individual learning with collective futures.

Discussion and implications

This study set out to systematically examine how greening practices are integrated into higher education by analyzing 195 peer-reviewed articles from Web of Science and Scopus. The review was guided by three **research questions:**

(1) What types of content are being integrated into sustainability education across higher education contexts?

(2) What pedagogical models are used to support the greening of higher education teaching and learning?

(3) In what kinds of learning environments does sustainability education take place, and how do these settings shape student engagement and learning outcomes?

The findings of this systematic literature review reflect the increasing diversification and sophistication of strategies used to green higher education curriculum. They underscore a broad movement from content-centric approaches to **pedagogical and institutional transformations** that engage students, faculty, and external partners in new configurations of sustainability learning. This section synthesizes the key insights emerging from the review and situates them in relation to broader debates within the field, offering implications for higher education policy, practice, and research.

One of the central observations across the reviewed literature is the growing consensus around the centrality of **systems thinking** and **interdisciplinary approaches** in sustainability education. This aligns with earlier work by Sterling (2010) and Barth et al. (2014), who emphasized that linear, discipline-bound forms of teaching are ill-equipped to prepare learners for the complexities of sustainability challenges. Instead, the emphasis is increasingly on pedagogical frameworks that foster integrative reasoning, cross-sector collaboration, and the ability to engage with uncertainty and complexity. This has led to a proliferation of curriculum models that embed causal loop analysis, scenario planning, and feedback mapping into both disciplinary and transdisciplinary settings. These findings also resonate with recent UNESCO (2024) guidance that frames systems thinking as a transversal competency for climate-responsive education.

Alongside systems thinking, **competence-based education** has gained substantial traction as a framework for curriculum design. However, while frameworks such as UNESCO's key competencies for sustainability and the EU's GreenComp provide a robust conceptual foundation (European Commission JRC, 2022), many institutions struggle with operationalization. This gap confirms earlier critiques (Redman et al., 2021) that competencies risk remaining rhetorical unless accompanied by clear instructional and institutional scaffolding.

A significant contribution of this review is its documentation of how **transformative and value-based pedagogies** are being used to cultivate ethical awareness and civic agency. Many studies move beyond cognitive approaches to sustainability and engage with students' affective and moral development through critical pedagogy, narrative practices, and reflective inquiry. These findings build on foundational work by Mezirow (Mezirow, 1997; Mezirow & Taylor, 2009) and Freire (2000), affirming that education for sustainability must include opportunities for students to explore their values, identities, and responsibilities within planetary systems. Recent contributions in posthumanist and indigenous scholarship (Kopnina, 2022) further reinforce the need for pluralistic, relational approaches to sustainability education—approaches that acknowledge not only interdependence among people, but also between people and non-human entities.

Experiential and place-based learning emerged as a dominant strategy across disciplines, supporting calls from Gruenewald (2003) to reconnect learning with local ecologies and civic life. These pedagogies bridge the gap between theory and practice by immersing students in real-world sustainability challenges and fostering situated, embodied knowledge.

Importantly, the review highlights that such practices often require significant institutional investment—in faculty training, community partnerships, and curricular flexibility. Where these investments are lacking, experiential learning risks being reduced to tokenistic or extracurricular activities.

The review also reveals uneven adoption of **local and indigenous knowledge systems** in higher education. While there is a clear trend toward acknowledging the epistemic value of these traditions, their integration into curricula remains limited and often fragmented. This mirrors findings from global reports such as the IPBES (2019) Global Assessment, which emphasized the importance of indigenous and local knowledge in fostering biodiversity conservation and sustainability resilience. In higher education, this requires more than content inclusion—it demands co-design processes, community engagement, and a shift in institutional epistemologies (Anderson, 2025; Whyte, 2013). Without such shifts, there is a risk that indigenous knowledge becomes appropriated rather than respected.

Digital and technology-enhanced pedagogies were shown to play a growing but ambivalent role. On one hand, they expand access, support multimodal learning, and offer tools for simulating complex sustainability scenarios. On the other hand, concerns persist about digital fatigue, inequity in access, and the environmental impact of educational technologies themselves. These tensions call for a more nuanced discussion about the digital infrastructure of sustainability education, echoing scholar voices (Knox et al., 2020; Macgilchrist, 2021) who argue that edtech must be evaluated not only for pedagogical efficacy but also for its ethical and ecological footprint.

Across these thematic categories, the report reveals a strong orientation toward **student-centered**, **participatory**, **and co-constructive pedagogies**. These approaches reflect a shift in the role of the learner—from passive consumer of information to active co-creator of knowledge and social change. This pedagogical reorientation aligns with recent thinking in transformative learning theory, decolonial education, and networked learning environments (Andreotti, 2016; Kemmis et al., 2014).

Despite these promising developments, several **cross-cutting challenges** persist. The first is institutional integration. While many innovations occur at the course or program level, there is often limited evidence of systemic alignment across departments or governance structures. Second, faculty development remains under-researched and under-supported. Many instructors report feeling unprepared to teach sustainability in interdisciplinary or experiential formats (Brundiers et al., 2021; Brundiers & Wiek, 2013). Third, there is a lack of longitudinal assessment. Few studies track the long-term impact of curriculum greening on student behavior, institutional change, or societal outcomes, leaving questions about efficacy and scalability unanswered.

The **implications for practice** include the need for robust professional development programs, institutional frameworks that reward pedagogical innovation, and greater investment in infrastructure for experiential and community-based learning. For policymakers, the findings suggest the importance of supporting curricular flexibility, recognizing non-traditional forms of knowledge, and fostering partnerships between universities and their communities. Finally, for researchers, the field would benefit from greater methodological diversity, including ethnographic, participatory, and longitudinal studies that capture the complexity of curriculum transformation.

Conclusion

This report has offered a comprehensive review of the evolving landscape of sustainability education in higher education, structured around three interrelated analytical pillars: **curriculum contents**, **pedagogical approaches**, and **learning environments**. Across all three dimensions, the literature reflects a growing consensus that educating for

sustainability entails more than the inclusion of environmental topics—it demands a fundamental transformation of what is taught, how it is taught, and where learning takes place.

In terms of **content**, the findings reveal a marked shift from discipline-specific knowledge toward integrative, applied, and systems-based understandings of sustainability. While competence frameworks—such as UNESCO's key competencies and the EU's GreenComp—provide a coherent scaffold, their translation into practice remains inconsistent. Notably, the content dimension is enriched by efforts to pluralize epistemologies through the inclusion of indigenous, local, and practice-based knowledge. Yet, this inclusion is often partial and project-based, pointing to a need for deeper curricular integration and institutional commitment.

The second pillar, **pedagogical approaches**, underscores a widespread transition from transmissive to transformative education. Experiential, place-based, and critical pedagogies are increasingly used to foster deeper engagement, ethical reflection, and civic agency among students. The literature points to the importance of dialogic, co-constructive, and problem-centered teaching strategies that support both individual and collective transformation. At the same time, the adoption of digital and hybrid formats introduces both opportunities and tensions, especially in terms of equity, ecological impact, and the preservation of humanistic and relational learning principles.

The third pillar, **learning environments**, highlights the material and spatial dimensions of sustainability education. These environments—ranging from digital platforms to outdoor classrooms and "campus-as-laboratory" models—are not neutral backdrops but active mediators of educational experience. Community-engaged, institutional, and multisensory spaces allow students to situate their learning in real-world contexts, enhancing both relevance and responsibility. However, structural barriers—such as institutional silos, resource constraints, and access inequities—continue to limit the scalability of such environments.

Jointly, the three pillars illustrate that greening curriculum practices are undergoing a process of pedagogical and institutional redefinition. It is increasingly characterized by complexity literacy, epistemic plurality, and learner-centered design. Yet, the report also points to key areas requiring further attention: aligning competence models with assessment practices; embedding co-creation processes into curriculum and governance; and ensuring that digital infrastructures support rather than undermine sustainability principles.

Ultimately, the greening of higher education must be understood as a dynamic and systemic undertaking. It requires not only curricular innovation and pedagogical reform, but also sustained institutional support, faculty development, and cross-sectoral collaboration. As sustainability challenges intensify, the role of higher education institutions as agents of transformation becomes ever more critical—not simply in producing knowledge, but in modeling the values, practices, and environments that underpin a just and sustainable future.

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Annexes

Supplementary material 1: Metadata extraction table

Article ID	Include	Criteria	Authors	Year	Article Title	Source title	Volume	Issue	DOI
SCOPUS_002	Include	C1	Zainal Abidin M.S.; Mokhtar M.; Arsat M.	2024	Unraveling the challenges of education for sustainable development: a compelling case study	Qualitative Research Journal	24	4	10.1108/QRJ-05-2023-0090
SCOPUS_003	Include	C1	Ashford T.; Kuzich S.; Gelves-Gomez F.	2024	Reflecting on practice in sustainable education classrooms: COVID-19 tales of hope	Journal of University Teaching and Learning Practice	21	3	10.53761/wwep7q93
SCOPUS_006	Include	C2	Li Y.; Huang Y.	2024	Sustainable Development Goals (SDGs) and Local Self-Government: Approaches and Strategies for Sustainable Education	Lex Localis	22	2	10.52152/22.2.277-292(2024)
SCOPUS_014	Exclude	C1	Jumaidi A.; Mustanir M.; Yusuf T.R.; Sanusi S.	2024	Political Study Analyses of Education Policy to Improve Education Quality	Emerging Science Journal	8	4	10.28991/ESJ-2024-08-04-011
SCOPUS_016	Exclude	C1	Meng B.; Hao Z.	2024	Role of green finance and higher education in fostering the sustainability and energy transition practices	Humanities and Social Sciences Communications	11	1	10.1057/s41599-024-03843-3
SCOPUS_019	Exclude	C1	Peng Y.; Alias B.S.; Wan X.; Mansor A.N.	2024	LINKING CURRICULUM IMPLEMENTATION TO SCHOOL SDG: A SYSTEMATIC REVIEW	Journal of Lifestyle and SDG'S Review	4	2	10.47172/2965-730X.SDGsReview.v4.n02
SCOPUS_023	Include		Çam-Tosun F.; Söğüt S.	2024	Development and validation of a sustainable education scale	Sustainable Development	32	4	10.1002/sd.2892

SCOPUS_025	Include		Powell S.; Vargas V.R.; McCabe O.	2024	HE system of choice: An emerging landscape of post-neoliberal, technocentric and socio-ecological conceptualisations of learning	Journal of University Teaching and Learning Practice	21	3	10.53761/40jggc34
SCOPUS_035	Exclude	C1	Saraiva E.; Faria F.; Ferreira C.; Azevedo M.M.	2024	Education for Sustainability Through Field Activities and Game-Based Tasks	Journal of Teacher Education for Sustainability	26	1	10.2478/jtes-2024-0008
SCOPUS_036	Exclude	C1	Cai T.; Shi X.; Shang Z.; Zhu X.; Qi J.	2024	The role of blockchain technology in facilitating finance for metal and mining resources	Resources Policy	99		10.1016/j.resourpol.2024.105383
SCOPUS_037	Exclude	C1	Albairmani A.M.A.; Muhammad A.H.; Saud I.A.K.; Salman S.A.; Shihab S.M.	2024	THE IMPACT OF SUSTAINABLE EDUCATION ON ECONOMIC RESILIENCE IN IRAQ: HUMAN CAPITAL AS A MODERATING VARIABLE	Journal of Sustainability Science and Management	19	10	10.46754/jssm.2024.10.011
SCOPUS_038	Include		Marisa S.; Gunawan; Susilawati E.	2024	Global Education Development Plan to Build Sustainable Education Based on Artificial Intelligence	Qubahan Academic Journal	4	2	10.48161/qaj.v4n2a207

SCOPUS_039	Exclude	C1	Olugbade D.; Edwards B.I.; Ojo O.A.	2024	Facilitating Cognitive Load Management and Improved Learning Outcomes and Attitudes in Middle School Technology and Vocational Education Through AI Chatbot	Journal of Technical Education and Training	16	3	10.30880/jtet.2024.16.03.009
SCOPUS_042	Exclude	C4	Li C.; Sun Z.	2024	Evaluation of the Quality of Sustainable Entrepreneurship Education in Universities Based on the Grey Correlation Algorithm	Journal of Information and Knowledge Management	23	3	10.1142/S0219649224500266
SCOPUS_043	Include		Chaname-Chira R.; Santisteban-Chevez D.; Tafur K.M.R.; Villalobos P.G.; Campos-Ugaz W.; Alcaide-Aranda L.I.C.; Villegas D.R.A.	2024	Critical Thinking and the Impact on University Education for Sustainable Development	Indian Journal of Information Sources and Services	14	3	10.51983/ijiss-2024.14.3.13
SCOPUS_045	Exclude	C1	Yuliawan D.; Suherman W.S.; Nopembri S.	2024	Structural analysis of physical activity, self-efficacy on academic achievement, and critical thinking abilities of elementary school children; [Análisis estructural de la actividad física, la autoeficacia en el rendimiento académico y las habilidades de pensamiento crítico de niños de escuela primaria]	Retos	60		10.47197/retos.v60.106989

SCOPUS_048	Exclude	C1	Altinay Z.; Altinay F.; Sharma R.C.; Dagli G.; Shadiev R.; Yikici B.; Altinay M.	2024	Capacity Building for Student Teachers in Learning, Teaching Artificial Intelligence for Quality of Education	Societies	14	8	10.3390/soc14080148
SCOPUS_052	Exclude	C1	Steffansen R.N.	2024	How to Become the Instructive Fool Supervising Planning Students at a PBL University	Journal of Problem Based Learning in Higher Education	12	1	10.54337/ojs.jpblhe.v12i1.8219
SCOPUS_056	Exclude	C1	Jing T.; Chung E.; Gregory M.L.; Abdullah J.	2024	Towards Sustainable Education: Exploring the Intention to Pursue Vocational Higher Education among Senior High School Students in Ningxia, China	Asian Journal of University Education	20	2	10.24191/ajue.v20i2.27398
SCOPUS_059	Include		Zaghloul H.S.	2024	High-Impact Educational Practices (HIEPs) in Educational Media: Towards a Proposed Vision for the Sustainability of Egyptian Specific Education	Journal of Teacher Education for Sustainability	26	1	10.2478/jtes-2024-0003
SCOPUS_066	Exclude	C1	Shang Y.; Xie Y.; Chen W.	2024	Addressing resource scarcity and fostering sustainability through environmental education in Asia	Resources Policy	90		10.1016/j.resourpol.2024.104823
SCOPUS_069	Include		Presi O.; Dervishaj A.; La Ragione C.	2024	Perspectives of a Sustainable Intercultural and Inclusive Education to Shape Life-Changers of Tomorrow	Journal of Education Culture and Society	15	2	10.15503/jecs2024.2.153.168

SCOPUS_073	Exclude	C1	Santiago N.M.; Santos J.M.; Galita W.M.; Mariano O.R.; Adriano R.C.	2024	QUALITY AND SUSTAINABLE EDUCATION (SDG4): USABILITY OF ONLINE EDUCATIONAL APPLICATIONS IN UNEXPECTED ONLINE LEARNING IMPLEMENTATION	Journal of Lifestyle and SDG'S Review	4	2	10.47172/2965-730X.SDGsReview.v4.n02
SCOPUS_079	Exclude	C1	Wang Z.; Li H.; Zhang Y.	2024	Sustainability education and resource curse control in the selected resource-rich economies	Resources Policy	97		10.1016/j.resourpol.2024.105274
SCOPUS_081	Exclude	C1	Lou Y.	2024	Sustainable education index and copper trade interconnections	Resources Policy	98		10.1016/j.resourpol.2024.105316
SCOPUS_083	Exclude	C2	Kanbul S.; Adamu I.; Mohammed Y.B.	2024	A Global Outlook on AI-Predicted Impacts of ChatGPT on Contemporary Education	SAGE Open	14	3	10.1177/21582440241266370
SCOPUS_084	Include	C1	Taboada-González P.; Aguilar-Virgen Q.	2024	The Perception of Undergraduate Students From Different Educational Systems on Sustainability	SAGE Open	14	2	10.1177/21582440241243153
SCOPUS_088	Include		Li C.; Sindhuphak A.	2024	ESTABLISHING SUSTAINABLE EDUCATION FOR FASHION AND TEXTILEDESIGN ACCORDING TO THE SDG	Journal of Lifestyle and SDG'S Review	4	2	10.47172/2965-730X.SDGsReview.v4.n02
SCOPUS_089	Exclude	C2	Zhang X.	2024	Sustainable development in African countries: evidence from the impacts of education and poverty ratio	Humanities and Social Sciences Communications	11	1	10.1057/s41599-024-03912-7

SCOPUS_090	Include		Alhazemi A.A.	2024	Transformative Approaches to Sustainable Education: Technology, Leadership and SDGs in Higher Education Institutions	International Journal of Learning, Teaching and Educational Research	23	5	10.26803/ijlter.23.5.3
SCOPUS_092	Exclude	C1	Li J.; Zou X.	2024	Investment in the mining industry: Sustainable education and green literacy concepts	Resources Policy	98		10.1016/j.resourpol.2024.105293
SCOPUS_093	Exclude	C1	Arora B.; Al-Wadi H.; Afari E.	2024	Scaffolding instruction for improvement in learning English language skills	International Journal of Evaluation and Research in Education	13	2	10.11591/ijere.v13i2.26659
SCOPUS_100	Exclude	C1	Rafiqah K.; Hashim M.R.H.; Yunus M.M.	2024	Roles of English for Specific Purposes (ESP) in STEM Education to Leverage Sustainable Education	Asian Journal of University Education	20	3	10.24191/ajue.v20i3.27857
SCOPUS_105	Exclude	C4	Lai Y.-H.; Lin Y.-S.; Chang Y.-C.; Chen S.-Y.	2024	Cyber-physical metaverse learning in cultural sustainable education	Library Hi Tech			10.1108/LHT-12-2023-0585
SCOPUS_106	Exclude	C1	Jekabsone I.; Gudele I.	2023	Online Adult Education for Sustainable Development: The Analysis of the Consequences of the Covid-19 Pandemic in Latvia	Journal of Teacher Education for Sustainability	25	1	10.2478/jtes-2023-0010
SCOPUS_108	Exclude	C1	Jatmiko B.; Prahani B.K.; Saphira H.V.; Siswanto J.	2024	Investigation-based multiple representation online model to improve students' problem-solving skills	Perspektivy Nauki i Obrazovania	69	3	10.32744/pse.2024.3.38

SCOPUS_110	Exclude	C1	Ika Sari G.; Winasis S.; Pratiwi I.; Wildan Nuryanto U.; Basrowi	2024	Strengthening digital literacy in Indonesia: Collaboration, innovation, and sustainability education	Social Sciences and Humanities Open	10		10.1016/j.ssaho.2024.101100
SCOPUS_115	Include		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			10.1177/10567879241270503
SCOPUS_117	Include		Strielkowski W.; Korneeva E.N.; Neshcheret A.K.; Sundeeva L.A.	2024	Sustainable Education at Higher Education Institutions (HEIs) and the COVID-19 Pandemic: A Bibliometric Review Study Field Review	Integration of Education	28	1	10.15507/1991-9468.114.028.202401.022
SCOPUS_126	Include		Buthelezi P.M.	2023	THE COVID-19 PANDEMIC IS A CLARION CALL FOR A SYSTEMS-THINKING BASED APPROACH	Journal of Sustainable Development Law and Policy	14	2	10.4314/jsdlp.v14i2.10
SCOPUS_127	Exclude	C1	Lustenberger U.B.; Krestnikova A.; Gröninger O.G.; Grass R.N.; Stark W.J.	2023	Knowledge Transfer in Support of the Development of Oxygen Concentrators in Emergency Settings During the COVID-19 Pandemic	Journal of Chemical Education	100	5	10.1021/acs.jchemed.2c00925
SCOPUS_129	Include		Al-Worafi Y.M.; Goh K.W.; Hermansyah A.; Tan C.S.; Ming L.C.	2024	The Use of ChatGPT for Education Modules on Integrated Pharmacotherapy of Infectious Disease: Educators' Perspectives	JMIR Medical Education	10	1	10.2196/47339
SCOPUS_132	Exclude	C1	Li J.; Xue E.; Liu C.; Li X.	2023	Integrated macro and micro analyses of student burden reduction policies in China: call for a collaborative "family–school–society" model	Humanities and Social Sciences Communications	10	1	10.1057/s41599-023-01695-x

SCOPUS_134	Exclude	C4	Lin K.-C.; Li N.-T.; Chen M.-Y.	2024	Sustainable education on improving the quality of peer assessment: design and implementation of an online deep learning-based peer assessment system	Library Hi Tech			10.1108/LHT-11-2023-0569
SCOPUS_135	Exclude	C1	Ma X.; Zhang D.	2023	Digitalization of the economy for fossil fuels efficiency and carbon neutrality	Resources Policy	86		10.1016/j.resourpol.2023.104133
SCOPUS_136	Exclude	C1	Kravale-Paulin M.; Livitina O.; Olehnovica E.; Fjodorova I.	2023	Attractiveness of the Workplace Environment of Educational Institutions in the Context of Sustainable Development	Journal of Teacher Education for Sustainability	25	2	10.2478/jtes-2023-0024
SCOPUS_137	Exclude	C1	Cheng Y.; Zhao G.; Meng W.; Wang Q.	2024	Resources utilization, taxation and green education: A path to sustainable power generation	Resources Policy	88		10.1016/j.resourpol.2023.104389
SCOPUS_138	Exclude	C2	Lele D.D.	2023	Exploring environmental education programs in oil-producing indigenous communities in Niger Delta, Ogoniland, Nigeria	Australian Journal of Environmental Education	39	3	10.1017/aee.2023.21
SCOPUS_139	Include	C5	Alshahrani A.	2023	The impact of ChatGPT on blended learning: Current trends and future research directions	International Journal of Data and Network Science	7	4	10.5267/j.ijdns.2023.6.010
SCOPUS_146	Include		Embarak O.H.; Hawarna S.	2023	Smart Education for Industry 4.0 Sustainable Futures: A New Theory of Maximization for Learner Success	International Journal of Information and Education Technology	13	11	10.18178/ijiet.2023.13.11.1979
SCOPUS_161	Exclude	C1	Tin T.T.; Ee L.C.; Rong J.C.J.; Mohan S.A.	2024	Sleep quality as a mediating role in general health and academic performance in the context of sustainable education	International Journal of Innovative Research and Scientific Studies	7	2	10.53894/ijirss.v7i2.2864

SCOPUS_164	Exclude	C4	Al-Hazaima H.; Low M.; Sharma U.	2024	The integration of education for sustainable development into accounting education: stakeholders' salience perspectives	Journal of Public Budgeting, Accounting and Financial Management			10.1108/JPBAFM-06-2023-0105
SCOPUS_165	Exclude	C4	Wrobel A.; Beasy K.; Fiedler T.; Mann A.; Morrison B.; Towle N.; Wood G.; Doyle R.; Peterson C.; Bettiol S.	2024	Common experiences and critical reflections: embedding education for sustainability in higher education curricula across disciplines	International Journal of Sustainability in Higher Education			10.1108/IJSHE-04-2024-0242
SCOPUS_169	Exclude	C3	Jafarov S.	2024	EDUCATION POLICY OF 3RD GENERATION UNIVERSITIES; [POLÍTICA DE EDUCAÇÃO DAS UNIVERSIDADES DE 3ª GERAÇÃO]; [POLÍTICA EDUCATIVA DE LAS UNIVERSIDADES DE TERCERA GENERACIÓN]	Revista de Gestao Social e Ambiental	18	6	10.24857/rgsa.v18n6-007
SCOPUS_170	Exclude	C2	Mursaleen H.; Taimur S.	2023	Gender Construct for Sustainable Development in Pakistan: Evaluating Alignment of Education System with the Religious Ideology	Societies	13	10	10.3390/soc13100224
SCOPUS_175	Exclude	C1	Hu N.; Zheng B.	2023	Natural resources, education, and green economic development	Resources Policy	86		10.1016/j.resourpol.2023.104053
SCOPUS_181	Include		Ker G.; van Gorp R.	2024	Quality education for all: a case study of success for a neurodivergent learner	Frontiers in Sustainability	5		10.3389/frsus.2024.1399361

SCOPUS_182	Exclude	C4	Zhu B.; Zheng Y.; Ding M.; Dai J.; Liu G.; Miao L.	2023	A pedagogical approach optimization toward sustainable architectural technology education applied by massive open online courses	Archnet-IJAR: International Journal of Architectural Research	17	3	10.1108/ARCH-07-2022-0151
SCOPUS_185	Exclude	C1	Saad M.; Shah N.A.; Supian K.; Rani A.A.; Abidin I.	2023	Emotional and spiritual quotient for sustainable education's service quality	International Journal of Evaluation and Research in Education	12	4	10.11591/ijere.v12i4.25434
SCOPUS_187	Include		Dehtjare J.; Uzule K.	2023	Sustainable Higher Education Management: Career Drivers of Academic Staff	Journal of Teacher Education for Sustainability	25	2	10.2478/jtes-2023-0018
SCOPUS_189	Exclude	C1	Razak N.A.; Rasli R.M.; Subhan S.; Ahmad N.A.; Malik S.	2023	Systematic review on digital transformation among teachers in public schools	International Journal of Evaluation and Research in Education	12	2	10.11591/ijere.v12i2.24498
SCOPUS_193	Exclude	C4	Sahoo D.K.; Sharma B.; Sundaray D.	2024	Environmental education within the right to education framework	E-Learning and Digital Media			10.1177/20427530241276139
SCOPUS_194	Include	C5	Tan H.L.; Zainordin N.B.; Rasdi M.T.M.	2024	Navigating the Complexities: A Systematic Literature Review on the Challengers of Implementing Sustainable Interior Architecture Education	Future Cities and Environment	10	1	10.5334/fce.288
SCOPUS_198	Exclude	C1	Yang X.	2023	Role of green finance and investment in sustainable resource development in China	Resources Policy	86		10.1016/j.resourpol.2023.104219
SCOPUS_199	Include		Vasudevan A.; Fernandes S.; Panda R.; Gupta P.; Srivastava M.; Nukulkij D.; Adialita T.	2024	Adoption of online degree programs in higher education in India: An exploratory study based on stakeholder perception and proposed policy measures	Journal of Infrastructure, Policy and Development	8	9	10.24294/jipd.v8i9.6158

SCOPUS_200	Include		Nguyen T.B.; Nguyen Q.L.; Trinh T.P.T.; Nguyen T.H.A.; Nguyen T.M.T.; Cao T.K.; Nguyen T.T.H.; Pham T.K.O.	2023	Curriculum Development Competency of Pedagogical Students: An Exploratory Study from Vietnam	International Journal of Learning, Teaching and Educational Research	22	5	10.26803/IJLTER.22.5.23
SCOPUS_201	Exclude	C1	Diep N.H.; Hoai V.T.T.; Son P.N.; Nga P.T.; Thuy H.T.P.; Duc N.M.	2023	Developing competencies of natural science teachers for designing and organizing STEM education activities in Vietnam	International Journal of Education and Practice	11	3	10.18488/61.v11i3.3430
SCOPUS_202	Exclude	C4	Navarro I.J.; Marti J.V.; Yepes V.	2023	Evaluation of Higher Education Students' Critical Thinking Skills on Sustainability	International Journal of Engineering Education	39	3	10.13039/501100011033
SCOPUS_209	Include		Ameli K.	2022	Where is Nature? Where is Nature in Nature and Outdoor Learning in Higher Education? An Analysis of Nature-Based Learning in Higher Education Using Multispecies Ethnography	Journal of Teacher Education for Sustainability	24	2	10.2478/jtes-2022-0020
SCOPUS_212	Exclude	C1	Rahman M.M.; Haque A.K.M.A.; Suib F.H.	2023	The Confronts of Edutourism in the Post-COVID-19 Pandemic Era: A Malaysian Perspective	Intellectual Discourse	31	2	10.31436/id.v31i2.1911
SCOPUS_213	Exclude	C1	Erenso F.; Maunenenda M.	2023	Plant Species Composition and Conservation Values at Dilla University Botanical and Ecotourism Garden, Dilla, Ethiopia	International Journal of Forestry Research	2023		10.1155/2023/9354257
SCOPUS_220	Exclude	C1	Xing W.; Jamaludin K.A.; Hamzah M.I.	2023	Application Research of the Theory of Sustainable Education Scientific Development in the Teaching of High School Art Education	Educational Administration: Theory and Practice	29	2	
SCOPUS_222	Exclude	C1	Acharya K.P.; Acharya M.; Somai K.B.	2023	Gardening at School for New Good Life: Entrepreneurship for Sustainable Education in the Public Schools in Nepal	Qualitative Report	28	6	10.46743/2160-3715/2023.6104
SCOPUS_225	Exclude	C1	Alsarayreh R.S.; Al-Khasawneh F.M.; Soub T.F.A.	2022	Parental Engagement in Online Teaching and Learning During COVID-19 Pandemic: Implications for Sustainable Education	Journal of Teacher Education for Sustainability	24	1	10.2478/jtes-2022-0010

SCOPUS_228	Exclude	C1	Kabadayi A.; Skutil M.; Maněnová M.	2022	ICT Equipment in the Kindergartens for Sustainable Education from Kindergarten Principals' Perspectives in the Czech Republic	TEM Journal	11	2	10.18421/TEM112-09
SCOPUS_229	Exclude	C1	Rashid Bunyatova A.	2022	IQ AND EQ SKILLS TRAINING WITHING THE SMART EDUCATION-SMART YOUTH PROGRAM; [ENTRENAMIENTO EN HABILIDADES IQ Y EQ DENTRO DEL PROGRAMA SMART EDUCATION-SMART YOUTH]	Universidad y Sociedad	14	S5	
SCOPUS_230	Exclude	C1	Zekavat M.	2023	A Comparative Study of the Human-Nature Relationship in The Fate of Fausto and I'll Sow My Hands in the Garden	Children's Literature in Education			10.1007/s10583-023-09552-w
SCOPUS_233	Exclude	C1	Summers K.; Crist J.; Streitwieser B.	2022	Education as an Opportunity for Integration: Assessing Colombia, Peru, and Chile's Educational Responses to the Venezuelan Migration Crisis	Journal on Migration and Human Security	10	2	10.1177/23315024221085189
SCOPUS_237	Include		Niemczyk E.K.	2022	The Complexity of Education for Sustainable Development: Insights from South African Higher Education; [KOMPLEKSNOST IZOBRAŽEVANJA ZA TRAJNOSTNI RAZVOJ: VPOGLED V JUŽNOAFRIŠKO VISOKO ŠOLSTVO]	Sodobna Pedagogika/Journal of Contemporary Educational Studies	73	2	
SCOPUS_245	Exclude	C1	Agarwal S.; Kayal S.; Tripathi N.; Pal S.	2023	Understanding Acceptance of New Media: An Empirical Evaluation of Students Undergoing Higher Education in Media Studies	International Journal of Media and Information Literacy	8	2	10.13187/ijmil.2023.2.257
SCOPUS_252	Exclude	C4	Raybould C.	2022	Trends forecasting as a tool for sustainable education	Fashion, Style and Popular Culture	9	3	10.1386/fspc_00058_1
SCOPUS_254	Include		Lim C.K.; Haufiku M.S.; Tan K.L.; Farid Ahmed M.; Ng T.F.	2022	Systematic Review of Education Sustainable Development in Higher Education Institutions	Sustainability (Switzerland)	14	20	10.3390/su142013241
SCOPUS_263	Exclude	C1	Wang H.; Lu Q.	2022	Understanding Philosophies of Higher Education between Countries in China's Belt and Road Initiative: Analysis of University	SAGE Open	12	4	10.1177/21582440221141867

					Mottos Based on Natural Language Processing Technology				
SCOPUS_265	Exclude	C4	Albert M.; Uhlig M.	2022	Education for sustainable development at Chemnitz University of Technology	International Journal of Sustainability in Higher Education	23	6	10.1108/IJSHE-02-2021-0078
SCOPUS_269	Exclude	C1	Dewey S.; Prohaska A.	2022	"You're a product of your environment for sure": Correctional educators on their perceptions of and contributions to prison social climate	Crime, Law and Social Change	77	4	10.1007/s10611-021-09999-2
SCOPUS_271	Exclude	C1	Pilotti M.A.E.; Nazeeruddin E.; Alkuhayli H.; Elmoussa O.	2022	Predicting performance of Middle Eastern female students: A challenge for sustainable education	Psychology in the Schools	59	9	10.1002/pits.22715
SCOPUS_273	Include		Dong X.; Zhang X.; Zhang C.; Bi C.	2023	Building sustainability education for green recovery in the energy resource sector: A cross country analysis	Resources Policy	81		10.1016/j.resourpol.2023.103385
SCOPUS_274	Exclude	C1	Tahili M.H.; Tolla I.; Ahmad M.A.; Samad S.; Saman A.; Pattaufi	2022	Developing the strategic collaboration model in basic education	International Journal of Evaluation and Research in Education	11	2	10.11591/ijere.v11i2.21907
SCOPUS_276	Exclude	C4	Shanika V.G.; Jayawickrama T.S.; Perera B.A.K.S.	2023	The Adaptability of Sustainability Education in Quantity Surveying Degree Programs in Sri Lanka: The Industry Perception	International Journal of Construction Education and Research	19	3	10.1080/15578771.2022.2100017
SCOPUS_277	Exclude	C1	Charina A.; Kurnia G.; Mulyana A.; Mizuno K.	2022	Sustainable Education and Open Innovation for Small Industry Sustainability Post COVID-19 Pandemic in Indonesia	Journal of Open Innovation: Technology, Market, and Complexity	8	4	10.3390/joitmc8040215
SCOPUS_278	Exclude	C1	Verma R.; Grover P.	2022	Role of social media in promotion of green school initiatives by government green schools in India	Journal of Public Affairs	22	4	10.1002/pa.2643
SCOPUS_287	Include		Karataş K.; Han B.	2022	Role of Social Justice in the Relationship Between Cultural Intelligence and Attitude Toward Teaching Profession	Journal of Teacher Education for Sustainability	24	1	10.2478/jtes-2022-0007
SCOPUS_289	Include		Ma J.J.	2023	Development of education for sustainable fashion design using a challenge-based learning approach	International Journal of Fashion Design, Technology and Education	16	2	10.1080/17543266.2022.2137249
SCOPUS_290	Exclude	C1	Casa-Coila M.D.; Mamani-Jilaja D.; Cervantes-Alagón	2023	PERCEPTIONS OF POLLUTION AND ENVIRONMENTAL ATTITUDES AMONG	Revista de Gestao Social e Ambiental	17	1	10.24857/rgsa.v17n1-023

					Title				DOI
			S.L.; Mamani-Vilca P.S.; Yana-Salluca M.; Alanoca-Gutierrez R.		UNIVERSITY STUDENTS IN THE PUNO REGION, PERU; [PERCEPCIONES SOBRE CONTAMINACIÓN Y ACTITUDES AMBIENTALES EN ESTUDIANTES UNIVERSITARIOS EN LA REGIÓN PUNO, PERÚ]				
SCOPUS_291	Include		Acevedo-Duque Á.; Jiménez-Bucarey C.; Prado-Sabido T.; Fernández-Mantilla M.M.; Merino-Flores I.; Izquierdo-Marín S.S.; Valle-Palomino N.	2023	Education for Sustainable Development: Challenges for Postgraduate Programmes	International Journal of Environmental Research and Public Health	20	3	10.3390/ijerph20031759
SCOPUS_292	Include		Maulana N.	2023	TOWARD SUSTAINABLE HIGHER EDUCATION: INTEGRATING SOFT SKILL DEVELOPMENT INTO BUSINESS SCHOOL CURRICULUM IN INDONESIA; [EM DIREÇÃO A UMA EDUCAÇÃO SUPERIOR SUSTENTÁVEL: INTEGRANDO O DESENVOLVIMENTO DE HABILIDADES LEVES NO CURRÍCULO DA ESCOLA DE NEGÓCIOS NA INDONÉSIA]	Journal of Law and Sustainable Development	11	4	10.55908/sdgs.v11i4.325
SCOPUS_300	Exclude	C1	Sunzuma G.; Luneta K.	2023	An evaluation of secondary school mathematics textbooks in light of sustainable education in Zimbabwe	LUMAT	11	1	10.31129/LUMAT.11.1.1886
SCOPUS_307	Include		Kalnbalkite A.; Pubule J.; Blumberga D.	2022	Education for Advancing the Implementation of the Green Deal Goals for Bioeconomy	Environmental and Climate Technologies	26	1	10.2478/rtuect-2022-0007
SCOPUS_308	Exclude	C1	Račiūnaitė-Paužuolienė R.	2021	Academic youth's education and career abroad: A case study of sustainable education in the UK	Journal of Education Culture and Society	12	1	10.15503/jecs2021.1.504.519
SCOPUS_309	Exclude	C1	Beranová M.; Severová L.	2022	Economic aspects of financial literacy in the context of sustainable management; [Экономические аспекты финансовой грамотности в контексте устойчивого управления]	Terra Economicus	20	2	10.18522/2073-6606-2022-20-2-147-159

SCOPUS_312	Exclude	C1	Khalid A.; Malik G.F.; Mahmood K.	2021	Sustainable development challenges in libraries: A systematic literature review (2000–2020)	Journal of Academic Librarianship	47	3	10.1016/j.acalib.2021.102347
SCOPUS_314	Include		Palma L.C.; Pedrozo E.Á.	2022	Framework for Sustainable Transformative Learning: Promoting Changes for Sustainability	International Journal of Social Ecology and Sustainable Development	13	1	10.4018/IJSESD.298336
SCOPUS_319	Exclude	C4	Megahed N.A.; Ghoneim E.M.	2022	E-learning ecosystem metaphor: building sustainable education for the post-COVID-19 era	International Journal of Learning Technology	17	2	10.1504/ijlt.2022.125075
SCOPUS_321	Exclude	C1	Sumi S.S.; Mondal B.K.; Jahan N.; Seddeque A.; Hossain M.T.	2022	DETERMINANTS OF ACADEMIC ACHIEVEMENT AT SECONDARY LEVELS: A STUDY IN MAGURA DISTRICT OF BANGLADESH	Malaysian Online Journal of Educational Management	10	1	
SCOPUS_326	Exclude	C1	Sørensen L.B.; Germundsson L.B.; Hansen S.R.; Rojas C.; Kristensen N.H.	2021	What skills do agricultural professionals need in the transition towards a sustainable agriculture? A qualitative literature review	Sustainability (Switzerland)	13	24	10.3390/su132413556
SCOPUS_327	Include		Sandri O.	2021	Providing a 'point of entry': Approaches to framing sustainability in curriculum design in Higher Education	Australian Journal of Environmental Education	37	1	10.1017/aee.2020.19
SCOPUS_336	Include		Tanabe J.	2021	Sustaining Language Learning through Social Interaction at a Japanese National University	IAFOR Journal of Education	9	6	10.22492/ije.9.6.06
SCOPUS_338	Include		Jurgena I.; Cedere D.; Keviša I.; Szerlag A.; Jedrzejowska A.	2021	Opinion of Pre-service Preschool Teachers on Responsiveness: A Comparative Study of Latvian and Polish Students in the Aspect of Sustainable Education	Journal of Teacher Education for Sustainability	23	2	10.2478/jtes-2021-0013
SCOPUS_357	Include		Bianchi C.; Salazar Rua R.	2022	A feedback view of behavioural distortions from perceived public service gaps at 'street-level' policy implementation: The case of unintended outcomes in public schools	Systems Research and Behavioral Science	39	1	10.1002/sres.2771

SCOPUS_358	Exclude	C1	Nguyen N.T.P.; Chu A.T.T.; Tran L.H.; Pham S.X.; Nguyen H.N.; Nguyen V.T.	2022	Factors Influencing Elementary Teachers' Readiness in Delivering Sex Education amidst Covid-19 pandemic	International Journal of Learning, Teaching and Educational Research		21	2	10.26803/ijlter.21.2.18
SCOPUS_359	Include		Saudelli M.G.; Niemczyk E.K.	2022	Education for sustainable development: Insights from Canadian and South African universities	Perspectives in Education		40	3	10.18820/2519593X/pie.v40.i3.4
SCOPUS_360	Exclude	C1	Bordoloi R.; Das P.; Das K.	2021	Perception towards online/blended learning at the time of Covid-19 pandemic: an academic analytics in the Indian context	Asian Association of Open Universities Journal		16	1	10.1108/AAOUJ-09-2020-0079
SCOPUS_365	Include		Debrah J.K.; Vidal D.G.; Dinis M.A.P.	2021	Raising awareness on solid waste management through formal education for sustainability: A developing countries evidence review	Recycling		6	1	10.3390/recycling6010006
SCOPUS_375	Exclude	C1	Iqbal Q.; Ahmad N.H.; Halim H.A.	2021	Insights on entrepreneurial bricolage and frugal innovation for sustainable performance	Business Strategy and Development		4	3	10.1002/bsd2.147
SCOPUS_382	Exclude	C1	Anlimachie M.A.; Avoada C.; Amoako-Mensah T.	2022	Leapfrogging Inequality Strategies for Transformed Rural Education: A School District Case, Ghana	Australian and International Journal of Rural Education		32	1	10.47381/aijre.v32i1.282
SCOPUS_385	Include		MacKeen D.	2022	Planting a seed: Sustainable education for students with Additional Support Needs	European Journal of Geography		13	4	10.48088/ejg.d.mac.13.4.98.119
SCOPUS_386	Exclude	C2	Sefoka I.M.	2022	Judicial Administration and Enforcement of the Right to Quality Education in South Africa: A Discussion of Selected Case Laws	Journal of Educational and Social Research		12	2	10.36941/jesr-2022-0045
SCOPUS_393	Exclude	C1	Rozentale S.; Grintale I.; Paegle L.; Vanadzins I.; Matisane L.	2021	Motivation and Challenges of Teleworking Employees of Educational Institutions in Latvia During COVID-19	Journal of Teacher Education for Sustainability		23	2	10.2478/jtes-2021-0020
SCOPUS_395	Exclude	C2	Visković I.	2021	Inclusive pedagogical practice as a predictor of quality early childhood education	European Journal of Educational Research		10	4	10.12973/EU-JER.10.4.1711
SCOPUS_397	Include		Maharjan N.; Kuroda K.; Silwal G.; Toyama S.; Ominato Y.; Tsuchida Y.; Araki	2022	IMPLEMENTATION OF DESIGN BASED LEARNING FOR THE DEVELOPMENT OF SDGs EDUCATIONAL GAMES	Journal of Technology and Science Education		12	2	10.3926/jotse.1578

			N.; Yamaguchi T.; Ichitsubo M.						
SCOPUS_398	Exclude	C1	Villegas-Ch W.; Sánchez-Viteri S.; Román-Cañizares M.	2021	Academic activities recommendation system for sustainable education in the age of COVID-19	Informatics	8	2	10.3390/informatics8020029
SCOPUS_399	Exclude	C2	Mishra D.; Satpathy A.S.; Parmar T.S.; Singhdeo A.K.	2022	MCDM Approach to Assess Dropping out of Education by Children: A Study in the Indian Scenario to Take Appropriate Measures for a Sustainable Education System	International Journal of Social Ecology and Sustainable Development	13	1	10.4018/IJSESD.295965
SCOPUS_400	Exclude	C2	Dar W.A.	2022	Critical Analysis of Educational Aspirations and Practices Inside a Low-Cost Rural Private School: Possible Implications for Quality and Sustainability	International Journal of Social Ecology and Sustainable Development	13	1	10.4018/IJSESD.306648
SCOPUS_403	Include		Onyilo I.R.; Arsat M.B.; Akor T.S.; Latif A.A.; Amin N.F.M.	2019	Sustainable development and sustainability in engineering education in Nigeria	International Journal of Engineering and Advanced Technology	8	5	10.35940/ijeat.E1074.0585C19
SCOPUS_407	Exclude	C1	Polyakova O.; Galstyan-Sargsyan R.	2021	Sustainable Higher Education via Telecollaboration: Improving Plurilingual and Pluricultural Competence; [Устойчивое высшее образование посредством телеколлаборации: повышение плюрилингвальной и плюрикультурной компетенций]	Integration of Education	25	4	10.15507/1991-9468.105.025.202104.544
SCOPUS_411	Exclude	C1	Espino J.M.S.; Artal C.G.; Betancor S.M.G.	2021	Video Lectures: An Analysis of Their Useful Life Span and Sustainable Production	International Review of Research in Open and Distributed Learning	22	3	10.19173/IRRODL.V22I3.5553
SCOPUS_412	Exclude	C1	Lina W.; Wei Z.; Chen Q.	2020	Progress, hotspots and trends of international interdisciplinary education research in the past 30 years — Visualization analysis of journal papers based on WoS	International Journal of Information and Education Technology	10	2	10.18178/ijiet.2020.10.2.1351
SCOPUS_415	Include		Kapenieks J.	2020	Spaced E-learning for Sustainable Education	Journal of Teacher Education for Sustainability	22	2	10.2478/jtes-2020-0016
SCOPUS_416	Exclude	C1	Smitheram E.	2021	A Sustainable Start for the Youngest Congolese Refugees in Uganda	Childhood Education	97	4	10.1080/00094056.2021.1951526
SCOPUS_418	Exclude	C1	Coskun-Setirek A.; Tanrikulu Z.	2021	M-Universities: Critical Sustainability Factors	SAGE Open	11	1	10.1177/2158244021999388

SCOPUS_422	Exclude	C2	Sumaryanta; Mardapi D.; Sugiman; Herawan T.	2019	Community-based teacher training: Transformation of sustainable teacher empowerment strategy in Indonesia	Journal of Teacher Education for Sustainability	21	1	10.2478/jtes-2019-0004
SCOPUS_423	Exclude	C2	Suparsa I.M.; Setini M.; Asih D.; Telagawathi N.L.W.S.	2021	Teacher Performance Evaluation through Knowledge Sharing and Technology during the COVID 19 Pandemic	Webology	18	Special Issue	10.14704/WEB/V18SI04/WEB18168
SCOPUS_426	Exclude	C7	Molina-Torres M.P.; Ortiz-Urbano R.	2021	Sustainable education and conservation of cultural heritage for teacher education students	Formacion Universitaria	14	1	10.4067/S0718-50062021000100207
SCOPUS_427	Exclude	C1	Shanmuganeethi V.; Muthuramalingam S.; Uma K.V.	2020	Intelligent dynamic grouping for collaborative activities in learning management system	Journal of Engineering Education Transformations	34	2	10.16920/jeet/2020/v34i2/151590
SCOPUS_429	Include		Volkova M.V.; Stoffers J.; Kochetkov D.M.	2019	Education projects for sustainable development: Evidence from ural federal university	Changing Societies and Personalities	3	3	10.15826/csp.2019.3.3.073
SCOPUS_430	Include		Soomro B.A.; Ghumro I.A.; Shah N.	2020	Green entrepreneurship inclination among the younger generation: An avenue towards a green economy	Sustainable Development	28	4	10.1002/sd.2010
SCOPUS_431	Exclude	C2	Cattaro G.M.; Richard P.; Wodon Q.	2021	Challenges and Opportunities for Catholic Schools Globally: Insights from OIEC's World Congress	Journal of Catholic Education	24	1	10.15365/joce.2401132021
SCOPUS_432	Exclude	C3	Cronin J.	2019	The Cuyahoga fire at fifty: a false history obscures the real water crisis that never ceased	Journal of Environmental Studies and Sciences	9	3	10.1007/s13412-019-00550-3
SCOPUS_435	Exclude	C1	Cavus N.; Sani A.S.; Haruna Y.; Lawan A.A.	2021	Efficacy of social networking sites for sustainable education in the era of COVID-19: A systematic review	Sustainability (Switzerland)	13	2	10.3390/su13020808
SCOPUS_441	Include		Dicks A.P.; D'Eon J.C.; Morra B.; Kutas Chisu C.; Quinlan K.B.; Cannon A.S.	2019	A Systems Thinking Department: Fostering a Culture of Green Chemistry Practice among Students	Journal of Chemical Education	96	12	10.1021/acs.jchemed.9b00287
SCOPUS_445	Exclude	C2	Te Ava A.	2020	Culturally responsive pedagogy for sustainable quality education in the cook islands setting	Waikato Journal of Education	25	1	10.15663/wje.v25i0.714
SCOPUS_446	Exclude	C1	Almayali H.H.; Almusawy A.M.R.	2021	The Strategy of e-learning Crisis Management and Effectiveness of Intelligent e-education During Covid-19 for a Sustainable Education System	Webology	18	Special Issue	10.14704/WEB/V18SI05/WEB18228

SCOPUS_452	Exclude	C1			Aesthetic practice as part of work with sustainability, participation and learning environments - Examples from a finnish and Swedish preschool	Nordic Studies in Education			10.23865/NSE.V40.2601
			Häikiö T.K.; Mårtensson P.; Lohilahti L.	2020			40	4	
SCOPUS_453	Exclude	C1			Competencies of principals in ensuring sustainable education: Teachers' views	International Journal of Evaluation and Research in Education			10.11591/ijere.v8i2.18273
			Şemin F.K.	2019			8	2	
SCOPUS_454	Exclude	C1			Reimagining the sustainable and social justice mathematics classrooms in the fourth industrial revolution	International Journal of Learning, Teaching and Educational Research			10.26803/ijlter.19.12.15
			Moloi T.J.; Matabane M.E.	2020			19	12	
SCOPUS_456	Exclude	C2	Norton E.; Li Y.; Mason L.R.; Washington-Allen R.A.	2019	Assessing the impact of a geospatial data collection app on student engagement in environmental education	Education Sciences	9	2	10.3390/educsci9020118
SCOPUS_459	Include				Digitalization and sustainable higher education: Constructive and destructive potential of professional dynasties; [Skaitmeninimas Ir Tvarus Aukštasis Mokslas: Konstruktyvus Ir Destruktyvus Profesinių Dinastijų Potencialas]	Transformations in Business and Economics			
			Volchik V.; Posukhova O.; Strielkowski W.	2021			20	3	
SCOPUS_462	Exclude	C2			In search of an effective teacher: Ghana's move towards achieving sustainable education through teacher education reforms	International Journal of Higher Education			10.5430/ijhe.v9n4p216
			Adu-Gyamfi K.; Otami D.C.	2020			9	4	
SCOPUS_466	Include				Teaching land as an extension of self: The role of ecopsychology in disrupting capitalist narratives of land and resource exploitation	Radical Teacher			10.5195/rt.2021.706
			Ricket A.L.	2021			119		
SCOPUS_468	Include		Eppinga M.B.; Lozano-Cosme J.; de Scisciolo T.; Arens P.; Santos M.J.; Mijts E.N.	2020	Putting sustainability research into practice on the university campus: An example from a Caribbean small island state	International Journal of Sustainability in Higher Education	21	1	10.1108/IJSHE-03-2019-0131
SCOPUS_472	Exclude	C4	Kristensen A.K.; Kristensen M.L.	2020	Non-greeting rituals in clinical placements	Nurse Education Today	94		10.1016/j.nedt.2020.104570

SCOPUS_473	Exclude	C4	Zhekibayeva B.; Kalimova A.; Sarsekeyeva Z.; Ossipova S.; Zhukenova G.	2020	Research on integrated learning upon enhancing cognitive activity in primary school	Journal of Intellectual Disability - Diagnosis and Treatment	8	3	10.6000/2292-2598.2020.08.03.16
SCOPUS_477	Exclude	C4	Arkorful V.E.; Basiru I.; Anokye R.; Latif A.; Agyei E.K.; Hammond A.; Pokuaah S.; Arkorful E.V.; Abdul-Rahaman S.	2020	Equitable Access and Inclusiveness in Basic Education: Roadblocks to Sustainable Development Goals	International Journal of Public Administration	43	3	10.1080/01900692.2019.1627554
SCOPUS_478	Exclude	C4	Tsai W.-T.	2019	Environmental education policy for pursuing sustainable campus: Experience from Taiwan higher education	Environmental Engineering and Management Journal	18	3	10.30638/eemj.2019.062
SCOPUS_481	Exclude	C4	Gravis I.; Németh K.; Twemlow C.; Németh B.	2020	The Case for Community-Led Geoheritage and Geoconservation Ventures in Māngere, South Auckland, and Central Otago, New Zealand	Geoheritage	12	1	10.1007/s12371-020-00449-4
SCOPUS_482	Exclude	C2	Seehawer M.; Breidlid A.	2021	Dialogue between epistemologies as quality education. Integrating knowledges in Sub-Saharan African classrooms to foster sustainability learning and contextually relevant education	Social Sciences and Humanities Open	4	1	10.1016/j.ssaho.2021.100200
SCOPUS_483	Exclude	C1	Lyons K.M.; Christopoulos A.; Brock T.P.	2020	Sustainable pharmacy education in the time of COVID-19	American Journal of Pharmaceutical Education	84	6	10.5688/ajpe8088
SCOPUS_491	Include	C5	Lavrysh Y.; Lytovchenko I.; Lukianenko V.	2020	Ecocomposition integration into ESP course for bachelors at a technical university1	Mextesol Journal	44	1	
SCOPUS_497	Include	C6	Huss N.; Ikiugu M.N.; Hackett F.; Sheffield P.E.; Palipane N.; Groome J.	2020	Education for sustainable health care: From learning to professional practice	Medical Teacher	42	10	10.1080/0142159X.2020.1797998

SCOPUS_498	Exclude	C1	Engliana E.; Prasetyo A.; Nisa A.	2021	Empowering Young Children with Folktales and Storytelling: A Report from a Rural West Java Village	Asia-Pacific Journal of Research in Early Childhood Education	15	1	10.17206/apjrece.2021.15.1.157
SCOPUS_502	Exclude	C1	Le T.T.; Chen S.	2018	Teaching cultures in English as International Language (EIL): A political model for Asia-Pacific countries	International Journal of Innovation, Creativity and Change	3	4	
SCOPUS_503	Exclude	C1	Fleacă E.	2017	Core processes roadmap to deploy the higher education institution's internationalization strategy	TEM Journal	6	1	10.18421/TEM61-12
SCOPUS_504	Exclude	C1	Zeinz H.	2019	Digitalization and A.I. as Challenges and Chances for Future Teaching and Teacher Education: A Reflection	Beijing International Review of Education	1	02-Mar	10.1163/25902539-00102011
SCOPUS_509	Exclude	C1	Ahmad N.H.; Halim H.A.; Ramayah T.; Rahman S.A.	2015	Green entrepreneurship inclination among Generation Y: The road towards a green economy	Problems and Perspectives in Management	13	2	
SCOPUS_511	Exclude	C1	Deus R.M.; Battistelle R.A.G.; Silva G.H.R.D.	2016	Sustainability insights from the mission statements of leading Brazilian Universities	International Journal of Educational Management	30	3	10.1108/IJEM-05-2014-0065

SCOPUS_513	Include		Zain S.M.; Mahmood N.A.; Basri N.E.A.; Zawawi M.A.; Mamat L.F.; Saad N.F.M.	2016	Sustainable education model through recycling and ekorelawan volunteering activities	Pertanika Journal of Social Sciences and Humanities	24	April	https://www.academia.edu/74923546/Sus
SCOPUS_514	Exclude	C1	Pullen S.; Brinkert K.	2014	SolEn for a Sustainable Future: Developing and Teaching a Multidisciplinary Course on Solar Energy to Further Sustainable Education in Chemistry	Journal of Chemical Education	91	10	10.1021/ed400345m
SCOPUS_515	Exclude	C1	Azevedo H.C.	2017	The role of sustainable learning policies on the fight against hunger in adult education	Brazilian Journal of International Law	14	1	10.5102/rdi.v14i1.4357
SCOPUS_516	Exclude	C1	Ogunjinmi A.A.; Oluwatuyi B.G.; Oniya B.J.	2015	Determining ecological knowledge and attitudes of students: The role of personal factors and school exposure	International Journal of Conservation Science	6	3	
SCOPUS_517	Exclude	C1	Maragakis A.; Van Den Dobbelsteen A.; Maragakis A.	2017	Is Higher education economically unsustainable? An exploration of factors that undermine sustainability assessments of higher education	A+BE Architecture and the Built Environment	3		
SCOPUS_518	Exclude	C1	Guseva S.; Dombrovskis V.; Capulis S.	2015	Unity of Affect and Intellect for Future Teachers' Education Sustainable Development	International Journal of Learning in Higher Education	22	2	10.18848/2327-7955/CGP/v22i02/48616

SCOPUS_523	Exclude	C1	Geitz G.; de Geus J.	2019	Design-based education, sustainable teaching, and learning	Cogent Education	6	1	10.1080/2331186X.2019.1647919
SCOPUS_526	Exclude	C1	Dubey R.; Gunasekaran A.; Deshpande A.	2017	Building a comprehensive framework for sustainable education using case studies	Industrial and Commercial Training	49	1	10.1108/ICT-08-2016-0051
SCOPUS_527	Exclude	C3	Iliško D.; Zariņa S.; Drelinga E.	2015	The textbook "rita, raitis and numbers" by J. Mencis (Sen.) and D. Draviņa for the pre-school learners; [Ikimokyklinio ugdymo J. Mencio (Sen.) ir D. Draviņos matematikos vadovėlis „Rita, Raitis ir skaičiai"]	Pedagogika	120	4	10.15823/p.2015.046
SCOPUS_528	Exclude	C1	Abdalla O.A.M.; Okorley E.L.; Boateng S.A.	2018	Perceived Level and Farmer Characteristics Factors Associated with Level of Environmental Sustainability of Cotton Farming System in the Sudanese Gezira Scheme	International Journal of Sustainable Development and World Ecology	25	6	10.1080/13504509.2018.1431972
SCOPUS_529	Exclude	C1	Fedulin A.A.; Sakharchuk E.S.; Ilkevich S.V.	2014	Moscow regional education cluster in tourism and services: A new sustainable development paradigm	World Applied Sciences Journal	30	30	10.5829/idosi.wasj.2014.30.mett.34

SCOPUS_531	Exclude	C1	Kulnieks A.; Longboat D.R.; Young K.	2016	Engaging eco-hermeneutical methods: Integrating Indigenous and environmental curricula through an eco-justice-arts-informed pedagogy	AlterNative	12	1	10.20507/AlterNative.2016.12.1.4
SCOPUS_532	Exclude	C1	Jahiel A.R.	2015	Between the local and the global in the Age of the Anthropocene: the case for the "regional" in Environmental Studies and Sciences	Journal of Environmental Studies and Sciences	5	2	10.1007/s13412-015-0251-y
SCOPUS_534	Exclude	C1	Tlali M.F.	2017	Creating sustainable physical sciences learning environments: A case for decolonised and transformative learning	Perspectives in Education	35	2	10.18820/2519593X/pie.v35i2.7
SCOPUS_536	Exclude	C1	Maragakis A.; Van Den Dobbelsteen A.; Maragakis A.	2017	Validating the need to include the economic returns of graduates as a metric of a higher education institutions level of sustainability	A+BE Architecture and the Built Environment	3		10.5430/ijhe.v5n4p
SCOPUS_538	Exclude	C1	Sharma S.	2014	Ensuring children learn through community participation: A case of sustainable education initiative in Chhattisgarh	Indian Journal of Social Work	75	1	

SCOPUS_540	Exclude	C1	Manouselis N.; Kyrgiazos G.; Stoitsis G.	2014	Exploratory study of multi-criteria recommendation algorithms over technology enhanced learning datasets	Journal of E-Learning and Knowledge Society	10	1	
SCOPUS_542	Exclude	C3	Maragakis A.; Van Den Dobbelsteen A.; Maragakis A.	2017	Earning capacity of sustainable education -a review of current perceptions regarding the salaries, under-employment and over-education of higher-education graduates and their potential application in sustainability assessments	A+BE Architecture and the Built Environment	3		
SCOPUS_543	Exclude	C1	Wen Y.; Wu J.	2017	A Study on Singapore Chinese Language Teachers' Professional Proficiency and Training Needs for Sustainable Development	Journal of Teacher Education for Sustainability	19	2	10.1515/jtes-2017-0015
SCOPUS_545	Exclude	C1	Elbarkouky M.M.G.; Aboshady A.M.; Salem A.S.	2013	Sustainability assessment framework for engineering and sciences educational institutions in developing countries	WIT Transactions on Ecology and the Environment	173		10.2495/SDP130491
SCOPUS_546	Exclude	C1	Emerson G.; Cowlishaw K.	2013	A study of sustainable development practices within the Australian textile and clothing industry	International Journal of Social Sustainability in Economic, Social and Cultural Context	8	2	10.18848/2325-1115/CGP/v08i02/55183
SCOPUS_547	Exclude	C1	Badjanova J.; Pipere A.; Iliško D.	2017	Gender Identity of Students and Teachers: Implications for a Sustainable Future	Journal of Teacher Education for Sustainability	19	2	10.1515/jtes-2017-0019

SCOPUS_548	Exclude	C1	Gauvreau P.	2018	Sustainable education for bridge engineers	Journal of Traffic and Transportation Engineering (English Edition)	5	6	10.1016/j.jtte.2018.10.001
SCOPUS_549	Include		Wu Y.C.J.; Lu C.C.J.; Lirn T.-C.; Yuan C.-H.	2014	An overview of university level sustainable transportation curricula in North America and Europe	Transportation Research Part D: Transport and Environment	26		10.1016/j.trd.2013.10.006
SCOPUS_551	Exclude	C2	López-Alcarria A.; Gutiérrez-Pérez J.; Perales-Palacios J.; Burgos-Peredo O.	2014	Greening the curricula: A comparison between primary and secondary eco-school projects	International Journal of Sustainability Education	9	2	10.18848/2325-1212/cgp/v09i02/55261
SCOPUS_552	Exclude	C4	Zain S.M.; Basri N.E.A.; Mahmood N.A.; Basri H.; Yaacob M.; Ahmad M.	2013	Innovation in sustainable education and entrepreneurship through the UKM recycling center operations	International Education Studies	6	6	10.5539/ies.v6n6p168
SCOPUS_553	Exclude	C3	Alders R.R.	2018	The National Library of Aruba goes Green! A Chronology and History	Journal of Library Administration	58	7	10.1080/01930826.2018.1514837
SCOPUS_554	Exclude	C5	Chen S.; Gao Y.	2019	Education for all and sustainable development: An empirical study on family cognition and household resource using in china; [Edukacja dla wszystkich i zrównoważony rozwój: Badania empiryczne nad rodziną i wykorzystaniem zasobów w gospodarstwach domowych w chinach]	Problemy Ekorozwoju	14	1	
SCOPUS_555	Exclude	C4	Maragakis A.; Van Den Dobbelsteen A.; Erlenbach A.	2017	Analysis of STARS as a Sustainability Assessment System Universally Usable in Higher Education	A+BE Architecture and the Built Environment	3		10.18848/2325-1212/cgp/v10i3-4/55331
SCOPUS_558	Include		Maragakis A.; Van Den Dobbelsteen A.	2017	Higher education: Features, trends and needs in sustainability	A+BE Architecture and the Built Environment	3		https://doi.org/10.7480/abe.2017.3.3655
SCOPUS_559	Exclude	C1	Gilroy-Scott B.; Chilton J.; Goodhew S.	2013	Earth footprint of the construction phase of the wales institute for sustainable education at the centre for alternative technology	International Journal of Sustainability Education	8	2	10.18848/2325-1212/cgp/v08i02/55275

SCOPUS_561	Include	C1	Stokes L.C.; Selin N.E.	2016	The mercury game: evaluating a negotiation simulation that teaches students about science-policy interactions	Journal of Environmental Studies and Sciences	6	3	10.1007/s13412-014-0183-y
SCOPUS_563	Exclude	C5	Dzelzkaleja L.; Sen J.K.	2018	Contradictions in Higher Education	Journal of Teacher Education for Sustainability	20	1	10.2478/jtes-2018-0008
SCOPUS_565	Include		Hengrasmee S.; Chansomsak S.	2016	A novel approach to architectural education for sustainability: A quest for reformation and transformation	Global Journal of Engineering Education	18	3	
SCOPUS_566	Include		Celik B.G.; Ozbek M.E.; Attaran S.; Jalili M.	2014	Comparison of Environmental Responsibility of Construction Management Students Based on Exposure to Sustainability in Curricula and on Campus	International Journal of Construction Education and Research	10	2	10.1080/15578771.2013.826752
SCOPUS_568	Exclude	C5	Jurgena I.; Cedere D.; Keviša I.	2018	The Prospects of Transdisciplinary Approach to Promote Learners' Cognitive Interest in Natural Science for Sustainable Development	Journal of Teacher Education for Sustainability	20	1	10.2478/jtes-2018-0001
SCOPUS_569	Exclude	C5	Kabadayi A.	2016	A suggested in-service training model based on Turkish preschool teachersí conceptions for sustainable development	Journal of Teacher Education for Sustainability	18	1	10.1515/jtes-2016-0001
SCOPUS_570	Include		de Lange D.E.	2013	How do Universities Make Progress? Stakeholder-Related Mechanisms Affecting Adoption of Sustainability in University Curricula	Journal of Business Ethics	118	1	10.1007/s10551-012-1577-y
SCOPUS_571	Exclude	C5	Fedosejeva J.; Boče A.; Romanova M.; Iliško D.; Ivanova O.	2018	Education for Sustainable Development: The Choice of Pedagogical Approaches and Methods for the Implementation of Pedagogical Tasks in the Anthropocene Age	Journal of Teacher Education for Sustainability	20	1	10.2478/jtes-2018-0010
SCOPUS_572	Exclude	C5	Mohammadi M.; Moradi K.	2017	Exploring Change in EFL Teachers' Perceptions of Professional Development	Journal of Teacher Education for Sustainability	19	1	10.1515/jtes-2017-0002
SCOPUS_577	Exclude	C2	Amin M.Z.; Zamin N.; Rahim H.A.; Hassan N.I.; Kamarudin N.D.	2018	Robo therapist: A sustainable approach to teach basic expressions for special needs children in Malaysia	International Journal of Engineering and Technology(UAE)	7	3	10.14419/ijet.v7i3.29.18533
SCOPUS_579	Exclude	C8	Davis-Morrison V.	2018	Geography and Education for Sustainable Development: A	Caribbean Geography	23		

					Jamaican case study of the CSEC Revised Geography			
SCOPUS_580	Exclude	C2	Fomunyam K.G.; Teferra D.	2017	Curriculum responsiveness within the context of decolonisation in South African higher education	Perspectives in Education	35	2	10.18820/2519593X/pie.v35i2.15
SCOPUS_581	Exclude	C2	Aktepe A.	2018	Application of fuzzy quality function deployment model, group decision making and Choquet integral to improve service quality in engineering education	International Journal of Engineering Education	35	1	
SCOPUS_582	Exclude	C1	Chan A.; Islam M.S.	2015	State, religion, and environmentalism: fostering social cohesion and environmental protection in Singapore	Environmental Sociology	1	3	10.1080/23251042.2015.1045263
SCOPUS_587	Exclude	C1	Makijenko J.; Burlakovs J.; Brizga J.; Klavins M.	2016	Energy efficiency and behavioral patterns in Latvia	Management of Environmental Quality: An International Journal	27	6	10.1108/MEQ-05-2015-0103
SCOPUS_589	Exclude	C5	Sa'di I.T.	2019	Assessing environmental orientations of children at UNRWA schools: Investigating psychometric properties of the new ecological paradigm scale	International Journal of Learning, Teaching and Educational Research	18	7	10.26803/ijlter.18.7.8
SCOPUS_590	Exclude	C2	Dewi M.P.; Rahmatunnisa M.; Sumaryana A.; Kristiadi J.B.	2018	Ensuring service quality in education for Indonesia's sustainable education	Journal of Social Studies Education Research	9	4	10.17499/jsser.26856
SCOPUS_591	Include	C2	Silverman G.S.; Wally M.K.	2016	Preparation of environmental studies and sciences students to participate in the environmental risk dialogue	Journal of Environmental Studies and Sciences	6	3	10.1007/s13412-015-0331-z
SCOPUS_593	Exclude	C4	Wade R.	2012	Pedagogy, places and people	Journal of Teacher Education for Sustainability	14	2	10.2478/v10099-012-0014-8
SCOPUS_596	Include		Maragakis A.; van den Dobbelsteen A.	2015	Sustainability in higher education: Analysis and selection of assessment systems	Journal of Sustainable Development	8	3	10.5539/jsd.v8n3p1
SCOPUS_599	Exclude	C4	Memon Z.A.; Bhutto A.; Chanar Z.A.; Robson M.G.	2015	Finding 'corporate social responsibility' research trends and content in chinese universities: A literature review	International Journal of Technology Management and Sustainable Development	14	3	10.1386/tmsd.14.3.179_1
SCOPUS_603	Exclude	C4	Price T.J.	2005	Preaching what we practice: Experiences from implementing	International Journal of Sustainability in Higher Education	6	2	10.1108/14676370510589873

					ISO 14001 at the University of Glamorgan				
SCOPUS_604	Exclude	C4	Secord D.L.; Greengrove C.L.	2002	Environmental science as a vehicle for building natural sciences and ee into a new interdisciplinary urban public university	Journal of Environmental Education	34	1	10.1080/00958960209603480
SCOPUS_605	Exclude	C1	Webber S.; Nahl D.	2011	Sustaining learning for LIS through use of a virtual world	IFLA Journal	37	1	10.1177/0340035210397137
SCOPUS_606	Exclude	C1	Andresen M.; Campbell C.	2010	We are all students of green design	Journal of Green Building	5	3	10.3992/jgb.5.3.30
SCOPUS_607	Include		Leino M.	2007	Sustainable Education and Socialization Through Mistakes	Journal of Teacher Education for Sustainability	7		10.2478/v10099-009-0006-5
SCOPUS_608	Include		Blewitt J.	2010	Deschooling society? A lifelong learning network for sustainable communities, urban regeneration and environmental technologies	Sustainability	2	11	10.3390/su2113465
SCOPUS_610	Exclude	C1		2008	Climate change	Appropriate Technology	35	2	
SCOPUS_611	Include		Wooltorton S.	2004	Local sustainability at school: A political reorientation	Local Environment	9	6	10.1080/1354983042000288085
SCOPUS_613	Include		Auer M.R.	2008	Sensory perception, rationalism and outdoor environmental education	International Research in Geographical and Environmental Education	17	1	10.2167/irgee225.0
SCOPUS_615	Exclude	C1	Resnick L.B.; Hall M.W.	1998	Learning organizations for sustainable education reform	Daedalus	127	4	
SCOPUS_616	Include		Devuysi D.; Hens I.	1990	Integration of environmental education into general university teaching in europe	Higher Education in Europe	15	4	10.1080/0379772900150403
SCOPUS_617	Include		Strode A.	2010	Students' independent professional activity in pedagogical practice	Journal of Teacher Education for Sustainability	12	2	10.2478/v10099-009-0053-y
SCOPUS_618	Exclude	C2	Richardson J.; Janusheva V.	2012	The lasting impact of "Reading to Learn" and sustainability of professional development	International Journal of Learning	18	9	10.18848/1447-9494/cgp/v18i09/47726
SCOPUS_620	Exclude	C2	Smith G.R.	2004	How green is technology? The paradox of online sustainable education	International Journal of Sustainable Development and World Ecology	11	3	10.1080/13504500409469830
SCOPUS_621	Include		Martin E.S.; Lewis D.; Tumman L.J.; Smith B.J.; Brown P.	1993	Environmental education in Sweden	The Environmentalist	13	3	10.1007/BF01901384

SCOPUS_622	Include		Vincent S.; Focht W.	2011	Interdisciplinary environmental education: Elements of field identity and curriculum design	Journal of Environmental Studies and Sciences	1	1	10.1007/s13412-011-0007-2
SCOPUS_623	Include		Pace P.	2010	Self-evaluation as a tool in developing environmental responsibility	Journal of Teacher Education for Sustainability	12	1	10.2478/v10099-009-0043-0
SCOPUS_624	Exclude	C3	Haigh M.	2010	Exploring sustainability in the context of land reclamation: An exercise for environmental management trainees	International Journal of Environment and Sustainable Development	9	####	10.1504/ijesd.2010.029975
SCOPUS_625	Include		Holmberg J.; Svanström M.; Peet D.J.; Mulder K.; Ferrer-Balas D.; Segalàs J.	2008	Embedding sustainability in higher education through interaction with lecturers: Case studies from three European technical universities	European Journal of Engineering Education	33	3	10.1080/03043790802088491
SCOPUS_626	Exclude	C4	Teodosiu C.; Căliman A.F.	2002	Science shop contributions to environmental curriculum development	Environmental Engineering and Management Journal	1	2	10.30638/eemj.2002.027
SCOPUS_627	Exclude	C2	Warren Flint R.; Mccarter W.; Bonniwell T.	2000	Interdisciplinary education in sustainability: Links in secondary and higher education: The Northampton Legacy Program	International Journal of Sustainability in Higher Education	1	2	10.1108/1467630010328261
SCOPUS_628	Include		Koger S.M.; Scott B.A.	2007	Psychology and Environmental Sustainability: A Call for Integration	Teaching of Psychology	34	1	10.1080/00986280709336642
SCOPUS_629	Exclude	C2	Wong Bing Kwan F.; Stimpson P.	2003	Environmental education in Singapore: A curriculum for the environment or in the national interest?	International Research in Geographical and Environmental Education	12	2	10.1080/10382040308667522
SCOPUS_630	Exclude	C4	Rickinson M.; Lundholm C.	2008	Exploring students' learning challenges in environmental education	Cambridge Journal of Education	38	3	10.1080/03057640802299627
SCOPUS_631	Exclude	C2	Ozioma Anie S.; Alakpodia O.N.	2006	2005 Conference of Nigeria Library Association: Delta State Chapter	Library Hi Tech News	23	6	10.1108/07419050610692235
SCOPUS_633	Include		Vincent S.; Focht W.	2009	US higher education environmental program managers' perspectives on curriculum design and core competencies: Implications for sustainability as a guiding framework	International Journal of Sustainability in Higher Education	10	2	10.1108/14676370910945963
SCOPUS_634	Exclude	C1	Reunamo J.	2007	The Agentive Role of Children's Views in Sustainable Education	Journal of Teacher Education for Sustainability	8		10.2478/v10099-009-0014-5
SCOPUS_638	Exclude	C1	Sakk M.; Veisson M.; Lukk K.	2009	The quality of family relations in ensuring sustainable education	Journal of Teacher Education for Sustainability	11	2	10.2478/v10099-009-0040-3

SCOPUS_639	Exclude	C2	Mbebeb F.E.	2009	Developing productive lifeskills in children: Priming entrepreneurial mindsets through socialisation in family occupations	International Journal of Early Childhood	41	2	10.1007/BF03168876
SCOPUS_640	Exclude	C1	Goulios H.; Patuzzi R.B.	2008	Audiology education and practice from an international perspective	International Journal of Audiology	47	10	10.1080/14992020802203322
SCOPUS_641	Exclude	C4	Sidiropoulos L.	2011	Navigating the journey to sustainability: The case for embedding sustainability literacy into all tertiary education business programs	International Journal of Environmental, Cultural, Economic and Social Sustainability	7	3	10.18848/1832-2077/cgp/v07i03/54940
SCOPUS_642	Exclude	C1	Oļehnoviča E.; Kravale-Pauliņa M.	2008	Career education for teachers: Reflections on ESF project implementation in Latvia	Journal of Teacher Education for Sustainability	9		10.2478/v10099-009-0020-7
SCOPUS_643	Exclude	C2	Stimpson P.; Kwan F.W.B.	2001	Environmental Education in Guangzhou in the People's Republic of China: Global theme, politically determined	Environmental Education Research	7	4	10.1080/13504620120081278
SCOPUS_645	Exclude	C1	Assaraf O.B.-Z.; Orion N.	2009	A design based research of an earth systems based environmental curriculum	Eurasia Journal of Mathematics, Science and Technology Education	5	1	10.12973/ejmste/75256
SCOPUS_647	Exclude	C1	Tekin M.; Arslan R.; Ulusoy Y.	2006	Agricultural machinery education in Turkiye	International Journal of Engineering Education	22	1 PART I	
SCOPUS_648	Exclude	C2	Lakatos G.; Csobod É.; Kiss M.; Mészáros I.; Szabó J.	2003	A distance learning course as a tool to implement SD in Hungary	International Journal of Sustainability in Higher Education	4	1	10.1108/14676370310455314
SCOPUS_649	Exclude	C1	Kent J.	2004	How Can the VET Sector Drive the Adoption of Sustainable Practices in Industry?	Australian Journal of Environmental Education	20	1	10.1017/S0814062600002330
SCOPUS_650	Exclude	C4	Ross N.	2007	Help wanted	Alternatives Journal	33	5	
SCOPUS_655	Exclude	C1	Kula P.	2008	Teaching left-handed primary school pupils in Estonia	Journal of Teacher Education for Sustainability	9		10.2478/v10099-009-0019-0
SCOPUS_656	Include		Koger S.M.; Scott B.A.	2007	Psychology and environmental sustainability: A call for integration	Teaching of Psychology	34	1	10.1207/s15328023top3401_3
SCOPUS_657	Exclude	C1	Fettig J.	2004	Some aspects of the environmental labour market in five European countries and conclusions with respect to environmental curricula	Water Science and Technology	49	8	10.2166/wst.2004.0500

SCOPUS_658	Include		Lemons J.	1991	Structure and function of environmental programmes	The Environmentalist	11	4	10.1007/BF01266563
SCOPUS_659	Exclude	C1	Ilgar R.	2011	Geography education for sustainable education system under the influence of globalization, the case of Turkiye	Australian Journal of Basic and Applied Sciences	5	4	
WoS_001	Exclude	C1	Semin, FK	2020	Developing Sustainable Education Disposition Scale and Teacher Views regarding the Education Disposition	JOURNAL OF EDUCATION AND FUTURE-EGITIM VE GELECEK DERGISI		17	10.30786/jef.483133
WoS_002	Exclude	C4	Arianpoor, A; Al-Ani, SSD; Khayoon, HM	2024	Toward a satisfactory sustainable education for international students: a qualitative framework for international accounting students	QUALITY ASSURANCE IN EDUCATION			10.1108/QAE-02-2024-0025
WoS_003	Include		Sterling, S	2008	SUSTAINABLE EDUCATION - TOWARDS A DEEP LEARNING RESPONSE TO UNSUSTAINABILITY	POLICY & PRACTICE-A DEVELOPMENT EDUCATION REVIEW		6	
WoS_004	Exclude	C4	Sandri, O	2021	Providing a 'point of entry': Approaches to framing sustainability in curriculum design in Higher Education	AUSTRALIAN JOURNAL OF ENVIRONMENTAL EDUCATION	37	1	
WoS_005	Exclude	C1	Ceviz, B; Albuz, A	2020	Sustainable Education Practices in Amateur Gui-tar Education during the Covid-19 Pandemic	PEGEM EGITIM VE OGRETIM DERGISI	14	3	10.47750/pegegog.14.03.03
WoS_006	Exclude	C1	MacDonald, M	2016	Discovering Art Through Science: Elwyn Richardson's environmental curriculum	EDUCATIONAL PHILOSOPHY AND THEORY	48	7	10.1080/00131857.2016.1151760
WoS_007	Exclude	C1	Van den Branden, K	2012	Sustainable education: basic principles and strategic recommendations	SCHOOL EFFECTIVENESS AND SCHOOL IMPROVEMENT	23	3	10.1080/09243453.2012.678865
WoS_008	Exclude	C4	Formánková, S; Stevik, K; Kucerová, R	2017	RESPONSIBLE AND SUSTAINABLE EDUCATION IN THE CZECH REPUBLIC AND NORWAY - CASE OF THE FACULTY OF BUSINESS AND ECONOMICS, MENDELU IN BRNO AND THE FACULTY OF	RESPONSIBILITY AND SUSTAINABILITY OF HIGHER EDUCATION INSTITUTIONS			

					BUSINESS ADMINISTRATION, HUAS				
WoS_009	Exclude	C4	Thomas, I	2009	Critical Thinking, Transformative Learning, Sustainable Education, and Problem-Based Learning in Universities	JOURNAL OF TRANSFORMATIVE EDUCATION	7	3	10.1177/1541344610385753
WoS_010	Exclude	C1	Bosevska, J; Kriewaldt, J	2020	Fostering a whole-school approach to sustainability: learning from one school's journey towards sustainable education	INTERNATIONAL RESEARCH IN GEOGRAPHICAL AND ENVIRONMENTAL EDUCATION	29	1	10.1080/10382046.2019.1661127
WoS_011	Include		Xu, YY; Yu, HL; Wan, X; Zhang, LM	2024	Strategies for sustainable development in university education: Breaking barriers and cultivating awareness	EDUCATION AND INFORMATION TECHNOLOGIES			10.1007/s10639-024-12727-7
WoS_012	Exclude	C1	Shiao, YT; Chen, CH; Wu, KF; Chen, BL; Chou, YH; Wu, TN	2023	Reducing dropout rate through a deep learning model for sustainable education: long-term tracking of learning outcomes of an undergraduate cohort from 2018 to 2021	SMART LEARNING ENVIRONMENTS	10	1	10.1186/s40561-023-00274-6
WoS_013	Exclude	C1	Sanga, K; Reynolds, M; Wright, T; Joskin, A; Mwaraksurmes, A; Cagivinaka, V	2024	Oceania oralities research and sustainable education: Exploring layers of engagement	INTERNATIONAL EDUCATION JOURNAL- COMPARATIVE PERSPECTIVES	23	2	10.70830/iejcp.2302.20346
WoS_014	Exclude	C1	McCrea, N	2015	Food first: Beginning steps towards children's sustainable education	YOUNG CHILDREN AND THE ENVIRONMENT: EARLY EDUCATION FOR SUSTAINABILITY, 2ND EDITION			
WoS_016	Exclude	C1	Megahed, NA; Ghoneim, EM	2022	E-learning ecosystem metaphor: building sustainable education for the post-COVID-19 era	INTERNATIONAL JOURNAL OF LEARNING TECHNOLOGY	17	2	10.1504/IJLT.2022.10049986
WoS_017	Exclude	C1	Goldberg, SJ; Nazziwa, S	2021	Critical Cosmopolitanism and Sustainable Education: Primary Educator Perspectives from Uganda and the United States	TRANSMODAL COMMUNICATIONS: Transpositioning Semiotics and Relations	1		
WoS_018	Include		Ivanova, Z	2018	Formation of Sustainable Education in the Implementation of the Erasmus+ programs	MODERN JOURNAL OF LANGUAGE TEACHING METHODS	8	11	

WoS_019	Exclude	C1	Durmishi, L; Durmishi, A; Filipova, M; Ibrahimi, S	2024	MANAGING A POSITIVE AND LIFE-SKILLS DEVELOPMENT IN THE SCHOOL-BASED CURRICULA: A LITERATURE REVIEW ON THE SUSTAINABLE EDUCATION	STRATEGIES FOR POLICY IN SCIENCE AND EDUCATION-STRATEGII NA OBRAZOVATELNATA I NAUCHNATA POLITIKA	32	5	10.53656/str2024-5-1-man
WoS_020	Exclude	C1	Waked, A; El Alaoui, K; Pilotti, MAE	2023	Second-language writing anxiety and its correlates: A challenge to sustainable education in a post-pandemic world	COGENT EDUCATION	10	2	10.1080/2331186X.2023.2280309
WoS_021	Exclude	C1	Khademi-Vidra, A; Bakos, IM	2023	The Impact of Sustainable Education Practices on Food Consumption Behaviours-An Experimental Study of Agrarian School's Students in Hungary	EUROPEAN JOURNAL OF CONTEMPORARY EDUCATION	12	2	10.13187/ejced.2023.2.462
WoS_022	Exclude	C1	Chansomsak, S; Vale, B	2008	The Buddhist approach to education: an alternative approach for sustainable education	ASIA PACIFIC JOURNAL OF EDUCATION	28	1	10.1080/02188790701850063
WoS_023	Exclude	C1	Morris, E; Mwaraksurmes, AS	2024	Shifting from face-to-face to online teaching and learning: Growth opportunities experienced by Vanuatu primary school teachers	INTERNATIONAL EDUCATION JOURNAL-COMPARATIVE PERSPECTIVES	23	2	10.70830/iejcp.2302.20344
WoS_024	Include		Savelyeva, T; Park, J	2022	Blockchain technology for sustainable education	BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY	53	6	10.1111/bjet.13273
WoS_025	Exclude	C1	Triyanto; Haryono, B; Handayani, RD	2023	Civic education teachers' role in transformation during the COVID-19 pandemic	SOUTH AFRICAN JOURNAL OF EDUCATION	43		10.15700/saje.v43ns2a2162
WoS_026	Exclude	C1	Bolmsten, J; Manuel, ME	2020	Sustainable participatory processes of education technology development	ETR&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT	68	5	10.1007/s11423-020-09803-3
WoS_027	Exclude	C4	Diritsky, IL	2014	Green Careers and the Community College: Embrace the Possibility	ADULT LEARNING	25	2	10.1177/1045159514523111
WoS_028	Exclude	C1	Szekely, E; Mason, M	2019	Complexity theory, the capability approach, and the sustainability of development initiatives in education	JOURNAL OF EDUCATION POLICY	34	5	10.1080/02680939.2018.1465999
WoS_029	Exclude	C1	Mwaraksurmes, AS	2024	Teachers' perspectives of factors affecting lesson planning practices in Vanuatu mathematics classrooms	INTERNATIONAL EDUCATION JOURNAL-	23	2	10.70830/iejcp.2302.20349

						COMPARATIVE PERSPECTIVES			
WoS_030	Include		Clarke, P	2012	Sustainable cities, sustainable minds, sustainable schools: Pop-Up-Farm as a connecting device	IMPROVING SCHOOLS	15	1	10.1177/1365480212438759
WoS_032	Exclude	C1	Abdullah, MA; Ahmad, BE; Ismail, MR	2023	Indigenous sustainable education modelling: The role of chaperones in Batek children's education in Malaysia	INTERNATIONAL REVIEW OF EDUCATION	69	6	10.1007/s11159-023-10035-9
WoS_033	Include		Argiolas, C; Baldo, V; Martellini, M	2016	Knowledge Dissemination and Best Practice Transfer on Biosafety, Biosecurity and Biorisk Management Through a Sustainable and Effective Education and Awareness System	BIODIVERSITY AND EDUCATION FOR SUSTAINABLE DEVELOPMENT			10.1007/978-3-319-32318-3_20
WoS_034	Exclude	C1	Moghadam, NR; Narafshan, MH; Anjomshoa, L	2022	Education for sustainable development: Effects of sustainability education on English language learners' empathy and reading comprehension	JOURNAL OF ENVIRONMENTAL EDUCATION	53	5	10.1080/00958964.2022.2107605
WoS_035	Include		Porfireanu, CM; Leonte, N; Popescu, O; Moanta, AD; Saftel, MA	2024	Exploring Sustainable Approaches to Improving Student Intelligence Through Basketball-Specific Means in Higher Education	EDUCATION SCIENCES	14	12	10.3390/educsci14121409
WoS_036	Include		Haj-Hosseini, N; Jonasson, H; Stridsman, M; Carlsson, L	2024	Interactive remote electrical safety laboratory module in biomedical engineering education	EDUCATION AND INFORMATION TECHNOLOGIES	29	15	10.1007/s10639-024-12636-9
WoS_037	Include		Irwin, R	2023	Can Education Outgrow the Rhetoric of 'Development' Embedded in the UN Sustainability Goals?	NEW ZEALAND JOURNAL OF EDUCATIONAL STUDIES	58	1	10.1007/s40841-022-00270-3
WoS_038	Exclude	C1	Sorina, D; Roman, I; Vac, C	2019	Emotional intelligence of students - instrument of adaptation and control of the university dropout	JOURNAL OF EDUCATIONAL SCIENCES & PSYCHOLOGY	9	1	
WoS_039	Include		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	10.1080/15313220.2013.786337
WoS_040	Exclude	C1	Mihai, EC; Ghita, IA	2023	Modern approaches in toddlers' education	JOURNAL OF EDUCATIONAL SCIENCES & PSYCHOLOGY	13	2	10.51865/JESP.2023.2.05

WoS_041	Exclude	C4	Beilin, R; Bender, H	2010	THE GETTING OF INTERDISCIPLINARITY: THE EVERYDAY PRACTICE OF ENVIRONMENTAL CURRICULUM DESIGN	INTERDISCIPLINARY HIGHER EDUCATION: PERSPECTIVES AND PRACTICALITIES	5		10.1108/S1479-3628(2010)0000005013
WoS_042	Exclude	C1	Fonseca, RP; Vizachri, TR	2023	Teachers' views on 'food' animals for sustainability education: an exploratory study	ENVIRONMENTAL EDUCATION RESEARCH	29	9	10.1080/13504622.2023.2180380
WoS_043	Exclude	C1	Almulla, MA	2024	Investigating Students' Intention to Use M-Learning: The Mediating Role of Mobile Usefulness and Intention to Use	INTERNATIONAL JOURNAL OF INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION	20	1	10.4018/IJICTE.337136
WoS_044	Include		Sterling, S	2010	Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education	ENVIRONMENTAL EDUCATION RESEARCH	16	5-6	10.1080/13504622.2010.505427
WoS_045	Include		Noordegraaf-Eelens, L; Kloeg, J; Noordzij, G	2019	PBL and sustainable education: addressing the problem of isolation	ADVANCES IN HEALTH SCIENCES EDUCATION	24	5	10.1007/s10459-019-09927-z
WoS_046	Exclude	C1	Oktay, HE; Danaci, HM; Unvan, M; Kavas, KR; Bakir, I	2021	Virtual Education Trials and Evaluation Process in Architecture	JOURNAL OF QUALITATIVE RESEARCH IN EDUCATION-EGITIMDE NITEL ARASTIRMALAR DERGISI		25	10.14689/enad.25.13
WoS_047	Include		Tub, LD; Gorby, C; Poerschke, U; Kalisperis, LN; Woollen, M	2013	Environmentally conscious design - educating future architects	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	14	4	10.1108/IJSHE-09-2011-0065
WoS_048	Exclude	C1	Abioui, M; Dades, M; Kostyuchenko, Y; Benssaou, M; Martínez-Frías, J; M'Barki, L; Ezaidi, S; Aichi, A; Di Cencio, A; Garzarella, A; De Carvalho, CN	2020	Covid-19 and education in Morocco as a potential model of concern for North Africa: a short commentary	INTERNATIONAL JOURNAL OF ETHICS EDUCATION	5	2	10.1007/s40889-020-00100-4
WoS_049	Exclude	C1	Narváez-Zurita, XE; Narváez-Zurita, CI	2024	PROMOTING SUSTAINABLE EDUCATION: ALTERNATIVE FINANCING FOR SAVINGS AND	REVISTA CONRADO	20	96	

					CREDIT COOPERATIVES IN CAPITAL MARKETS			
WoS_050	Include		Jaffar, MN; Ab Rahman, A; Hamed, KRA; Ahmad, MI; Ritonga, M; Azam, MHN	2024	Development Of Augmented Reality Arabic For Islamic Tourism: Sustainable Education Need Analysis	IJAZ ARABI JOURNAL OF ARABIC LEARNING	7	2	10.18860/ijazarabi.V7i2.25794
WoS_051	Include		Paulus, SC	2016	Exploring a pluralist understanding of learning for sustainability and its implications for outdoor education practice	JOURNAL OF ADVENTURE EDUCATION AND OUTDOOR LEARNING	16	2	10.1080/14729679.2015.1121504
WoS_052	Exclude	C2	Babou, AI; Selmaoui, S; Alami, A; Benjelloun, N; Zaki, M	2023	Teaching Biodiversity: Towards a Sustainable and Engaged Education	EDUCATION SCIENCES	13	9	10.3390/educsci13090931
WoS_053	Include		Köhler, AR; Bakker, C; Peck, D	2013	Critical materials: a reason for sustainable education of industrial designers and engineers	EUROPEAN JOURNAL OF ENGINEERING EDUCATION	38	4	10.1080/03043797.2013.796341
WoS_054	Exclude	C1	Selwyn, N	2024	Digital degrowth: toward radically sustainable education technology	LEARNING MEDIA AND TECHNOLOGY	49	2	10.1080/17439884.2022.2159978
WoS_055	Exclude	C3	Roman, I; Vac, C; Roman, AR	2019	The role of the Life Sciences Learning Center of USAMV Cluj-Napoca in dropout prevention	JOURNAL OF EDUCATIONAL SCIENCES & PSYCHOLOGY	9	1	
WoS_056	Exclude	C1	Ibrahim, R; Sarirete, A	2011	A constructivist approach to student development: Effat University case study	INTERNATIONAL JOURNAL OF TECHNOLOGY ENHANCED LEARNING	3	3	10.1504/IJTEL.2011.040226
WoS_057	Exclude	C1	Johnson-Burel, D; Drame, E; Frattura, E	2014	Participatory research in support of quality public education in New Orleans	EDUCATIONAL ACTION RESEARCH	22	3	10.1080/09650792.2013.872576
WoS_058	Exclude	C1	Gedik, N; Günes, EPU; Beylik, A; Çabuk, A; Tiras, E	2023	Portable Lightboard Use in Online Higher Education	OPEN PRAXIS	15	2	10.55982/openpraxis.15.2.548
WoS_059	Exclude	C1	Maruatona, T	2006	Lifelong learning for facilitating democratic participation in Africa	INTERNATIONAL JOURNAL OF LIFELONG EDUCATION	25	6	10.1080/02601370600989137

WoS_060	Include		de Lima, J; Isaac, S; Kovacs, H	2024	Teaching assistants' contributions to creating inclusive and equitable learning spaces in engineering	EUROPEAN JOURNAL OF ENGINEERING EDUCATION			10.1080/03043797.2024.2346332
WoS_061	Exclude	C1	Ade-Ojo, GO	2011	Practitioners' perception of the impact of the vision of policy-makers on practice: the example of the recommendations of the Moser Commission	RESEARCH PAPERS IN EDUCATION	26	1	10.1080/02671520903257997
WoS_062	Exclude	C1	Makokotlela, MV	2020	An E-Portfolio as an Assessment Strategy in an Open Distance Learning Context	INTERNATIONAL JOURNAL OF INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION	16	4	10.4018/IJICTE.2020100109
WoS_063	Exclude	C3	Buttacavoli, M	2024	An Anthropologist Fails to Become a Fish: Multispecies Sensing in the Anthropocene	AUSTRALIAN JOURNAL OF ENVIRONMENTAL EDUCATION	40	2	10.1017/aee.2024.26
WoS_064	Exclude	C1	Al Balushi, HM; Ambusaidi, AK	2023	The influence of environmental education on Omani students self-reported environmental attitudes and behaviours	INTERNATIONAL RESEARCH IN GEOGRAPHICAL AND ENVIRONMENTAL EDUCATION	32	2	10.1080/10382046.2022.2154976
WoS_065	Exclude	C4	Verma, R; Dadhich, M; Sharma, A	2024	Bridging Data-Driven Learning and Generative AI: A Framework for Sustainable Education Through Metacognitive Resource Utilization	INTEGRATING GENERATIVE AI IN EDUCATION TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS			10.4018/979-8-3693-2440-0.ch026
WoS_066	Include		Pocol, CB; Stanca, L; Dabija, DC; Pop, ID; Miscoiu, S	2022	Knowledge Co-creation and Sustainable Education in the Labor Market-Driven University-Business Environment	FRONTIERS IN ENVIRONMENTAL SCIENCE	10		10.3389/fenvs.2022.781075
WoS_067	Include		Palomino, MDP; Valdivia, EM	2021	Implications of dialogical pedagogical gatherings for sustainable quality higher education	REVISTA PUBLICACIONES	51	1	10.30827/publicaciones.v51i1.16002
WoS_068	Exclude	C1	Shafaei, A; Abd Razak, N	2016	Internationalisation of higher education: Conceptualising the antecedents and outcomes of cross-cultural adaptation	POLICY FUTURES IN EDUCATION	14	6	10.1177/1478210316645017

WoS_069	Exclude	C1	Zheng, WJ; Lay, YF; Jamaludin, ANSJB	2024	AUTHORITATIVE PARENTING STYLE AND LIFELONG MUSIC LEARNING INTENTION: THE MEDIATING ROLE OF PERCEIVED DETERMINANTS	PROBLEMS OF EDUCATION IN THE 21ST CENTURY	82	6	10.33225/pec/24.82.923
WoS_070	Exclude	C1	Song, Q	2024	Interactive learning environment for the sporting skills development of physical education students	EDUCATION AND INFORMATION TECHNOLOGIES	29	10	10.1007/s10639-023-12280-9
WoS_071	Exclude	C1	Riddell, A; Niño-Zarazúa, M	2016	The effectiveness of foreign aid to education What can be learned?	INTERNATIONAL JOURNAL OF EDUCATIONAL DEVELOPMENT	48		10.1016/j.ijedudev.2015.11.013
WoS_072	Exclude	C4	Peña-Sánchez, N; Camero-Arranz, A	2023	An interdisciplinary action for caring for the biodiversity of the Canary Islands through arts-based explorations	INTERNATIONAL JOURNAL OF EDUCATION THROUGH ART	19	1	10.1386/eta_00120_3
WoS_073	Exclude	C1	Sharma, A; Panackal, N; Rautela, S; Fazalbhoy, S	2023	TRACING THE FOUR-DECADE JOURNEY OF RESEARCH IN ETHICS AND HIGHER EDUCATION- A BIBLIOMETRIC ANALYSIS	MIER-JOURNAL OF EDUCATIONAL STUDIES TRENDS AND PRACTICES	13	2	10.52634/mier/2023/v13/i2/2513
WoS_074	Include		Míguez-Alvarez, C; Crespo, B; Arce, E; Cuevas, M; Regueiro, A	2022	Blending learning as an approach in teaching sustainability	INTERACTIVE LEARNING ENVIRONMENTS	30	9	10.1080/10494820.2020.1734623
WoS_075	Exclude	C1	Ruano, MA; Cruzado, MG	2012	Use of education as social indicator in the assessment of sustainability throughout the life cycle of a building	EUROPEAN JOURNAL OF ENGINEERING EDUCATION	37	4	10.1080/03043797.2012.708719
WoS_076	Exclude	C1	Zhan, Y; He, RY; So, WWM	2019	Developing elementary school children's water conversation action competence: a case study in China	INTERNATIONAL JOURNAL OF EARLY YEARS EDUCATION	27	3	10.1080/09669760.2018.1548346
WoS_077	Include		Hwang, S	2011	Narrative Inquiry for Science Education: Teachers' repertoire-making in the case of environmental curriculum	INTERNATIONAL JOURNAL OF SCIENCE EDUCATION	33	6	10.1080/09500693.2010.481800
WoS_078	Exclude	C7	Gutiérrez-Ujaque, D	2023	ACTIONS AND ACTIONS TOWARDS QUALITY AND SUSTAINABLE EDUCATION: A CASE STUDY BETWEEN SOCIAL EDUCATION AND INDUSTRIAL ENGINEERING DEGREES	CONTEXTOS EDUCATIVOS-REVISTA DE EDUCACION		31	10.18172/con.5475

WoS_079	Exclude	C1	Manouselis, N; Kyrgiazos, G; Stoitsis, G	2014	EXPLORATORY STUDY OF MULTI-CRITERIA RECOMMENDATION ALGORITHMS OVER TECHNOLOGY ENHANCED LEARNING DATASETS	JOURNAL OF E-LEARNING AND KNOWLEDGE SOCIETY	10	1	
WoS_080	Exclude	C1	Pillay, V	2020	Jika iMfundo: a South African study of 'turning education around' through improved curriculum coverage	PROFESSIONAL DEVELOPMENT IN EDUCATION	46	2	10.1080/19415257.2018.1550101
WoS_081	Exclude	C1	Luque-Sánchez, F; Montejo-Gámez, J	2023	A Virtual Escape Room for the Enhancement of Mathematical Communication in Secondary Education	TECHNOLOGY KNOWLEDGE AND LEARNING			10.1007/s10758-023-09706-1
WoS_082	Exclude	C1	Stone-MacDonald, A; Douglass, A	2015	Introducing Online Training in an Early Childhood Professional Development System: Lessons Learned in One State	EARLY CHILDHOOD EDUCATION JOURNAL	43	3	10.1007/s10643-014-0649-2
WoS_083	Include		de Souza, EK; Dias, KL	2024	ACCESSIBLE AND SUSTAINABLE TECHNOLOGY IN EDUCATION: EXPERIENCES OF EDUCATIONAL ALTERNATIVE ROBOTICS	CADERNOS EDUCACAO TECNOLOGIA E SOCIEDADE	17	1	10.14571/brajets.v17.n1.195-212
WoS_084	Exclude	C1	BROCKUTNE, B	1995	EDUCATING ALL FOR POSITIVE PEACE - EDUCATION FOR POSITIVE PEACE OR OPPRESSION	INTERNATIONAL JOURNAL OF EDUCATIONAL DEVELOPMENT	15	3	10.1016/0738-0593(94)00042-N
WoS_085	Exclude	C1	Ali, MF; Alam, M; Kumar, A; Ali, N	2024	Investigation of primary school teachers' attitude towards inclusive education in Western Division in Fiji	COGENT EDUCATION	11	1	10.1080/2331186X.2024.2419704
WoS_086	Exclude	C1	Dadhich, M; Hiran, KK; Bhaumik, A; Chakkaravarthy, M	2024	Demystifying the Dynamic Determinants of Generative Artificial Intelligence (AI) Literacy for Adaptable Sustainable Education: Multistage Structure Equation Remodeling	INTEGRATING GENERATIVE AI IN EDUCATION TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS			10.4018/979-8-3693-2440-0.ch004
WoS_087	Exclude	C3	Sohil, F; Sohail, MU	2022	Measuring the impact of COVID-19 on distance learning for educational sustainability	COGENT EDUCATION	9	1	10.1080/2331186X.2022.2034248
WoS_088	Include		Huang, TC; Lin, WJ; Yueh, HP	2019	How to Cultivate an Environmentally Responsible Maker? A CPS Approach to a	INTERNATIONAL JOURNAL OF SCIENCE AND	17		10.1007/s10763-019-09959-2

					Comprehensive Maker Education Model	MATHEMATICS EDUCATION			
WoS_089	Include		Zhao, S; Cheah, KSL	2023	The challenges of Malaysian private universities in reaching sustainable education toward responsible consumption	CLEANER AND RESPONSIBLE CONSUMPTION	10		10.1016/j.clrc.2023.100130
WoS_090	Exclude	C1	Garcia-Peñalvo, FJ; Alier, M; Pereira, J; Casany, MJ	2024	Safe, Transparent, and Ethical Artificial Intelligence: Keys to Quality Sustainable Education (SDG4)	INTERNATIONAL JOURNAL OF EDUCATIONAL RESEARCH AND INNOVATION		22	10.46661/ijeri.11036
WoS_091	Exclude	C1	Ferriz-Valero, A; Osterlie, O; García-Martínez, S; Baena-Morales, S	2022	Flipped Classroom: A Good Way for Lower Secondary Physical Education Students to Learn Volleyball	EDUCATION SCIENCES	12	1	10.3390/educsci12010026
WoS_092	Exclude	C1	Urbanska, M; Charzynski, P; Gadsby, H; Novak, TJ; Sahin, S; Yilmaz, MD	2022	Environmental Threats and Geographical Education: Students' Sustainability Awareness-Evaluation	EDUCATION SCIENCES	12	1	10.3390/educsci12010001
WoS_093	Exclude	C1	Ariffin, JAM; Rami, AAM; Nasharudin, NAM; Zaremohzzabieh, Z	2024	Crucial competencies for crisis management: the importance of middle leaders' conceptual skills in navigating turbulent times	INTERNATIONAL JOURNAL OF LEADERSHIP IN EDUCATION			10.1080/13603124.2024.2387551
WoS_094	Exclude	C1	Baecke, M; Vigmo, S	2024	Lost opportunities for globalisation, digitalisation, and socially sustainable education? Advocating for digital and global Bildung in Swedish upper secondary schools	FRONTIERS IN EDUCATION	9		10.3389/feduc.2024.1351709
WoS_095	Exclude	C1	Sihvonen, P; Lappalainen, R; Herranen, J; Aksela, M	2024	Promoting Sustainability Together with Parents in Early Childhood Education	EDUCATION SCIENCES	14	5	10.3390/educsci14050541
WoS_096	Exclude	C1	Espino, JMS; Artal, CG; Betancor, SMG	2021	Video Lectures: An Analysis of Their Useful Life Span and Sustainable Production	INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTRIBUTED LEARNING	22	3	
WoS_097	Exclude	C1	Valencia-Arias, A; Rodríguez-Correa, PA; Marín-Carmona, A; Zuleta-Orrego, JI;	2024	University social responsibility strategy: a case study	COGENT EDUCATION	11	1	10.1080/2331186X.2024.2332854

			Palacios-Moya, L; Baquedano, CAP; Gallegos, A						
WoS_098	Include		Rennie, F; Jóhannesdóttir, S; Kristinsdottir, S	2011	Re-Thinking Sustainable Education Systems in Iceland: The Net-University Project	INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING	12	4	10.19173/irrodl.v12i4.871
WoS_099	Exclude	C1	Jones, V; Mitra, S; Gupta, N	2022	Climate change and sustainability education in India and the place for arts-based practice: reflections from East Kolkata Wetlands	LONDON REVIEW OF EDUCATION	20	1	10.14324/LRE.20.1.48
WoS_100	Exclude	C1	Bekalo, SA; Brophy, M; Welford, AG	2003	The development of education in post-conflict 'Somaliland'	INTERNATIONAL JOURNAL OF EDUCATIONAL DEVELOPMENT	23	4	10.1016/S0738-0593(03)00016-6
WoS_101	Exclude	C1	Ferriz-Valero, A; Osterlie, O; Penichet-Tomas, A; Baena-Morales, S	2022	The Effects of Flipped Learning on Learning and Motivation of Upper Secondary School Physical Education Students	FRONTIERS IN EDUCATION	7		10.3389/feduc.2022.832778
WoS_102	Exclude	C1	Fang, SC	2019	ENVIRONMENTAL PERCEPTION OF CLIMATE CHANGE PERCEIVED BY UNIVERSITY STUDENTS ON VEGETARIAN BEHAVIORAL INTENTION	JOURNAL OF BALTIC SCIENCE EDUCATION	18	2	10.33225/jbse/19.18.227
WoS_103	Exclude	C1	Janhonen, K; Olsson, C; Waling, M	2023	Collaborative participation in a home economics context: using school meals as a part of sustainable education	EDUCATION INQUIRY			10.1080/20004508.2022.2163073
WoS_104	Exclude	C1	Jeong, JS; González-Gómez, D; Conde-Núñez, MC; Gallego-Picó, A	2019	EXAMINATION OF STUDENTS' ENGAGEMENT WITH R-SPQ-2F OF LEARNING APPROACH IN FLIPPED SUSTAINABLE SCIENCE COURSE	JOURNAL OF BALTIC SCIENCE EDUCATION	18	6	10.33225/jbse/19.18.880
WoS_105	Include		Kurent, B; Avsec, S	2024	Synergizing Systems Thinking and Technology-Enhanced Learning for Sustainable Education Using the Flow Theory Framework	SUSTAINABILITY	16	21	10.3390/su16219319
WoS_106	Include		Kopnina, H	2022	Exploring posthuman ethics: opening new spaces for postqualitative inquiry within pedagogies of the circular economy	AUSTRALIAN JOURNAL OF ENVIRONMENTAL EDUCATION	38	3-4	10.1017/aee.2021.16

WoS_107	Exclude	C1	Hashim, MAM; Tlemsani, I; Matthews, R	2022	Higher education strategy in digital transformation	EDUCATION AND INFORMATION TECHNOLOGIES	27	3	10.1007/s10639-021-10739-1
WoS_108	Exclude	C3	Imran, M; Almusharraf, N	2024	Shaping a sustainable future: a study of teachers' perspectives on environmental education awareness	COGENT EDUCATION	11	1	10.1080/2331186X.2024.2422223
WoS_109	Include		Hays, J; Reinders, H	2020	Sustainable learning and education: A curriculum for the future	INTERNATIONAL REVIEW OF EDUCATION	66	1	10.1007/s11159-020-09820-7
WoS_110	Exclude	C1	Ramasamy, SP; Shahzad, A; Hassan, R	2023	COVID-19 Pandemic Impact on Students Intention to Use E-Learning Among Malaysian Higher Education Institutions	JOURNAL OF EDUCATION-US	203	3	10.1177/00220574211032599
WoS_111	Exclude	C1	McQuade, R; Ventura-Medina, E; Wiggins, S; Anderson, T	2020	Examining self-managed problem-based learning interactions in engineering education	EUROPEAN JOURNAL OF ENGINEERING EDUCATION	45	2	10.1080/03043797.2019.1649366
WoS_112	Exclude	C1	Singh, A; Sharma, S; Paliwal, M	2021	Adoption intention and effectiveness of digital collaboration platforms for online learning: the Indian students' perspective	INTERACTIVE TECHNOLOGY AND SMART EDUCATION	18	4	10.1108/ITSE-05-2020-0070
WoS_113	Exclude	C1	Gou, HL	2023	Sustainable Education for Middle-Aged and Elderly: Learning to Know, Learning to do for Sustainable Living	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	12	4	10.14207/ejsd.2023.v12n4p267
WoS_114	Exclude	C1	Ogelman, HG	2012	Teaching Preschool Children About Nature: A Project to Provide Soil Education for Children in Turkiye	EARLY CHILDHOOD EDUCATION JOURNAL	40	3	10.1007/s10643-012-0510-4
WoS_115	Include		Utami, NW; Sayuti, SA; Jailani, J	2021	Indigenous artifacts from remote areas, used to design a lesson plan for preservice math teachers regarding sustainable education	HELIYON	7	3	10.1016/j.heliyon.2021.e06417
WoS_116	Include		Satalkina, L; Mühlmann, K; Pietrzykowski, M; Steiner, G	2024	Empowering future innovators and entrepreneurs by transdisciplinary knowledge integration: universities' role in building competences for navigating poly-crises	COGENT EDUCATION	11	1	10.1080/2331186X.2024.2439626
WoS_117	Exclude	C1	Tarosa, GH	2024	Supporting sustainability: The professional learning of beginning teachers in Vanuatu	INTERNATIONAL EDUCATION JOURNAL-COMPARATIVE PERSPECTIVES	23	2	10.70830/iejcp.2302.20348

				Year	Title	Journal	Vol	Issue	DOI
WoS_118	Exclude	C1		Kapuciánová, K; Jancariková, K; Kapuciánová, M; Loukotová, L	2024	Education for Sustainability in Czech Kindergarten: Example of Good Practice in Kindergarten Semínko - Growing Microgreens	EUROPEAN JOURNAL OF CONTEMPORARY EDUCATION	13	1	10.13187/ejced.2024.1.67
WoS_119	Include			Fytopoulou, E; Karasmanaki, E; Tampakis, S; Tsantopoulos, G	2023	Effects of Curriculum on Environmental Attitudes: A Comparative Analysis of Environmental and Non-Environmental Disciplines	EDUCATION SCIENCES	13	6	10.3390/educsci13060554
WoS_120	Exclude	C1		Robertson, M	2009	Young netizens creating public citizenship in cyberspace	INTERNATIONAL RESEARCH IN GEOGRAPHICAL AND ENVIRONMENTAL EDUCATION	18	4	10.1080/10382040903251158
WoS_121	Include			Deep, P; Adarsh, T	2024	Multi-layered exclusion in premier higher education institutions of India	HIGHER EDUCATION	88	1	10.1007/s10734-023-01102-z
WoS_122	Exclude	C1		Tsang, JTY; So, MKP; Chong, ACY; Lam, BSY; Chu, AMY	2021	Higher Education during the Pandemic: The Predictive Factors of Learning Effectiveness in COVID-19 Online Learning	EDUCATION SCIENCES	11	8	10.3390/educsci11080446
WoS_123	Exclude	C1		Bainbridge, A	2020	Digging our own grave: A Marxian consideration of formal education as a destructive enterprise	INTERNATIONAL REVIEW OF EDUCATION	66	5-6	10.1007/s11159-020-09866-7
WoS_124	Include			Boley, BB	2011	Sustainability in Hospitality and Tourism Education: Towards an Integrated Curriculum	JOURNAL OF HOSPITALITY & TOURISM EDUCATION	23	4	10.1080/10963758.2011.10697017
WoS_125	Exclude	C1		Gorina, L; Gordova, M; Khristoforova, I; Sundeeva, L; Strielkowski, W	2023	Sustainable Education and Digitalization through the Prism of the COVID-19 Pandemic	SUSTAINABILITY	15	8	10.3390/su15086846
WoS_126	Include			Masyhuri, M; Siswanto, S; Kurniawati, DT	2024	How green cultural festivals can increase environmental performance in Islamic University?: human resource perspective	JOURNAL OF APPLIED RESEARCH IN HIGHER EDUCATION			10.1108/JARHE-02-2024-0074
WoS_127	Include			Glassey, R; Baelter, O	2021	Sustainable Approaches for Accelerated Learning	SUSTAINABILITY	13	21	10.3390/su132111994
WoS_128	Include			Kim, JY; Kim, HS	2024	Innovative Integration of Poetry and Visual Arts in Metaverse for Sustainable Education	EDUCATION SCIENCES	14	9	10.3390/educsci14091012
WoS_129	Include			Kang, Y; Wee, Y; Kim, W	2024	Smart Farming for Sustainable Agriculture: A Case Study through Korean Public TVET	JOURNAL OF TECHNICAL	16	2	10.30880/jtet.2024.16.02.017

						EDUCATION AND TRAINING			
WoS_130	Exclude	C1	Makda, F	2024	Digital education: Mapping the landscape of virtual teaching in higher education - a bibliometric review	EDUCATION AND INFORMATION TECHNOLOGIES			10.1007/s10639-024-12899-2
WoS_131	Exclude	C1	Wassermann, J; Maposa, M; Mhlongo, D	2018	If I choose history it is likely that I won't be able to leave for the cities to get a job: Rural learners and the choosing of history as a subject	JOURNAL OF EDUCATION		73	10.17159/2520-9868/i73a04
WoS_132	Exclude	C1	Mensah, RO; Swanzy-Impraim, E; Marfo, D; Babah, PA	2023	Incorporation of community resources in teaching social studies in junior high schools: A case in the adentan district of the greater accra region of Ghana	COGENT EDUCATION	10	1	10.1080/2331186X.2023.2206337
WoS_133	Exclude	C1	Lau, NS; Tse, TKC	2024	Education for Buddhist Modernism: Buddhicised education and reform in Hong Kong schools	BRITISH JOURNAL OF RELIGIOUS EDUCATION	46	4	10.1080/01416200.2024.2344176
WoS_134	Exclude	C4	Comino, E; Dominici, L; Reyneri, A; Treves, A	2025	Technical academia goes back to school: the role of universities in environmental and sustainable education for childhood	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	26	2	10.1108/IJSHE-05-2023-0205
WoS_135	Exclude	C1	Viteri, F; Clarebout, G; Crauwels, M	2013	Environmental education in Ecuador: conceptions and currents in Quito's private elementary schools	ENVIRONMENTAL EDUCATION RESEARCH	19	5	10.1080/13504622.2012.715628
WoS_136	Exclude	C1	Mackey, G	2012	To know, to decide, to act: the young child's right to participate in action for the environment	ENVIRONMENTAL EDUCATION RESEARCH	18	4	10.1080/13504622.2011.634494
WoS_137	Include		Knight, J; Motala-Timol, S	2022	Mauritius as a developing education hub	INTERNATIONAL JOURNAL OF EDUCATIONAL DEVELOPMENT	93		10.1016/j.ijedudev.2022.102646
WoS_138	Include		Niemczyk, EK	2022	The Complexity of Education for Sustainable Development: Insights from South African Higher Education	SODOBNA PEDAGOGIKA-JOURNAL OF CONTEMPORARY EDUCATIONAL STUDIES	73	2	
WoS_139	Exclude	C1	Nuamcharoen, S; Dhirathiti, NS	2018	A case study of the co-production approach to the implementation of education for sustainable development in Thailand	POLICY FUTURES IN EDUCATION	16	3	10.1177/1478210317739487

WoS_140	Exclude	C1	Martínez-Valdivia, E; Pegalajar-Palomino, MC; Higueras-Rodríguez, ML	2021	Dialogic Literary Circles as a Methodological Strategy for the training of students in Early Childhood Education Degree	INTERNATIONAL JOURNAL OF INSTRUCTION	14	3	10.29333/iji.2021.14315a
WoS_141	Exclude	C1	Munir, H	2022	Reshaping Sustainable University Education in Post-Pandemic World: Lessons Learned from an Empirical Study	EDUCATION SCIENCES	12	8	10.3390/educsci12080524
WoS_142	Include		Manning, L; de Aguiar, LK	2020	EMBEDDING SUSTAINABLE DEVELOPMENT IN THE CURRICULA: LEARNING ABOUT SUSTAINABLE DEVELOPMENT AS A MEANS TO DEVELOP SELF-AWARENESS	INTEGRATING SUSTAINABLE DEVELOPMENT INTO THE CURRICULUM	18		10.1108/S2055-36412020000018020
WoS_143	Exclude	C1	Mutambik, I	2024	The Use of AI-Driven Automation to Enhance Student Learning Experiences in the KSA: An Alternative Pathway to Sustainable Education	SUSTAINABILITY	16	14	10.3390/su16145970
WoS_144	Include		Suiçmez, I; Ozansoy, K	2024	Development of Sustainable Education Environments in Higher Education with Metaverse Applications	SUSTAINABILITY	16	23	10.3390/su162310331
WoS_145	Include		Van den Branden, K	2015	Sustainable Education: Exploiting Students' Energy for Learning as a Renewable Resource	SUSTAINABILITY	7	5	10.3390/su7055471
WoS_146	Include		Haines, CA	2017	Rethinking Thinking About Sustainable Development Curriculum	HANDBOOK OF THEORY AND PRACTICE OF SUSTAINABLE DEVELOPMENT IN HIGHER EDUCATION, VOL 4			10.1007/978-3-319-47877-7_10
WoS_147	Exclude	C1	Kukk, A	2009	APPLYING THE PRINCIPLE OF SUSTAINABILITY OF EDUCATION TO THE CURRICULA OF THE ELEMENTARY STAGES OF EDUCATION IN ESTONIA	PROBLEMS OF EDUCATION IN THE 21ST CENTURY	12		
WoS_148	Exclude	C2	Abidin, MSZ; Mokhtar, M; Arsat, M	2023	Education for sustainable development from the lenses of Malaysian school leaders: a preliminary study	ASIAN EDUCATION AND DEVELOPMENT STUDIES	12	2/3	10.1108/AEDS-01-2023-0011

WoS_150	Exclude	C1	Tian, XH; Liu, J; Tang, YL	2024	Liaoning University ChopMelon Net Project: Innovative Research on Sustainable Education Based on Real Social Issues	SUSTAINABILITY	16	9	10.3390/su16093781
WoS_151	Include		Holdsworth, S; Thomas, I	2016	A sustainability education academic development framework (SEAD)	ENVIRONMENTAL EDUCATION RESEARCH	22	8	10.1080/13504622.2015.1029876
WoS_152	Include		Kocot, M; Kwasek, A; Mathea, G; Kandefer, K; Sobon, D	2024	Students' Expectations Regarding the Achievement of Educational Outcomes in Terms of Knowledge, Practical Skills, and Social Competencies as Determinants of Sustainable Education	SUSTAINABILITY	16	3	10.3390/su16031263
WoS_153	Include		González-Zamar, MD; Abad-Segura, E; López-Meneses, E; Gómez-Galán, J	2020	Managing ICT for Sustainable Education: Research Analysis in the Context of Higher Education	SUSTAINABILITY	12	19	10.3390/su12198254
WoS_154	Exclude	C3	Hu, SK; Liou, JJH; Lu, MT; Chuang, YC; Tzeng, GH	2018	Improving NFC Technology Promotion for Creating the Sustainable Education Environment by Using a Hybrid Modified MADM Model	SUSTAINABILITY	10	5	10.3390/su10051379
WoS_155	Include		González-Muñoz, E; Gallardo-Vigil, MA; Gutiérrez-Pérez, J	2024	The Mysterious Disappearance: assessment of a sustainability-themed virtual educational escape room in higher education	JOURNAL OF APPLIED RESEARCH IN HIGHER EDUCATION			10.1108/JARHE-09-2023-0430
WoS_156	Exclude	C4	Saleh, MSM; Mehellou, A; Huang, M; Briandana, R	2024	Social media impact on sustainable intention and behaviour: a comparative study between university students in Malaysia and Indonesia	JOURNAL OF APPLIED RESEARCH IN HIGHER EDUCATION			10.1108/JARHE-10-2023-0479
WoS_157	Exclude	C4	Ioan, CC; Ursu, C	2011	ETHICAL AND SUSTAINABLE EDUCATION OF ENVIRONMENTAL ENGINEERS - BETWEEN REALITY AND HOPE	ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL	10	3	10.30638/eemj.2011.059
WoS_158	Exclude	C1	Shelest, KD; Ionov, VV; Tikhomirov, LY	2017	Environmental awareness raising through universities - city authorities' cooperation	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	18	1	10.1108/IJSHE-05-2015-0085
WoS_159	Exclude	C1	Silo, N; Mswela, N; Seetso, G	2024	Children's Concepts of the Environment: An Opportunity for Environmental Education as a Tool for Sustainability in Botswana Preschools	EARLY CHILDHOOD EDUCATION JOURNAL			10.1007/s10643-023-01609-1

WoS_160	Exclude	C1	Díaz-Pareja, EM; Llorent-Vaquero, M; Cámara-Estrella, AM; Ortega-Tudela, JM	2021	Sustainable Education: Using Social Networks in Education for Change	SUSTAINABILITY	13	18	10.3390/su131810368
WoS_161	Exclude	C1	Lee, H; Hwang, YH	2022	Technology-Enhanced Education through VR-Making and Metaverse-Linking to Foster Teacher Readiness and Sustainable Learning	SUSTAINABILITY	14	8	10.3390/su14084786
WoS_162	Include		Kurnaz, A; Aniktar, S	2024	Developing students' sustainability consciousness: the role of attitude and practice toward incorporating new uses of old buildings into architectural education	INTERNATIONAL JOURNAL OF TECHNOLOGY AND DESIGN EDUCATION			10.1007/s10798-024-09913-6
WoS_163	Exclude	C1	AL-Qadri, AH; Mouas, S; Saraa, N; Boudouaia, A	2024	Measuring academic self-efficacy and learning outcomes: the mediating role of university English students' academic commitment	ASIAN-PACIFIC JOURNAL OF SECOND AND FOREIGN LANGUAGE EDUCATION	9	1	10.1186/s40862-024-00253-5
WoS_164	Exclude	C1	Tongal, A; Yildirim, FS; Özkara, Y; Say, S; Erdogan, S	2024	Examining Teachers' Computational Thinking Skills, Collaborative Learning, and Creativity Within the Framework of Sustainable Education	SUSTAINABILITY	16	22	10.3390/su16229839
WoS_165	Exclude	C1	Vidaurre, SME; Rodríguez, NCV; Quelopana, RLG; Valdivia, ANM; Rossi, EAL; Nolasco-Mamani, MA	2024	Perceptions of Artificial Intelligence and Its Impact on Academic Integrity Among University Students in Peru and Chile: An Approach to Sustainable Education	SUSTAINABILITY	16	20	10.3390/su16209005
WoS_166	Exclude	C2	Weuffen, S; Burke, J; Goriss-Hunter, A; Plunkett, M; Emmett, S	2023	Working Towards a Sustainable, Responsive, Inclusive, and Diverse Global Education Future	INCLUSION, EQUITY, DIVERSITY, AND SOCIAL JUSTICE IN EDUCATION: A Critical Exploration of the Sustainable Development Goals			10.1007/978-981-19-5008-7_19
WoS_167	Include		Liu, CH; Horng, JS; Chou, SF; Huang, YC	2017	Analysis of tourism and hospitality sustainability education with co-competition creativity course planning	JOURNAL OF HOSPITALITY LEISURE SPORT & TOURISM EDUCATION	21		10.1016/j.jhlste.2017.08.008

WoS_168	Include		Foster, G; Stagl, S	2018	Design, implementation, and evaluation of an inverted (flipped) classroom model economics for sustainable education course	JOURNAL OF CLEANER PRODUCTION	183		10.1016/j.jclepro.2018.02.177
WoS_169	Exclude	C1	Orphanidou, Y; Efthymiou, L; Panayiotou, G	2024	Cultural Heritage for Sustainable Education Amidst Digitalisation	SUSTAINABILITY	16	4	10.3390/su16041540
WoS_170	Exclude	C1	Singh, N; Gunjan, VK; Mishra, AK; Mishra, RK; Nawaz, N	2022	SeisTutor: A Custom-Tailored Intelligent Tutoring System and Sustainable Education	SUSTAINABILITY	14	7	10.3390/su14074167
WoS_171	Exclude	C1	Alam, GM	2023	Has Secondary Science Education Become an Elite Product in Emerging Nations?-A Perspective of Sustainable Education in the Era of MDGs and SDGs	SUSTAINABILITY	15	2	10.3390/su15021596
WoS_172	Include		Avelar, ABA; da Silva-Oliveira, KD; Pereira, RD	2019	Education for advancing the implementation of the Sustainable Development Goals: A systematic approach	INTERNATIONAL JOURNAL OF MANAGEMENT EDUCATION	17	3	10.1016/j.ijme.2019.100322
WoS_173	Exclude	C1	Ryplova, R; Pokorny, J; Baxa, M	2023	Education for Sustainability: Innovative Teaching on Photosynthesis of Aquatic Plants in Ecological Context	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	12	4	10.14207/ejsd.2023.v12n4p69
WoS_174	Exclude	C1	Popoola, SI; Atayero, AA; Badejo, JA; John, TM; Odukoya, JA; Omole, DO	2018	Learning analytics for smart campus: Data on academic performances of engineering undergraduates in Nigerian private university	DATA IN BRIEF	17		10.1016/j.dib.2017.12.059
WoS_175	Exclude	C1	Lindgren, N; Öhman, J	2019	A posthuman approach to human-animal relationships: advocating critical pluralism	ENVIRONMENTAL EDUCATION RESEARCH	25	8	10.1080/13504622.2018.1450848
WoS_176	Exclude	C4	Lowenstein, S	2020	DELIBERATIVE DIALOGUE AND SYLLABUS DELIBERATION AS INNOVATIVE, CROSS-DISCIPLINARY, AND SUSTAINABLE TEACHING METHODS	TEACHING AND LEARNING STRATEGIES FOR SUSTAINABLE DEVELOPMENT	19		10.1108/S2055-364120200000019010
WoS_177	Exclude	C1	Håkansson, M; Östman, L	2019	The political dimension in ESE: the construction of a political moment model for analyzing bodily anchored political emotions in teaching and learning of the political dimension	ENVIRONMENTAL EDUCATION RESEARCH	25	4	10.1080/13504622.2017.1422113

WoS_178	Exclude	C1	Colás-Bravo, P; Quintero-Rodríguez, I	2023	YouTube as a Digital Resource for Sustainable Education	SUSTAINABILITY	15	7	10.3390/su15075687
WoS_179	Exclude	C1	Sousa, MJ; Marôco, AL; Gonçalves, SP; Machado, AD	2022	Digital Learning Is an Educational Format towards Sustainable Education	SUSTAINABILITY	14	3	10.3390/su14031140
WoS_180	Exclude	C1	Abbas, J; Aman, J; Nurunnabi, M; Bano, S	2019	The Impact of Social Media on Learning Behavior for Sustainable Education: Evidence of Students from Selected Universities in Pakistan	SUSTAINABILITY	11	6	10.3390/su11061683
WoS_181	Exclude	C1	Li, YZ; Su, GD; Pan, HC; Tan, CW; Li, GS	2024	Programming experiment course for innovative and sustainable education: A case study of Java for Millikan Oil-Drop experiment	JOURNAL OF CLEANER PRODUCTION	447		10.1016/j.jclepro.2024.141569
WoS_182	Include		Yu, CY	2024	Experiential Learning for Applying Green Patents in Sustainable Education	SUSTAINABILITY	16	15	10.3390/su16156591
WoS_183	Exclude	C1	Mata, L; Clipa, O; Tzafilkou, K	2020	The Development and Validation of a Scale to Measure University Teachers' Attitude towards Ethical Use of Information Technology for a Sustainable Education	SUSTAINABILITY	12	15	10.3390/su12156268
WoS_184	Exclude	C1	Heldal, M; Hagen, TL; Olaussen, IO; Haugen, GMD	2021	Social Sustainable Education in a Refugee Camp	SUSTAINABILITY	13	7	10.3390/su13073925
WoS_185	Exclude	C3	Nyamsuren, K; Gankhuyag, Z; Ganbaatar, J; Marinescu, N	2024	The Importance of Studying Abroad for a Sustainable Education: Research on Mongolian Student Opinions	SUSTAINABILITY	16	14	10.3390/su16146137
WoS_186	Include		Biancardi, A; Colasante, A; D'Adamo, I	2023	Sustainable education and youth confidence as pillars of future civil society	SCIENTIFIC REPORTS	13	1	10.1038/s41598-023-28143-9
WoS_187	Exclude	C1	van der Graaf, J; Rakovic, M; Fan, YZ; Lim, L; Singh, S; Bannert, M; Gasevic, D; Molenaar, I	2023	How to design and evaluate personalized scaffolds for self-regulated learning	METACOGNITION AND LEARNING	18	3	10.1007/s11409-023-09361-y
WoS_188	Exclude	C1	Alturki, U; Aldraiweesh, A	2023	The Factors Influencing 21st Century Skills and Problem-Solving Skills: The Acceptance of Blackboard as Sustainable Education	SUSTAINABILITY	15	17	10.3390/su151712845

WoS_189	Include		Weber, JM; Lindenmeyer, CP; Liò, P; Lapkin, AA	2021	Teaching sustainability as complex systems approach: a sustainable development goals workshop	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	22	8	10.1108/IJSHE-06-2020-0209
WoS_190	Exclude	C1	Kamruzzaman, MM; Alanazi, S; Alruwaili, M; Alshammari, N; Elaiwat, S; Abu-Zanona, M; Innab, N; Elzaghmouri, BM; Alanazi, BA	2023	AI- and IoT-Assisted Sustainable Education Systems during Pandemics, such as COVID-19, for Smart Cities	SUSTAINABILITY	15	10	10.3390/su15108354
WoS_191	Exclude	C1	Gui, PP; Alam, GM; Bin Hassan, A	2024	Whether Socioeconomic Status Matters in Accessing Residential College: Role of RC in Addressing Academic Achievement Gaps to Ensure Sustainable Education	SUSTAINABILITY	16	1	10.3390/su16010393
WoS_192	Exclude	C1	Popoola, SI; Atayero, AA; Badejo, JA; Odukoya, JA; Omole, DO; Ajayi, P	2018	Datasets on demographic trends in enrollment into undergraduate engineering programs at Covenant University, Nigeria	DATA IN BRIEF	18		10.1016/j.dib.2018.02.073
WoS_193	Exclude	C4	Walenta, J; Auld, K; Boggs, A; Glasgow, T; Randal, A	2017	Environmental focused experiential learning: what a university class on dumpster diving taught us about sustainable futures	ENVISIONING FUTURES FOR ENVIRONMENTAL AND SUSTAINABILITY EDUCATION			10.3920/978-90-8686-846-9_27
WoS_194	Exclude	C1	Turner, D; Harrison, SL; Buettner, P; Nowak, M	2014	School sun-protection policies-does being SunSmart make a difference?	HEALTH EDUCATION RESEARCH	29	3	10.1093/her/cyu010
WoS_195	Exclude	C3	Boskovic, D; Husremovic, D; Muslic, M; Kapo, A	2023	Teachers and Students as Promoters or Repressors of Sustainable Education: Navigating the Blended Learning Landscape	SUSTAINABILITY	15	24	10.3390/su152416812
WoS_196	Include		Ada, S	2020	Investigation of the Relationships between Individual Innovation and Sustainable Education Beliefs	SUSTAINABILITY	12	2	10.3390/su12020447
WoS_197	Include		Naseer, M; Zhang, W; Zhu, WH	2020	Prediction of Coding Intricacy in a Software Engineering Team through Machine Learning to Ensure Cooperative Learning and Sustainable Education	SUSTAINABILITY	12	21	10.3390/su12218986

WoS_198	Include		Kiwfo, K; Yeerum, C; Ayutthaya, PIN; Kesonkan, K; Suteerapataranon, S; Panitsupakamol, P; Chinwong, D; Paengnakorn, P; Chinwong, S; Kotchabhakdi, N; Saenjum, C; Vongboot, M; Grudpan, K	2021	Sustainable Education with Local-Wisdom Based Natural Reagent for Green Chemical Analysis with a Smart Device: Experiences in Thailand	SUSTAINABILITY	13	20	10.3390/su132011147
WoS_199	Exclude	C1	Ahn, J	2020	Unequal Loneliness in the Digitalized Classroom: Two Loneliness Effects of School Computers and Lessons for Sustainable Education in the E-Learning Era	SUSTAINABILITY	12	19	10.3390/su12197889
WoS_200	Exclude	C1	AbdelSalam, HM; Pilotti, MAE; El-Moussa, OJ	2021	Sustainable Math Education of Female Students during a Pandemic: Online versus Face-to-Face Instruction	SUSTAINABILITY	13	21	10.3390/su132112248
WoS_201	Exclude	C1	Zheng, W; Wen, ST; Lian, B; Nie, Y	2023	Research on a Sustainable Teaching Model Based on the OBE Concept and the TSEM Framework	SUSTAINABILITY	15	7	10.3390/su15075656
WoS_202	Exclude	C3	Kim, D; Kim, S	2018	Sustainable Education: Analyzing the Determinants of University Student Dropout by Nonlinear Panel Data Models	SUSTAINABILITY	10	4	10.3390/su10040954
WoS_203	Exclude	C1	Cassidy, A; Sipos, Y; Nyrose, S	2020	PROGRAMS, WORKSHOPS, RESOURCES, AND OTHER SUPPORTS FOR POST-SECONDARY SUSTAINABILITY EDUCATORS	INTEGRATING SUSTAINABLE DEVELOPMENT INTO THE CURRICULUM	18		10.1108/S2055-36412020000018023
WoS_204	Exclude	C2	Gruber, JS	2010	Key Principles of Community-Based Natural Resource Management: A Synthesis and Interpretation of Identified Effective Approaches for Managing the Commons	ENVIRONMENTAL MANAGEMENT	45	1	10.1007/s00267-008-9235-y
WoS_205	Exclude	C1	Díez-Palomar, J; de Sanmamed, AFF; García-	2018	Pathways to Equitable and Sustainable Education through the Inclusion of Roma Students in Learning Mathematics	SUSTAINABILITY	10	7	10.3390/su10072191

			Carrión, R; Molina-Roldán, S						
WoS_206	Exclude	C1	Riquelme-Arredondo, A; Torres-Contreras, H; Quiroz, V; Gutierrez-Martinetti, S	2024	Let's Take Care of the Water: Social Representations in Preschoolers	INTERNATIONAL JOURNAL OF EARLY CHILDHOOD			10.1007/s13158-024-00397-y
WoS_208	Exclude	C1	Simut, CC; Petrila, L; Popescu, FA; Oprea, IM	2021	Challenges and Opportunities for Telecommuting in the School System: Building a Sustainable Online Education in the Context of the SARS-Cov-2 Pandemic	SUSTAINABILITY	13	18	10.3390/su131810296
WoS_209	Exclude	C1	Pilotti, MAE; El-Moussa, OJ; Abdelsalam, HM	2022	Measuring the Impact of the Pandemic on Female and Male Students' Learning in a Society in Transition: A Must for Sustainable Education	SUSTAINABILITY	14	6	10.3390/su14063148
WoS_210	Exclude	C1	Gui, PP; Alam, GM	2024	Do Chinese Residential Colleges Narrow the Education Disparity Caused by Socioeconomic Status? A Comparison of Public and Private Universities Using Two Main Approaches to Assess Disparities in Access and Academic Attainment	SUSTAINABILITY	16	12	10.3390/su16125079
WoS_211	Include		Tsai, WT	2019	ENVIRONMENTAL EDUCATION POLICY FOR PURSUING SUSTAINABLE CAMPUS: EXPERIENCE FROM TAIWAN HIGHER EDUCATION	ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL	18	3	
WoS_212	Exclude	C1	Alfirevic, N; Malesevic Perovic, L; Kosor, MM	2024	SDG4 academic research productivity in the EU27: economic factors and COVID-19 impacts	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION			10.1108/IJSHE-08-2023-0366
WoS_213	Exclude	C1	Zeeshan, K; Hämäläinen, T; Neittaanmäki, P	2022	Internet of Things for Sustainable Smart Education: An Overview	SUSTAINABILITY	14	7	10.3390/su14074293
WoS_214	Exclude	C1	Santoveña-Casal, S; Pérez, MDF	2020	Sustainable Distance Education: Comparison of Digital Pedagogical Models	SUSTAINABILITY	12	21	10.3390/su12219067
WoS_215	Exclude	C1	Zhou, L; Alam, GM	2024	Commercial higher education strategies for recruiting international students in China: a	DISCOVER SUSTAINABILITY	5	1	10.1007/s43621-024-00216-3

					catalyst or obstacle for sustainable education and learning?				
WoS_216	Exclude	C3	Saxena, A; Pancholi, G; Yadav, B; Saini, R	2024	Exploring the Role of Artificial Intelligence in Advancing Higher Education for Sustainable Development: A Bibliometric Study	INTEGRATING GENERATIVE AI IN EDUCATION TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS			10.4018/979-8-3693-2440-0.ch010
WoS_217	Exclude	C1	Pilotti, MAE; Al Ghazo, R	2020	Sustainable Education Starts in the Classroom	SUSTAINABILITY	12	22	10.3390/su12229573
WoS_218	Include		Bobko, T; Corsette, M; Wang, MJ; Springer, E	2024	Exploring the Possibilities of Edu-Metaverse: A New 3-D Ecosystem Model for Innovative Learning	IEEE TRANSACTIONS ON LEARNING TECHNOLOGIES	17		10.1109/TLT.2024.3364908
WoS_219	Include		Cernicova-Buca, M; Ciurel, D	2022	Developing Resilience to Disinformation: A Game-Based Method for Future Communicators	SUSTAINABILITY	14	9	10.3390/su14095438
WoS_220	Include		de la Vega, AG	2022	A Proposal for Geography Competence Assessment in Geography Fieldtrips for Sustainable Education	SUSTAINABILITY	14	3	10.3390/su14031429
WoS_221	Exclude	C1	Jiménez-Pérez, E; Jara, MID; Gutiérrez-Fresneda, R; García-Guirao, P	2021	Sustainable Education, Emotional Intelligence and Mother-Child Reading Competencies within Multiple Mediation Models	SUSTAINABILITY	13	4	10.3390/su13041803
WoS_222	Include		Tripon, C	2022	Supporting Future Teachers to Promote Computational Thinking Skills in Teaching STEM-A Case Study	SUSTAINABILITY	14	19	10.3390/su141912663
WoS_223	Exclude	C1	Leal, F; Veloso, B; Pereira, CS; Moreira, F; Durao, N; Silva, NJ	2022	Interpretable Success Prediction in Higher Education Institutions Using Pedagogical Surveys	SUSTAINABILITY	14	20	10.3390/su142013446
WoS_224	Exclude	C1	Zhang, HM; Cheng, X; Cui, LR	2021	Progress or Stagnation: Academic Assessments for Sustainable Education in Rural China	SUSTAINABILITY	13	6	10.3390/su13063248
WoS_225	Exclude	C4	Alvarez-Castañon, LD; Romero-Ugalde, M	2022	Training of communities of sustainability practice through science and art	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	23	5	10.1108/IJSHE-01-2021-0030
WoS_226	Exclude	C3	Blom, R; Karrow, DD	2024	Environmental and sustainability education in teacher education	INTERNATIONAL JOURNAL OF	25	5	10.1108/IJSHE-07-2023-0288

					research: an international scoping review of the literature	SUSTAINABILITY IN HIGHER EDUCATION			
WoS_227	Include			Yu, CY; Chiang, YC	2018	Designing a Climate-Resilient Environmental Curriculum-A Transdisciplinary Challenge	SUSTAINABILITY	10	1	10.3390/su10010077
WoS_228	Exclude	C3		Alam, GM; Forhad, MAR	2023	The Impact of Accessing Education via Smartphone Technology on Education Disparity-A Sustainable Education Perspective	SUSTAINABILITY	15	14	10.3390/su151410979
WoS_229	Include			Agirreazkuenaga, L	2020	Education for Agenda 2030: What Direction do We Want to Take Going Forward?	SUSTAINABILITY	12	5	10.3390/su12052035
WoS_230	Exclude	C3		Leonard, SN; Devis, D; Macgill, B; Unsworth, P; Colton, J; Fowler, S; Hwang, GH; Yang, HH; Liang, HY	2024	Enhancing Empathy for Justice: A Methodology for Expansive Teacher Professional Development through Creative Body-Based Learning	SUSTAINABILITY	16	1	10.3390/su16010095
WoS_231	Include			Liu, P	2023	An Entrepreneurship Incubation Process Model and Gamified Educational Software Designed for Sustainable Education	SUSTAINABILITY	15	19	10.3390/su151914646
WoS_232	Exclude	C1		Gutiérrez-Angel, N; García-Sánchez, JN; Mercader-Rubio, I; García-Martín, J; Brito-Costa, S	2022	Digital Competence, Validation and Differential Patterns between Spanish and Portuguese Areas as Assessed from the Latest PISA Report as a Pathway to Sustainable Education and Social Concerns	SUSTAINABILITY	14	19	10.3390/su141912721
WoS_233	Exclude	C3		Kuleto, V; Bucea-Manea-Tonis, R; Bucea-Manea-Tonis, R; Ilic, MP; Martins, OMD; Rankovic, M; Coelho, AS	2022	The Potential of Blockchain Technology in Higher Education as Perceived by Students in Serbia, Romania, and Portugal	SUSTAINABILITY	14	2	10.3390/su14020749
WoS_234	Include			Garcia-Vallès, X; Martín, MB; Gavaldá, JMS; Romero, AP	2024	Students' Perceptions of Teacher Training for Inclusive and Sustainable Education: From University Classrooms to School Practices	SUSTAINABILITY	16	10	10.3390/su16104037
WoS_235	Exclude	C1		Valente, S; Dominguez-Lara, S; Lourenço, A	2024	Planning Time Management in School Activities and Relation to	SUSTAINABILITY	16	16	10.3390/su16166883

					Procrastination: A Study for Educational Sustainability				
WoS_236	Exclude	C1	Eryilmaz, R	2024	Sustainable Learning in Gifted Students: The Relationship Between Cultural Capital and Lifelong Learning	SUSTAINABILITY	16	23	10.3390/su162310702
WoS_237	Exclude	C1	Zerinou, I; Karasmanaki, E; Ioannou, K; Andrea, V; Tsantopoulos, G	2020	Energy Saving: Views and Attitudes among Primary School Students and Their Parents	SUSTAINABILITY	12	15	10.3390/su12156206
WoS_238	Exclude	C3	Pertegal-Felices, ML; Jimeno-Morenilla, A; Sánchez-Romero, JL; Mora-Mora, H	2020	Comparison of the Effects of the Kahoot Tool on Teacher Training and Computer Engineering Students for Sustainable Education	SUSTAINABILITY	12	11	10.3390/su12114778
WoS_239	Include		Novawan, A; Aisyiyah, S	2020	THE ROLE OF LEADERSHIP IN EDUCATION FOR SUSTAINABLE DEVELOPMENT CURRICULUM REFORM IN INDONESIAN HIGHER EDUCATION	INTRODUCTION TO SUSTAINABLE DEVELOPMENT LEADERSHIP AND STRATEGIES IN HIGHER EDUCATION	22		10.1108/S2055-364120200000022014
WoS_240	Include		Mokhtar, IA; Chong, EYT; Jusuf, SK	2023	Incorporating Sustainable Education in the Undergraduate Curriculum: The Experience of a Young University in Singapore	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	12	4	10.14207/ejsd.2023.v12n4p83
WoS_241	Exclude	C1	Han, J; Kelley, T; Knowles, JG	2023	Building a sustainable model of integrated stem education: investigating secondary school STEM classes after an integrated STEM project	INTERNATIONAL JOURNAL OF TECHNOLOGY AND DESIGN EDUCATION	33	4	10.1007/s10798-022-09777-8
WoS_242	Exclude	C1	Audley, S; Ginsburg, JL; Furlong, C	2024	We Don't Always Have to Be Talking about It: Moral Reasoning in US Early Childhood Education for Sustainable Development	SUSTAINABILITY	16	17	10.3390/su16177774
WoS_243	Exclude	C3	Jing, X; Zhu, RX; Lin, JQ; Yu, BJ; Lu, MM	2022	Education Sustainability for Intelligent Manufacturing in the Context of the New Generation of Artificial Intelligence	SUSTAINABILITY	14	21	10.3390/su142114148
WoS_244	Exclude	C1	Albulescu, I; Labar, AV; Manea, AD; Stan, C	2023	The Mediating Role of Anxiety between Parenting Styles and Academic Performance among Primary School Students in the Context of Sustainable Education	SUSTAINABILITY	15	2	10.3390/su15021539

				Prieto-Saborit, JA; Méndez-Alonso, D; Cecchini, JA; Fernández-Viciana, A; Bahamonde-Nava, JR	2021	Cooperative Learning for a More Sustainable Education: Gender Equity in the Learning of Maths	SUSTAINABILITY	13	15	10.3390/su13158220
WoS_245	Exclude	C1								
WoS_246	Include			Gayatri, P; Sit, H; Chen, S; Li, H	2023	Sustainable EFL Blended Education in Indonesia: Practical Recommendations	SUSTAINABILITY	15	3	10.3390/su15032254
WoS_247	Exclude	C3		Naseer, M; Zhang, W; Zhu, WH	2020	Early Prediction of a Team Performance in the Initial Assessment Phases of a Software Project for Sustainable Software Engineering Education	SUSTAINABILITY	12	11	10.3390/su12114663
WoS_248	Include			Almurayh, A; Saeed, S; Aldhafferi, N; Alqahtani, A; Saqib, M	2022	Sustainable Education Quality Improvement Using Academic Accreditation: Findings from a University in Saudi Arabia	SUSTAINABILITY	14	24	10.3390/su142416968
WoS_249	Exclude	C3		Cavus, N; Mohammed, YB; Yakubu, MN	2021	Determinants of Learning Management Systems during COVID-19 Pandemic for Sustainable Education	SUSTAINABILITY	13	9	10.3390/su13095189
WoS_250	Exclude	C3		Liang, L; Zhang, ZS; Guo, JL	2023	The Effectiveness of Augmented Reality in Physical Sustainable Education on Learning Behaviour and Motivation	SUSTAINABILITY	15	6	10.3390/su15065062
WoS_251	Exclude	C3		Gui, PP; Alam, GM	2024	Does socioeconomic status influence students' access to residential college and ameliorate performance discrepancies among them in China?	DISCOVER SUSTAINABILITY	5	1	10.1007/s43621-024-00203-8
WoS_252	Exclude	C3		Bi, C; Zeng, JJ	2019	Nonlinear and Spatial Effects of Tourism on Carbon Emissions in China: A Spatial Econometric Approach	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	16	18	10.3390/ijerph16183353
WoS_253	Exclude	C1		Ryplova, R; Pokorny, J	2020	Saving Water for the Future Via Increasing Plant Literacy of Pupils	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	9	3	10.14207/ejsd.2020.v9n3p313
WoS_254	Exclude	C2		Budwig, N	2015	Concepts and tools from the learning sciences for linking	CURRENT OPINION IN ENVIRONMENTAL SUSTAINABILITY	16		10.1016/j.cosust.2015.08.003

					research, teaching and practice around sustainability issues				
WoS_255	Include		Chang, A; Nkansah, JO	2024	Literacy for Sustainable Education: A Premise of Pedagogical Inclusiveness and Multilingualism in Higher Education	SUSTAINABILITY	16	24	10.3390/su162410943
WoS_256	Exclude	C1	Saygin, M; Say, S; Öztürk, IY; Gülden, B; Kaplan, K	2024	A Step towards Sustainable Education: Does an Entrepreneurial Teacher Nurture Creativity?	SUSTAINABILITY	16	18	10.3390/su16187948
WoS_257	Exclude	C3	Yang, Q; Lee, YC	2021	The Critical Factors of Student Performance in MOOCs for Sustainable Education: A Case of Chinese Universities	SUSTAINABILITY	13	14	10.3390/su13148089
WoS_258	Exclude	C1	Kwon, IS	2021	Analysis of Key Competencies and Curriculum Expertise of Korean Dance Programs to Assist in Their Long-Term Sustainability	SUSTAINABILITY	13	11	10.3390/su13115801
WoS_259	Exclude	C3	Bessadok, A; Bardesi, H	2023	Exploring Human Values and Students' Aspiration in E-Learning Adoption: A Structural Equation Modeling Analysis	SUSTAINABILITY	15	19	10.3390/su151914041
WoS_260	Exclude	C3	Wang, XY; Li, G; Tu, JF; Khuyen, NTT; Chang, CY	2021	Sustainable Education Using New Communication Technology: Assessment with Analytical Hierarchy Process (AHP)	SUSTAINABILITY	13	17	10.3390/su13179640
WoS_261	Exclude	C1	Cano-Hila, AB; Argemí-Baldich, R	2021	Early Childhood and Lockdown: The Challenge of Building a Virtual Mutual Support Network between Children, Families and School for Sustainable Education and Increasing Their Well-Being	SUSTAINABILITY	13	7	10.3390/su13073654
WoS_262	Include		Bucea-Manea-Tonis, R; Bucea-Manea-Tonis, R; Simion, VE; Ilic, D; Braicu, C; Manea, N	2020	Sustainability in Higher Education: The Relationship between Work-Life Balance and XR E-Learning Facilities	SUSTAINABILITY	12	14	10.3390/su12145872
WoS_263	Exclude	C3	Özdogru, M; Çevik, MN; Çevik, MS	2024	Investigation of Communication, Social Intelligence and Intercultural Sensitivity Competencies of Teacher Candidates in Sustainable Education by Structural Equation Modeling	SUSTAINABILITY	16	21	10.3390/su16219282

WoS_264	Include		Biancardi, A; Colasante, A; D'Adamo, I; Daraio, C; Gastaldi, M; Uricchio, AF	2023	Strategies for developing sustainable communities in higher education institutions	SCIENTIFIC REPORTS	13	1	10.1038/s41598-023-48021-8
WoS_265	Exclude	C1	Grigoroiu, MC; Tescasiu, B; Constantin, CP; Turcanu, C; Tecau, AS	2024	Extended Learning through After-School Programs: Supporting Disadvantaged Students and Promoting Social Sustainability	SUSTAINABILITY	16	17	10.3390/su16177828
WoS_266	Exclude	C1	Hu, JD; Hu, J	2022	Teachers' Frequency of ICT Use in Providing Sustainable Opportunity to Learn: Mediation Analysis Using a Reading Database	SUSTAINABILITY	14	23	10.3390/su142315998
WoS_267	Exclude	C1	Baines, K; Zarger, RK	2017	It's Good to Learn about the Plants: promoting social justice and community health through the development of a Maya environmental and cultural heritage curriculum in southern Belize	JOURNAL OF ENVIRONMENTAL STUDIES AND SCIENCES	7	3	10.1007/s13412-016-0416-3
WoS_268	Exclude	C1	Nguyen, MH; Serik, M; Vuong, TT; Ho, MT	2019	Internationalization and Its Discontents: Help-Seeking Behaviors of Students in a Multicultural Environment Regarding Acculturative Stress and Depression	SUSTAINABILITY	11	7	10.3390/su11071865
WoS_269	Exclude	C2	Krabonja, MV; Kustec, S; Skrbinjek, V; Abersek, B; Flogie, A	2024	Innovative Professional Learning Communities and Sustainable Education Practices through Digital Transformation	SUSTAINABILITY	16	14	10.3390/su16146250
WoS_270	Exclude	C1	EL-Nwasany, RI; Bakr, AF; Fathi, AA	2024	A Sustainable Vision for Technical Education 4.0 of Post COVID-19	SUSTAINABILITY	16	21	10.3390/su16219355
WoS_271	Exclude	C3	Korneeva, E; Strielkowski, W; Krayneva, R; Sherstobitova, A	2022	Social Health and Psychological Safety of Students Involved in Online Education during the COVID-19 Pandemic	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	19	21	10.3390/ijerph192113928
WoS_272	Exclude	C1	Gutiérrez-García, L; Sánchez-Martín, J; Blanco-Salas, J; Ruiz-Téllez, T; Corbacho-Cuello, I	2024	Use of aromatic plants and essential oils in the teaching of physics and chemistry to enhance motivation and sustainability	HELIYON	10	15	10.1016/j.heliyon.2024.e35301

					awareness among primary education trainee teachers				
WoS_273	Exclude	C4	Perera, CR; Hewege, CR	2016	Integrating sustainability education into international marketing curricula	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	17	1	10.1108/IJSHE-03-2014-0041
WoS_274	Exclude	C1	Chen, TC; Yu, JQ; Golmohammadi, AM	2022	Application of Sustainable Education Innovation in the Integrated Teaching of Theory and Practice Adopted in the Auto Chassis Course	DISCRETE DYNAMICS IN NATURE AND SOCIETY	2022		10.1155/2022/7737231
WoS_275	Exclude	C1	Elrawy, S; Abouelmagd, D	2021	Architectural and Urban Education in Egypt in the Post Covid-19 Pandemic	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	10	2	10.14207/ejsd.2021.v10n2p91
WoS_276	Exclude	C1	Cheng, CH; Wang, YC; Liu, WX	2019	Exploring the Related Factors in Students' Academic Achievement for the Sustainable Education of Rural Areas	SUSTAINABILITY	11	21	10.3390/su11215974
WoS_277	Exclude	C1	Andevski, M; Urosevic, S; Stamatovic, M	2012	DISCOURSE OF SUSTAINABLE DEVELOPMENT - A BASE OF ENVIRONMENTAL EDUCATION IN SERBIA	ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL	11	9	10.30638/eemj.2012.202
WoS_278	Exclude	C3	Dodonova, V; Dodonov, R; Voinarovska, L; Chornomordenko, D; Pavlov, Y; Binkivska, K; Lobanchuk, O	2024	Promoting Sustainable Education through Academic Integrity: The Habitus and Socialization Nexus	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	13	2	10.14207/ejsd.2024.v13n2p209
WoS_279	Exclude	C3	Gbobaniyi, O; Srivastava, S; Oyetunji, AK; Amaechi, CV; Beddu, SB; Ankita, B	2023	The Mediating Effect of Perceived Institutional Support on Inclusive Leadership and Academic Loyalty in Higher Education	SUSTAINABILITY	15	17	10.3390/su151713195
WoS_280	Include		Builes-Vélez, AE; Restrepo, J; Martínez, JD	2024	The significance of sustainability in higher education: a view to the curricular proposal at a Colombian University	INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION	25	5	10.1108/IJSHE-09-2023-0423
WoS_281	Exclude	C3	Singh, P; Alhassan, I; Binsaif, N; Alhussain, T	2023	Standard Measuring of E-Learning to Assess the Quality Level of E-Learning Outcomes: Saudi Electronic University Case Study	SUSTAINABILITY	15	1	10.3390/su15010844

WoS_282	Exclude	C3	Kumar, VV; Chatterjee, B; Tankha, G	2021	The Development and Validation of a Measure to Assess COVID-19 Stress among College Students for Sustainable Education	SUSTAINABILITY	13	17	10.3390/su13179828
WoS_283	Exclude	C3	Park, PN; Sanders, SR; Cope, MR; Muirbrook, KA; Ward, C	2021	New Perspectives on the Community Impact of Rural Education Deserts	SUSTAINABILITY	13	21	10.3390/su132112124
WoS_284	Exclude	C1	Strong, AM; Vea, MC; Ginger, C; Blouin, MR; Edling, L; Barrios-Garcia, MN; McDonald, MJ; Ispa-Landa, Z	2024	Teaching and learning about race, culture, and environment in a predominately white institution	JOURNAL OF ENVIRONMENTAL STUDIES AND SCIENCES	14	3	10.1007/s13412-024-00948-8
WoS_285	Exclude	C1	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	10.3390/su10103418
WoS_286	Exclude	C1	Goyal, M; Gupta, C; Gupta, V	2022	A meta-analysis approach to measure the impact of project-based learning outcome with program attainment on student learning using fuzzy inference systems	HELIYON	8	8	10.1016/j.heliyon.2022.e10248
WoS_287	Exclude	C1	Doukanari, E; Ktoridou, D; Efthymiou, L; Epaminonda, E	2021	The Quest for Sustainable Teaching Praxis: Opportunities and Challenges of Multidisciplinary and Multicultural Teamwork	SUSTAINABILITY	13	13	10.3390/su13137210
WoS_288	Include		Saul, KM; Perkins, JH	2022	A new framework for environmental education about energy transition: investment and the energy regulatory and industrial complex	JOURNAL OF ENVIRONMENTAL STUDIES AND SCIENCES	12	1	10.1007/s13412-021-00730-0
WoS_289	Exclude	C1	García-Machado, JJ; Papa, M; Carrassi, M	2023	The influence of the beliefs of Italian and Spanish managers in their engagement in sustainability reporting	DISCOVER SUSTAINABILITY	4	1	10.1007/s43621-023-00171-5
WoS_290	Exclude	C3	Wu, CH; Liu, CY; Weng, TS	2023	Critical Factors and Trends in NFT Technology Innovations	SUSTAINABILITY	15	9	10.3390/su15097573
WoS_291	Exclude	C1	Choi, W; Kim, S	2023	Curriculum Development of EdTech Class Using 3D Modeling Software for University Students in the Republic of Korea	SUSTAINABILITY	15	24	10.3390/su152416605

WoS_293	Exclude	C1	Sujová, E; Cierna, H; Simanova, L; Gejdos, P; Stefková, J	2021	Soft Skills Integration into Business Processes Based on the Requirements of Employers-Approach for Sustainable Education	SUSTAINABILITY	13	24	10.3390/su132413807
WoS_294	Include		Deev, M; Gamidullaeva, L; Finogeev, A; Finogeev, A; Vasin, S	2021	The Convergence Model of Education for Sustainability in the Transition to Digital Economy	SUSTAINABILITY	13	20	10.3390/su132011441
WoS_295	Exclude	C1	Prieto-Saborit, JA; Méndez-Alonso, D; Fernández-Viciana, A; Dixit, LJD; Nistal-Hernández, P	2022	Implementation of Cooperative Learning and Its Relationship with Prior Training of Teachers, Performance and Equity in Mathematics: A Longitudinal Study	SUSTAINABILITY	14	23	10.3390/su142316243
WoS_296	Exclude	C3	Fontao, CB; Santos, ML; Arias-Gago, AR	2024	Metacognitive analysis of the practicum subject of the Master 's in Secondary Teaching through a reflexive portfolio	HELIYON	10	11	10.1016/j.heliyon.2024.e32633
WoS_297	Exclude	C3	Su, PY; Hsiao, PW; Fan, KK	2023	Investigating the Relationship between Users' Behavioral Intentions and Learning Effects of VR System for Sustainable Tourism Development	SUSTAINABILITY	15	9	10.3390/su15097277
WoS_298	Exclude	C3	Park, S; Kim, S	2022	Identifying World Types to Deliver Gameful Experiences for Sustainable Learning in the Metaverse	SUSTAINABILITY	14	3	10.3390/su14031361
WoS_299	Exclude	C1	Zhou, XD; Chen, LH; Chen, CL	2019	Collaborative Learning by Teaching: A Pedagogy between Learner-Centered and Learner-Driven	SUSTAINABILITY	11	4	10.3390/su11041174
WoS_300	Exclude	C3	Bassachs, M; Serra, T; Bubnys, R; Cañabate, D; Colomer, J	2022	Multimodal Approaches to Math and Physical Education within Cooperative Learning to Enhance Social Attitudes	SUSTAINABILITY	14	24	10.3390/su142416961
WoS_301	Exclude	C1	Ezenwoke, A; Ogunwale, O; Matiluko, O; Igbekele, E; Dare, S; Ezenwoke, O; Olayanju, A	2018	Academic performance data of undergraduate students' in 23 programmes from a private University in Nigeria	DATA IN BRIEF	20		10.1016/j.dib.2018.07.056

WoS_302	Include		Sehnem, S; Troiani, L; Lara, AC; Crizel, MG; Carvalho, L; Rodrigues, VP	2024	Sustainable fashion: challenges and barriers for advancing the circular economy	ENVIRONMENT DEVELOPMENT AND SUSTAINABILITY	26	2	10.1007/s10668-022-02872-9
WoS_303	Exclude	C3	Alonso-García, M; Garrido-Letrán, TM; Sánchez-Alzola, A	2021	Impact of COVID-19 on Educational Sustainability. Initial Perceptions of the University Community of the University of Cadiz	SUSTAINABILITY	13	11	10.3390/su13115938
WoS_304	Exclude	C3	González-Peña, OI; Morán-Soto, G; Rodríguez-Masegosa, R; Rodríguez-Lara, BM	2021	Effects of a Thermal Inversion Experiment on STEM Students Learning and Application of Damped Harmonic Motion	SUSTAINABILITY	13	2	10.3390/su13020919
WoS_305	Exclude	C3	Tsegay, SM; Ashraf, MA; Perveen, S; Zegergish, MZ	2022	Online Teaching during COVID-19 Pandemic: Teachers' Experiences from a Chinese University	SUSTAINABILITY	14	1	10.3390/su14010568
WoS_306	Exclude	C1	Al Mulhim, EN; Zaky, YAM	2023	Sustainability in E-Learning: E-Books and Academic Procrastination among Secondary Students	SUSTAINABILITY	15	20	10.3390/su152014668
WoS_307	Exclude	C1	Tran, T; Le, TTH; Nguyen, TT; Pham, AG; Vu, TH; Nguyen, MH; Vuong, HM; Vuong, TT; Hoang, PH; Ho, MT; Vuong, QH	2019	The Relationship between Birth Order, Sex, Home Scholarly Culture and Youths' Reading Practices in Promoting Lifelong Learning for Sustainable Development in Vietnam	SUSTAINABILITY	11	16	10.3390/su11164389
WoS_308	Exclude	C1	Cano, SR; Alonso, PS; Benito, VD; Villaverde, VA	2021	Evaluation of Motivational Learning Strategies for Children with Dyslexia: A FORDYSVAR Proposal for Education and Sustainable Innovation	SUSTAINABILITY	13	5	10.3390/su13052666
WoS_309	Exclude	C3	Koskela, T; Pihlainen, K; Piispa-Hakala, S; Vornanen, R; Hämäläinen, J	2020	Parents' Views on Family Resiliency in Sustainable Remote Schooling during the COVID-19 Outbreak in Finland	SUSTAINABILITY	12	21	10.3390/su12218844
WoS_310	Exclude	C1	Barragán-Sánchez, R; Corujo-Vélez, MC;	2020	Teaching Digital Competence and Eco-Responsible Use of	SUSTAINABILITY	12	18	10.3390/su12187721

			Palacios-Rodríguez, A; Román-Graván, P		Technologies: Development and Validation of a Scale				
WoS_311	Include		Brito, RM; Rodríguez, C; Aparicio, JL	2018	Sustainability in Teaching: An Evaluation of University Teachers and Students	SUSTAINABILITY	10	2	10.3390/su10020439
WoS_312	Exclude	C3	Satar, MS; Alharthi, S; Omeish, F; Alshibani, SM; Saqib, N	2024	Digital Learning Orientation and Entrepreneurial Competencies in Graduates: Is Blended Learning Sustainable?	SUSTAINABILITY	16	17	10.3390/su16177794
WoS_313	Include		Nusraningrum, D; Widyanti, W; Indrajaya, S; Soonsan, N; Sangthong, S; Pattanapokinsakul, K	2024	Improving E-learning mediating green innovation and green technology for green management practice	DISCOVER SUSTAINABILITY	5	1	10.1007/s43621-024-00463-4
WoS_314	Exclude	C3	Shah, Z; Kennedy-Clark, S; Xie, YC; Rahim, MS; Mahdavi, M; Levula, A	2022	Teacher Views on Teaching Sustainability in Higher Education Institutes in Australia	SUSTAINABILITY	14	14	10.3390/su14148431
WoS_315	Exclude	C3	Buric, M; Buric, MN; Stojanovic, AJ; Kascelan, L; Zugic, D	2022	Sustainability of Online Teaching: The Case Study Mother Tongue Spelling Course at Montenegrin Universities	SUSTAINABILITY	14	21	10.3390/su142113717
WoS_316	Exclude	C3	Dwivedi, A; Sassanelli, C; Agrawal, D; Gonzalez, ES; D'Adamo, I	2023	Technological innovation toward sustainability in manufacturing organizations: A circular economy perspective	SUSTAINABLE CHEMISTRY AND PHARMACY	35		10.1016/j.scp.2023.101211
WoS_317	Exclude	C1	López-Pimentel, JC; Medina-Santiago, A; Alcaraz-Rivera, M; Del-Valle-Soto, C	2021	Sustainable Project-Based Learning Methodology Adaptable to Technological Advances for Web Programming	SUSTAINABILITY	13	15	10.3390/su13158482
WoS_318	Exclude	C3	Rodrigo-González, A; Caballer-Tarazona, M; García-Gallego, A	2019	Active Learning on Trust and Reciprocity for Undergraduates	SUSTAINABILITY	11	16	10.3390/su11164399
WoS_319	Exclude	C3	Wang, QK; Sun, F; Wang, XC; Gao, Y	2023	Exploring Undergraduate Students' Digital Multitasking in Class: An Empirical Study in China	SUSTAINABILITY	15	13	10.3390/su151310184

WoS_320	Exclude	C3	Tan, KH; Kasiveloo, M; Abdullah, IH	2022	Token Economy for Sustainable Education in the Future: A Scoping Review	SUSTAINABILITY	14	2	10.3390/su14020716
WoS_321	Exclude	C3	Badilla-Quintana, MG; Sandoval-Henríquez, FJ	2021	Students' Immersive Experience in Initial Teacher Training in a Virtual World to Promote Sustainable Education: Interactivity, Presence, and Flow	SUSTAINABILITY	13	22	10.3390/su132212780
WoS_322	Include		O'Brien, W; Sarkis, J	2014	The potential of community-based sustainability projects for deep learning initiatives	JOURNAL OF CLEANER PRODUCTION	62		10.1016/j.jclepro.2013.07.001
WoS_323	Exclude	C1	Romero-López, M; Pichardo, MC; Bembibre-Serrano, J; García-Berbén, T	2020	Promoting Social Competence in Preschool with an Executive Functions Program Conducted by Teachers	SUSTAINABILITY	12	11	10.3390/su12114408
WoS_324	Exclude	C3	Karagozlu, D	2021	Creating a Sustainable Education Environment with Augmented Reality Technology	SUSTAINABILITY	13	11	10.3390/su13115851
WoS_325	Exclude	C3	Truta, C; Parv, L; Topala, I	2018	Academic Engagement and Intention to Drop Out: Levers for Sustainability in Higher Education	SUSTAINABILITY	10	12	10.3390/su10124637
WoS_326	Exclude	C3	Manzanares, MCS; Diez, JJR; Sánchez, RM; Yáñez, MJZ; Menéndez, RC	2020	Lifelong Learning from Sustainable Education: An Analysis with Eye Tracking and Data Mining Techniques	SUSTAINABILITY	12	5	10.3390/su12051970
WoS_327	Exclude	C3	Boukari, S; Guelmami, N; Chotrane, SG; Bouzid, S; Khemiri, A; Muscella, A; Khalifa, R	2022	Adaptation of the Questionnaire on Teacher Interaction in Tunisia: Teaching Strategies to Promote Sustainable Education in Schools	SUSTAINABILITY	14	5	10.3390/su14052489
WoS_328	Exclude	C1	Rodriguez-Barrios, EU; Melendez-Armenta, RA; Garcia-Aburto, SG; Lavoignet-Ruiz, M; Sandoval-Herazo, LC; Molina-Navarro, A; Morales-Rosales, LA	2021	Bayesian Approach to Analyze Reading Comprehension: A Case Study in Elementary School Children in Mexico	SUSTAINABILITY	13	8	10.3390/su13084285

WoS_329	Exclude	C1	Linde, I; Sarva, E; Daniela, L	2023	The Impact of an Online Professional Development Course on Teachers' Comprehension and Self-Efficacy in Developing Students' Self-Regulated Learning Skills	SUSTAINABILITY	15	12	10.3390/su15129408
WoS_330	Exclude	C3	Niksic, M; Pavic, L; Rozman, C	2023	Transformation of the Education System in Agricultural Advisory towards Sustainability-A Case Study in Slovenia	SUSTAINABILITY	15	10	10.3390/su15108242
WoS_331	Exclude	C3	Al Maani, D; Shanti, Z	2023	Technology-Enhanced Learning in Light of Bloom's Taxonomy: A Student-Experience Study of the History of Architecture Course	SUSTAINABILITY	15	3	10.3390/su15032624
WoS_332	Exclude	C1	Cabero-Almenara, J; Gutiérrez-Castillo, JJ; Palacios-Rodríguez, A; Barroso-Osuna, J	2020	Development of the Teacher Digital Competence Validation of DigCompEdu Check-In Questionnaire in the University Context of Andalusia (Spain)	SUSTAINABILITY	12	15	10.3390/su12156094
WoS_333	Include		Micklethwaite, P	2022	Sustainable Design Masters: Increasing the Sustainability Literacy of Designers	SUSTAINABILITY	14	6	10.3390/su14063255
WoS_334	Include		Hofman-Bergholm, M	2022	Storytelling as an Educational Tool in Sustainable Education	SUSTAINABILITY	14	5	10.3390/su14052946
WoS_335	Exclude	C3	Baabdullah, A; Alajlan, H; Alebaikan, R	2024	The Perceptions and Experiences of In-Service Teachers in a Computer Science Professional Development Program	SUSTAINABILITY	16	4	10.3390/su16041473
WoS_336	Exclude	C1	Muyor-Rodríguez, J; Fuentes-Gutiérrez, V; De la Fuente-Robles, YM; Amezcua-Aguilar, T	2021	Inclusive University Education in Bolivia: The Actors and Their Discourses	SUSTAINABILITY	13	19	10.3390/su131910818
WoS_337	Include		Cao, Y; Gao, XW; Yin, HF; Yu, KX; Zhou, D	2024	Reimagining Tradition: A Comparative Study of Artificial Intelligence and Virtual Reality in Sustainable Architecture Education	SUSTAINABILITY	16	24	10.3390/su162411135
WoS_338	Exclude	C3	Pinto-Llorente, AM; Izquierdo-Alvarez, V	2024	Digital Learning Ecosystem to Enhance Formative Assessment in Second Language Acquisition in Higher Education	SUSTAINABILITY	16	11	10.3390/su16114687

WoS_339	Include		Acevedo-Duque, A; Prado-Sabido, T; García-Salirrosas, EE; Mantilla, MMF; Calmet, VGV; Palomino, NV; Armas, HMA	2022	Postgraduate Trends in the Training of Human Talent for Sustainable Development	SUSTAINABILITY	14	21	10.3390/su142114356
WoS_340	Include		Cruz-Iglesias, E; Gil-Molina, P; Rekalde-Rodríguez, I	2022	A Navigation Chart for Sustainability for the Ocean i3 Educational Project	SUSTAINABILITY	14	8	10.3390/su14084764
WoS_341	Exclude	C3	Duru, I; Sunar, AS; White, S; Diri, B; Dogan, G	2019	A Case Study on English as a Second Language Speakers for Sustainable MOOC Study	SUSTAINABILITY	11	10	10.3390/su11102808
WoS_342	Exclude	C1	Blazic, BJ; Blazic, AJ	2022	Cybersecurity Skills among European High-School Students: A New Approach in the Design of Sustainable Educational Development in Cybersecurity	SUSTAINABILITY	14	8	10.3390/su14084763
WoS_343	Include		Seikkula-Leino, J; Jónsdóttir, SR; Håkansson-Lindqvist, M; Westerberg, M; Eriksson-Bergström, S	2021	Responding to Global Challenges through Education: Entrepreneurial, Sustainable, and Pro-Environmental Education in Nordic Teacher Education Curricula	SUSTAINABILITY	13	22	10.3390/su132212808
WoS_344	Exclude	C1	García-Perales, R; Palomares-Ruiz, A	2020	Education in Programming and Mathematical Learning: Functionality of a Programming Language in Educational Processes	SUSTAINABILITY	12	23	10.3390/su122310129
WoS_345	Exclude	C1	Aleksic, A; Nestic, S; Huber, M; Ljepava, N	2022	The Assessment of the Key Competences for Lifelong Learning-The Fuzzy Model Approach for Sustainable Education	SUSTAINABILITY	14	5	10.3390/su14052686
WoS_346	Exclude	C3	Atabekova, A	2021	Heritage Module within Legal Translation and Interpreting Studies: Didactic Contribution to University Students' Sustainable Education	SUSTAINABILITY	13	7	10.3390/su13073966
WoS_347	Include		Wang, Z; Deng, R	2024	Study on user intentions for a sustainable community idle book recycling and reading service	ENVIRONMENT DEVELOPMENT AND SUSTAINABILITY			10.1007/s10668-024-05781-1

					system from the perspective of value co-creation: a design proposal and validation based on Chinese community residents				
WoS_348	Exclude	C3	Odukoya, JA; Popoola, SI; Atayero, AA; Omole, DO; Badejo, JA; John, TM; Olowo, OO	2018	Learning analytics: Dataset for empirical evaluation of entry requirements into engineering undergraduate programs in a Nigerian university	DATA IN BRIEF	17		10.1016/j.dib.2018.02.025
WoS_349	Exclude	C1	Stoian, CE; Farcasiu, MA; Dragomir, GM; Gherhes, V	2022	Transition from Online to Face-to-Face Education after COVID-19: The Benefits of Online Education from Students' Perspective	SUSTAINABILITY	14	19	10.3390/su141912812
WoS_350	Exclude	C1	Esteve-Faubel, RP; Oller-Benitez, A; Aparicio-Flores, MP	2020	Perceptions of Future Teachers of Audiovisual Education and Communication. Challenges in Training for a Sustainable Education	SUSTAINABILITY	12	24	10.3390/su122410296
WoS_351	Exclude	C3	Marín-González, F; Lozano, SP; Báez, MS; Senior-Naveda, A; Guanipa-Ramírez, L; Pinto-Pereira, M	2024	The Integration of ICT in the Sustainable Educational Processes of Children's Emotional Self-Regulation: A Study Contextualised in Pandemic and Post-Pandemic Times	SUSTAINABILITY	16	22	10.3390/su162210080
WoS_352	Exclude	C3	Milosevic, D; Trnavac, D; Ilic, D; Vulic, M; Djurdjev, M; Radic, M; Markovic, B; Tomovic, N; Ljubojevic, S; Cakic, A; Bodolo, I; Dobric, M	2022	A Practical Model of the Application of Information Technology in Various Fields of Online Education during the COVID-19 Pandemic: Mechanical Engineering, Traffic, Informatics and Statistics, Accounting and Auditing	SUSTAINABILITY	14	23	10.3390/su142316164
WoS_353	Exclude	C3	Chivu, RG; Popa, IC; Orzan, MC; Marinescu, C; Florescu, MS; Orzan, AO	2022	The Role of Blockchain Technologies in the Sustainable Development of Students' Learning Process	SUSTAINABILITY	14	3	10.3390/su14031406
WoS_354	Exclude	C3	Obrad, C	2020	Constraints and Consequences of Online Teaching	SUSTAINABILITY	12	17	10.3390/su12176982
WoS_355	Exclude	C3	Choi, D; Chung, CY; Ha Truong	2019	Return on Education in Two Major Vietnamese Cities	SUSTAINABILITY	11	18	10.3390/su11184903
WoS_356	Exclude	C3	Metinal, YB; Ayalp, GG	2024	Modeling the Critical Factors Affecting the Success of Online	SUSTAINABILITY	16	9	10.3390/su16093803

					Architectural Education to Enhance Educational Sustainability			
WoS_357	Exclude	C3	Antón-Peset, A; Fernandez-Zamudio, MA; Pina, T	2021	Promoting Food Waste Reduction at Primary Schools. A Case Study	SUSTAINABILITY	13	2	10.3390/su13020600
WoS_358	Include		Al Kez, D; Lowans, C; Foley, A	2024	Sustainable Development in Third Level Programs: Distilling a Pathway to a True Net-Zero Education	SUSTAINABILITY	16	5	10.3390/su16051998
WoS_359	Include		Martín-Garin, A; Millán-García, JA; Leon, I; Oregi, X; Estevez, J; Marieta, C	2021	Pedagogical Approaches for Sustainable Development in Building in Higher Education	SUSTAINABILITY	13	18	10.3390/su131810203
WoS_360	Include		Peng, L; Jin, ST; Deng, Y; Gong, YC	2022	Students' Perceptions of Active Learning Classrooms from an Informal Learning Perspective: Building a Full-Time Sustainable Learning Environment in Higher Education	SUSTAINABILITY	14	14	10.3390/su14148578
WoS_361	Exclude	C3	Chung, SJ; Choi, LJ	2021	The Development of Sustainable Assessment during the COVID-19 Pandemic: The Case of the English Language Program in South Korea	SUSTAINABILITY	13	8	10.3390/su13084499
WoS_362	Exclude	C3	Prodip, MA; Roy, G	2023	The Role of 'Home School' in Improving Sustainability for Rohingya Refugees in Bangladesh	SUSTAINABILITY	15	15	10.3390/su151511860
WoS_363	Exclude	C3	Ciaccioni, S; Guidotti, F; Palumbo, F; Forte, R; Galea, E; Sacripanti, A; Lampe, N; Lampe, S; Jelusic, T; Bradic, S; Lascau, ML; Rodica-Borza, A; Pérez, RC; Rodríguez-Montero, FD; Kapan, M; Gezeker, K; Capranica, L; Tessitore, A	2024	Development of a Sustainable Educational Programme for Judo Coaches of Older Practitioners: A Transnational European Partnership Endeavor	SUSTAINABILITY	16	3	10.3390/su16031115

WoS_364	Exclude	C3	Roig-Vila, R; Prendes-Espinosa, P; Urrea-Solano, M	2020	Problematic Smartphone Use in Spanish and Italian University Students	SUSTAINABILITY	12	24	10.3390/su122410255
WoS_365	Exclude	C3	Fayez, O; Ozfidan, B; Ismail, H	2023	The Praxis of User Experience (UX) in the Design of Undergraduate Online Classes: Framing the Perceptions of Engineering and Social Sciences Students	SUSTAINABILITY	15	4	10.3390/su15043300
WoS_366	Include		Abdelrahim, Y; Zafer, A	2024	How Students' Well-Being, Education for Sustainable Development, and Sustainable Development Relate: A Case of Prince Mohammad Bin Fahd University	SUSTAINABILITY	16	21	10.3390/su16219334
WoS_367	Include		Henriksen, D; Mishra, P; Stern, R	2024	Creative Learning for Sustainability in a World of AI: Action, Mindset, Values	SUSTAINABILITY	16	11	10.3390/su16114451
WoS_368	Exclude	C3	Nistor, G; Anghel, M; Popa, M	2024	Identifying the Prosocial Orientations That Influence Choice of University Studies in the Social Field for Sustainable Educational Integration	SUSTAINABILITY	16	4	10.3390/su16041462
WoS_369	Exclude	C1	Shenkoya, T; Kim, E	2023	Sustainability in Higher Education: Digital Transformation of the Fourth Industrial Revolution and Its Impact on Open Knowledge	SUSTAINABILITY	15	3	10.3390/su15032473
WoS_370	Include		Calavia, MB; Blanco, T; Casas, R; Dieste, B	2022	Improving Design Project Management in Remote Learning	SUSTAINABILITY	14	17	10.3390/su141711025
WoS_371	Exclude	C3	Neyisci, N	2024	Emergency Response Competencies Strengthened by Sustainable Education: First Aid Training Program for Teachers	SUSTAINABILITY	16	18	10.3390/su16188166
WoS_372	Exclude	C3	Jiang, Z; Mok, IAC; Yang, X; Liu, SM; Chen, MD	2022	Pattern and Dynamics of Teacher Emotions during Teaching: A Case Study of a Senior Secondary Mathematics Teacher	SUSTAINABILITY	14	15	10.3390/su14159097
WoS_373	Include		Su, CH; Cheng, TW	2019	A Sustainability Innovation Experiential Learning Model for Virtual Reality Chemistry Laboratory: An Empirical Study with PLS-SEM and IPMA	SUSTAINABILITY	11	4	10.3390/su11041027

WoS_374	Exclude	C3	Kim, Y; Moon, J; Hwang, E	2018	Constructing Differentiated Educational Materials Using Semantic Annotation for Sustainable Education in IoT Environments	SUSTAINABILITY	10	4	10.3390/su10041296
WoS_375	Exclude	C1	Kuzmina, K; Trimingham, R; Bhamra, T	2020	Organisational Strategies for Implementing Education for Sustainable Development in the UK Primary Schools: A Service Innovation Perspective	SUSTAINABILITY	12	22	10.3390/su12229549
WoS_376	Include		Molina-Torres, MP; Ortiz-Urbano, R	2020	Active Learning Methodologies in Teacher Training for Cultural Sustainability	SUSTAINABILITY	12	21	10.3390/su12219043
WoS_377	Exclude	C3	Khahro, SH; Javed, Y	2022	Key Challenges in 21st Century Learning: A Way Forward towards Sustainable Higher Educational Institutions	SUSTAINABILITY	14	23	10.3390/su142316080
WoS_378	Exclude	C3	Dong, YA; Zhu, SS; Li, WJ	2021	Promoting Sustainable Creativity: An Empirical Study on the Application of Mind Mapping Tools in Graphic Design Education	SUSTAINABILITY	13	10	10.3390/su13105373
WoS_379	Exclude	C3	Tran, V; Ata, S; Tran, TH; Lam, DK; Pham, HL	2023	Blockchain-Powered Education: A Sustainable Approach for Secured and Connected University Systems	SUSTAINABILITY	15	21	10.3390/su152115545
WoS_380	Exclude	C3	Al-Jody, T; Aagela, H; Holmes, V	2021	Inspiring the Next Generation of HPC Engineers with Reconfigurable, Multi-Tenant Resources for Teaching and Research	SUSTAINABILITY	13	21	10.3390/su132111782
WoS_381	Exclude	C3	Kim, M; Albers, ND; Knotts, TL; Kim, J	2024	Sustainability in Higher Education: The Impact of Justice and Relationships on Quality of Life and Well-Being	SUSTAINABILITY	16	11	10.3390/su16114482
WoS_382	Exclude	C3	Zhou, L; Alam, GM; Rasdi, RM	2024	Marketing Strategies for Internationalization in China's Higher Education: An Ally or Barrier for Sustainable Development?	SUSTAINABILITY	16	1	10.3390/su16010395
WoS_383	Exclude	C3	Intra, FS; Nasti, C; Massaro, R; Perretta, A Jr; Di Girolamo, A; Brighi, A; Biroli, P	2023	Flexible Learning Environments for a Sustainable Lifelong Learning Process for Teachers in the School Context	SUSTAINABILITY	15	14	10.3390/su151411237

WoS_384	Exclude	C1	Dam-o, P; Gondek, J; Karbowiak, M; Wibig, T	2018	Observation of the Effect of Gender on Children's Concept of Motion; Sustainability Issue	SUSTAINABILITY	10	9	10.3390/su10093076
WoS_385	Exclude	C1	Uchima-Marin, C; Murillo, J; Salvador-Acosta, L; Acosta-Vargas, P	2024	Integration of Technological Tools in Teaching Statistics: Innovations in Educational Technology for Sustainable Education	SUSTAINABILITY	16	19	10.3390/su16198344
WoS_386	Exclude	C3	Lee, CJ; Hsu, Y	2021	Sustainable Education Using Augmented Reality in Vocational Certification Courses	SUSTAINABILITY	13	11	10.3390/su13116434
WoS_387	Exclude	C3	Gherhes, V; Simon, S; Para, I	2021	Analysing Students' Reasons for Keeping Their Webcams on or off during Online Classes	SUSTAINABILITY	13	6	10.3390/su13063203
WoS_388	Exclude	C1	Smaniotto, C; Saramin, A; Brunelli, L; Parpinel, M	2023	Insights and Next Challenges for the Italian Educational System to Teach Sustainability in a Global Context	SUSTAINABILITY	15	1	10.3390/su15010209
WoS_389	Include		Tripon, C; Gonta, I; Bulgac, A	2023	Nurturing Minds and Sustainability: An Exploration of Educational Interactions and Their Impact on Student Well-Being and Assessment in a Sustainable University	SUSTAINABILITY	15	12	10.3390/su15129349
WoS_390	Exclude	C3	Meddeb, P; Ruseti, S; Dascalu, M; Terian, SM; Travadel, S	2022	Counteracting French Fake News on Climate Change Using Language Models	SUSTAINABILITY	14	18	10.3390/su141811724
WoS_391	Exclude	C1	Medina-García, M; Doña-Toledo, L; Higueras-Rodríguez, L	2020	Equal Opportunities in an Inclusive and Sustainable Education System: An Explanatory Model	SUSTAINABILITY	12	11	10.3390/su12114626
WoS_392	Include		Muerza, V; Gargallo, P; Salvador, M; Turón, A	2024	Impact of Problem-Based Learning on the Perception, Understanding, and Application of Statistical Concepts in Business Administration and Management Students	SUSTAINABILITY	16	4	10.3390/su16041591
WoS_393	Exclude	C3	Pan, TM; Fan, KC	2020	A Sustainable Approach: Increasing Students' Information-Technology Competences and Job-Seeking Capabilities through Course Redesign Using FIT	SUSTAINABILITY	12	10	10.3390/su12104094

						Framework and Active Learning Pedagogy				
WoS_394	Exclude	C3	Zhang, J; Chen, ZZ; Ma, JJ; Liu, Z	2021	Investigating the Influencing Factors of Teachers' Information and Communications Technology-Integrated Teaching Behaviors toward Learner-Centered Reform Using Structural Equation Modeling	SUSTAINABILITY	13	22	10.3390/su132212614
WoS_395	Include		Huang, RH; Tlili, A; Wang, HH; Shi, YH; Bonk, CJ; Yang, JF; Burgos, D	2021	Emergence of the Online-Merge-Offline (OMO) Learning Wave in the Post-COVID-19 Era: A Pilot Study	SUSTAINABILITY	13	6	10.3390/su13063512
WoS_396	Include		Bradecki, T; Uherek-Bradecka, B; Tofiluk, A; Laar, M; Natanian, J	2024	Towards Sustainable Education by Design: Evaluating Pro-Ecological Architectural Solutions in Centers for Environmental Education	SUSTAINABILITY	16	12	10.3390/su16125053
WoS_397	Exclude	C1	Kazlauskiene, A; Gaucaitie, R; Cañabate, D; Colomer, J; Bubnys, R	2021	Sustainable Development of Students' Assumed Responsibility for Their Own Learning during Participatory Action Research	SUSTAINABILITY	13	18	10.3390/su131810183
WoS_398	Include		Domínguez, LGI; Clavijo, FV; Robles-Gómez, A; Pastor-Vargas, R	2024	A Sustainable Educational Tool for Engineering Education Based on Learning Styles, AI, and Neural Networks Aligning with the UN 2030 Agenda for Sustainable Development	SUSTAINABILITY	16	20	10.3390/su16208923
WoS_399	Exclude	C3	Aljohani, NR; Fayoumi, A; Hassan, SU	2019	Predicting At-Risk Students Using Clickstream Data in the Virtual Learning Environment	SUSTAINABILITY	11	24	10.3390/su11247238
WoS_400	Exclude	C3	Alammary, AS	2024	Blended Learning Delivery Methods for a Sustainable Learning Environment: A Delphi Study	SUSTAINABILITY	16	8	10.3390/su16083269
WoS_401	Include		Akça, F	2019	Sustainable Development in Teacher Education in Terms of Being Solution Oriented and Self-Efficacy	SUSTAINABILITY	11	23	10.3390/su11236878
WoS_402	Include		Zhang, HP; Gibson, HJ	2021	Long-Term Impact of Study Abroad on Sustainability-Related Attitudes and Behaviors	SUSTAINABILITY	13	4	10.3390/su13041953
WoS_403	Exclude	C1	Wibowo, NA; Sumarmi, S;	2023	Students' Environmental Care Attitude: A Study at Adiwiyata	SUSTAINABILITY	15	11	10.3390/su15118651

			Utaya, S; Bachri, S; Kodama, Y		Public High School Based on the New Ecological Paradigm (NEP)				
WoS_404	Exclude	C3	Karakose, T; Ozdemir, TY; Papadakis, S; Yirci, R; Ozkayran, SE; Polat, H	2022	Investigating the Relationships between COVID-19 Quality of Life, Loneliness, Happiness, and Internet Addiction among K-12 Teachers and School Administrators-A Structural Equation Modeling Approach	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	19	3	10.3390/ijerph19031052
WoS_405	Exclude	C3	Voukkali, I; Papamichael, I; Economou, F; Loizia, P; Klontza, E; Lekkas, DF; Naddeo, V; Zorpas, AA	2023	Factors affecting social attitude and behavior for the transition towards a circular economy	SUSTAINABLE CHEMISTRY AND PHARMACY	36		10.1016/j.scp.2023.101276
WoS_406	Exclude	C1	Cioca, LI; Bratu, ML	2021	Sustainable Education in the Context of COVID-19: Study of the Social Perception andWell-Being of Students at the Faculty of Engineering in Sibiu, Romania	SUSTAINABILITY	13	22	10.3390/su132212805
WoS_407	Exclude	C3	Pilotti, MAE; Abdelsalam, H; Anjum, F; Muhi, I; Nasir, S; Daqqa, I; Gunderson, GD; Latif, RM	2022	Adaptive Individual Differences in Math Courses	SUSTAINABILITY	14	13	10.3390/su14138197
WoS_408	Exclude	C1	Chavarría-Garza, WX; Santos-Guevara, A; Morones-Ibarra, JR; Aquines-Gutiérrez, O	2022	Assessment of Multiple Intelligences in First-Year Engineering Students in Northeast Mexico	SUSTAINABILITY	14	8	10.3390/su14084631
WoS_409	Include		Gusc, J; Heijes, C	2018	Oh This Learning, What a Thing It Is!-Putting Sustainability First in Teaching Techniques and in Content	SUSTAINABILITY	10	8	10.3390/su10082803
WoS_410	Exclude	C3	Pilotti, MAE; Alaoui, KE; Abdelsalam, HM; Khan, R	2023	Sustainable Development in Action: A Retrospective Case Study on Students' Learning Before, During, and After the Pandemic	SUSTAINABILITY	15	9	10.3390/su15097664
WoS_411	Exclude	C3	Olugbara, CT; Letseka, M; Olugbara, OO	2021	Multiple Correspondence Analysis of Factors Influencing Student	SUSTAINABILITY	13	23	10.3390/su132313451

					Acceptance of Massive Open Online Courses				
WoS_412	Include			Huang, RX; Pagano, A; Marengo, A	2024	Values-Based Education for Sustainable Development (VbESD): Introducing a Pedagogical Framework for Education for Sustainable Development (ESD) Using a Values-Based Education (VbE) Approach	SUSTAINABILITY	16	9	10.3390/su16093562
WoS_413	Exclude	C3		Ahmad, N; Hoda, N; Alahmari, F	2020	Developing a Cloud-Based Mobile Learning Adoption Model to Promote Sustainable Education	SUSTAINABILITY	12	8	10.3390/su12083126
WoS_414	Exclude	C3		Scavarda, A; Dias, A; Reis, A; Silveira, H; Santos, I	2021	A COVID-19 Pandemic Sustainable Educational Innovation Management Proposal Framework	SUSTAINABILITY	13	11	10.3390/su13116391
WoS_415	Exclude	C3		Davidovitch, N; Eckhaus, E	2024	Effect of Crisis-Induced Online Shift on Student Academic Preferences: Insights for Education Institutions to Develop Equitable and Sustainable Learning Models	SUSTAINABILITY	16	12	10.3390/su16125248
WoS_416	Exclude	C1		Lei, M; Alam, GM; bin Hassan, A	2023	Job Burnout amongst University Administrative Staff Members in China-A Perspective on Sustainable Development Goals (SDGs)	SUSTAINABILITY	15	11	10.3390/su15118873
WoS_417	Exclude	C1		Alshammary, FM; Alhalafawy, WS	2023	Digital Platforms and the Improvement of Learning Outcomes: Evidence Extracted from Meta-Analysis	SUSTAINABILITY	15	2	10.3390/su15021305
WoS_418	Exclude	C3		Kritikou, T; Panagiotakos, D; Abeliotis, K; Lasaridi, K	2021	Investigating the Determinants of Greek Households Food Waste Prevention Behaviour	SUSTAINABILITY	13	20	10.3390/su132011451
WoS_419	Include			Lin, HCK; Lu, LW; Lu, RS	2024	Integrating Digital Technologies and Alternate Reality Games for Sustainable Education: Enhancing Cultural Heritage Awareness and Learning Engagement	SUSTAINABILITY	16	21	10.3390/su16219451
WoS_420	Exclude	C1		Chang, YS; Hu, YJR; Chen, HW	2019	Learning Performance Assessment for Culture Environment Learning and Custom Experience with an AR Navigation System	SUSTAINABILITY	11	17	10.3390/su11174759

WoS_421	Exclude	C3	Liao, YK; Wu, WY; Le, TQ; Phung, TTT	2022	The Integration of the Technology Acceptance Model and Value-Based Adoption Model to Study the Adoption of E-Learning: The Moderating Role of e-WOM	SUSTAINABILITY	14	2	10.3390/su14020815
WoS_422	Include		Bucea-Manea-Tonis, R; Martins, OMD; Bucea-Manea-Tonis, R; Gheorghita, C; Kuleto, V; Ilic, MP; Simion, VE	2021	Blockchain Technology Enhances Sustainable Higher Education	SUSTAINABILITY	13	22	10.3390/su132212347
WoS_423	Exclude	C1	Demir, K	2024	Future of Undergraduate Education for Sustainable Development Goals: Impact of Perceived Flexibility and Attitudes on Self-Regulated Online Learning	SUSTAINABILITY	16	15	10.3390/su16156444
WoS_424	Exclude	C1	Lo, SC; Tsai, HH	2022	Perceived Effectiveness of Developing a Mobile System of Formative Test with Handwriting Revision to Devise an Instruction Design Based on Cognitive Apprenticeship Theory	SUSTAINABILITY	14	4	10.3390/su14042272
WoS_425	Include		Kjellgren, B; Richter, T	2021	Education for a Sustainable Future: Strategies for Holistic Global Competence Development at Engineering Institutions	SUSTAINABILITY	13	20	10.3390/su132011184
WoS_426	Exclude	C1	Dimitranov, D; Belev, B	2024	Sustainable Shipping Requires Sustainable Education and Training	SUSTAINABILITY	16	24	10.3390/su162411270
WoS_427	Include		Liu, TY; Jiang, YH; Wei, Y; Wang, X; Huang, SC; Dai, L	2024	Educational Practices and Algorithmic Framework for Promoting Sustainable Development in Education by Identifying Real-World Learning Paths	SUSTAINABILITY	16	16	10.3390/su16166871
WoS_428	Exclude	C1	Ali, R; Bhadra, J; Siby, N; Ahmad, Z; Al-Thani, NJ	2021	A STEM Model to Engage Students in Sustainable Science Education through Sports: A Case Study in Qatar	SUSTAINABILITY	13	6	10.3390/su13063483
WoS_429	Include		Chen, FH	2021	Sustainable Education through E-Learning: The Case Study of iLearn2.0	SUSTAINABILITY	13	18	10.3390/su131810186
WoS_430	Exclude	C1	Mróz, A; Ocetkiewicz, I	2021	Creativity for Sustainability: How Do Polish Teachers Develop	SUSTAINABILITY	13	2	10.3390/su13020571

					Students' Creativity Competence? Analysis of Research Results				
WoS_431	Include			Laciok, V; Sikorova, K; Fabiano, B; Bernatik, A	2021	Trends and Opportunities of Tertiary Education in Safety Engineering Moving towards Safety 4.0	SUSTAINABILITY	13	2	10.3390/su13020524
WoS_432	Exclude	C1		Li, JQ; Xia, HM; Qin, YC; Fu, PD; Guo, X; Li, RM; Zhao, XY	2022	Web GIS for Sustainable Education: Towards Natural Disaster Education for High School Students	SUSTAINABILITY	14	5	10.3390/su14052694
WoS_433	Exclude	C3		Li, M; Yu, ZG	2022	Teachers' Satisfaction, Role, and Digital Literacy during the COVID-19 Pandemic	SUSTAINABILITY	14	3	10.3390/su14031121
WoS_434	Exclude	C3		Chelli, F; Ciommi, M; Mariani, F; Polinesi, G; Recchioni, MC; Lamonica, GR; Salvati, L	2022	A Story of Strengths and Weaknesses in Tertiary Education: Evaluating 'Mobility' and 'Opportunities' in OECD Countries with Composite Indicators	SUSTAINABILITY	14	24	10.3390/su142416463
WoS_435	Include			Granados-Sánchez, J	2022	Levels of Transformation in Sustainable Curricula: The Case of Geography Education	SUSTAINABILITY	14	8	10.3390/su14084481
WoS_436	Exclude	C3		Viegas, C; Lima, N; Costa, AR	2023	Engineering Students' Perception on Self-Efficacy in Pre and Post Pandemic Phase	SUSTAINABILITY	15	12	10.3390/su15129538
WoS_437	Exclude	C1		Jeon, IS; Kim, SY; Kang, SJ	2024	Developing Standards for Educational Datasets by School Level: A Framework for Sustainable K-12 Education	SUSTAINABILITY	16	12	10.3390/su16124954
WoS_438	Exclude	C3		Wang, F; Wijaya, TT; Habibi, A; Liu, YX	2022	Predictors Influencing Urban and Rural Area students to Use Tablet Computers as Learning Tools: Combination of UTAUT and TTF Models	SUSTAINABILITY	14	21	10.3390/su142113965
WoS_439	Exclude	C3		Inglezakis, VJ; Rapp, D; Razis, P; Zorpas, AA	2023	Chemical Engineering beyond Earth: Astrochemical Engineering in the Space Age	SUSTAINABILITY	15	17	10.3390/su151713227
WoS_440	Exclude	C3		Gómez-Galán, J; Lázaro-Pérez, C; Martínez-López, JA	2021	Trajectories of Victimization and Bullying at University: Prevention for a Healthy and Sustainable Educational Environment	SUSTAINABILITY	13	6	10.3390/su13063426
WoS_441	Exclude	C1		El Hadraoui, H; Zegrari, M; Hammouch, FE; Guennouni, N;	2022	Design of a Customizable Test Bench of an Electric Vehicle Powertrain for Learning Purposes	SUSTAINABILITY	14	17	10.3390/su141710923

			Laayati, O; Chebak, A		Using Model-Based System Engineering				
WoS_442	Exclude	C1	Shanti, Z; Al-Tarazi, D	2023	Virtual Reality Technology in Architectural Theory Learning: An Experiment on the Module of History of Architecture	SUSTAINABILITY	15	23	10.3390/su152316394
WoS_443	Exclude	C1	Woropay-Hordziejewicz, NA; Buzniak, A; Lawendowski, R; Atroszko, PA	2022	Compulsive Study Behaviors Are Associated with Eating Disorders and Have Independent Negative Effects on Well-Being: A Structural Equation Model Study among Young Musicians	SUSTAINABILITY	14	14	10.3390/su14148617
WoS_444	Exclude	C3	Stevens, NS; Culén, AL	2024	Toward Sustainable Futures by Design Education	SUSTAINABILITY	16	16	10.3390/su16166777
WoS_445	Exclude	C1	Ma, YQ; Xiu, Q; Shao, LZ; Yao, H	2022	Promoting the Sustainable Improvement of Educational Empirical Research Quality: What Kinds of Collaborative Production Relationships Make Sense?	SUSTAINABILITY	14	6	10.3390/su14063380
WoS_446	Include		Okada, A; Panselinas, G; Bizoi, M; Malagrida, R; Torres, PL	2024	Fostering Transversal Skills through Open Schooling with the CARE-KNOW-DO Framework for Sustainable Education	SUSTAINABILITY	16	7	10.3390/su16072794
WoS_447	Include		Adams, T; Jameel, SM; Goggins, J	2023	Education for Sustainable Development: Mapping the SDGs to University Curricula	SUSTAINABILITY	15	10	10.3390/su15108340
WoS_448	Include		Valdés, H; Correa, C; Mellado, F	2018	Proposed Model of Sustainable Construction Skills for Engineers in Chile	SUSTAINABILITY	10	9	10.3390/su10093093
WoS_449	Exclude	C1	Tran, T; Hoang, AD; Nguyen, YC; Nguyen, LC; Ta, NT; Pham, QH; Pham, CX; Le, QA; Dinh, VH; Nguyen, TT	2020	Toward Sustainable Learning during School Suspension: Socioeconomic, Occupational Aspirations, and Learning Behavior of Vietnamese Students during COVID-19	SUSTAINABILITY	12	10	10.3390/su12104195
WoS_450	Exclude	C1	Hashim, HU; Yunus, MM; Norman, H	2022	'AReal-Vocab': An Augmented Reality English Vocabulary Mobile Application to Cater to Mild Autism Children in Response towards Sustainable Education for Children with Disabilities	SUSTAINABILITY	14	8	10.3390/su14084831
WoS_451	Exclude	C1	Díaz-Lauzurica, B; Moreno-Salinas, D	2019	Computational Thinking and Robotics: A Teaching Experience	SUSTAINABILITY	11	18	10.3390/su11185109

					in Compulsory Secondary Education with Students with High Degree of Apathy and Demotivation				
WoS_452	Exclude	C1	Geng, DY; Liu, JJ; Zhu, QH	2017	Motivating sustainable consumption among Chinese adolescents: An empirical examination	JOURNAL OF CLEANER PRODUCTION	141		10.1016/j.jclepro.2016.09.113
WoS_453	Include		Alkhayyal, B; Labib, W; Alsulaiman, T; Abdelhadi, A	2019	Analyzing Sustainability Awareness among Higher Education Faculty Members: A Case Study in Saudi Arabia	SUSTAINABILITY	11	23	10.3390/su11236837
WoS_454	Include		Liu, TT; Li, YJ; Feng, MQ; Chen, Y; Zhang, TY	2023	Understanding College Students' Engagement in Mobile Reading for Sustainability in Education: A Case Study from China	SUSTAINABILITY	15	3	10.3390/su15032848
WoS_455	Exclude	C3	Pilotti, MAE	2021	What Lies beneath Sustainable Education? Predicting and Tackling Gender Differences in STEM Academic Success	SUSTAINABILITY	13	4	10.3390/su13041671
WoS_456	Include		Ian, C; John, R; Suzy, U; David, G; Graham, D; Bobby, C; Aman, M; Bhamini, KA; Rees, B; Charles, N; Heather, R; Kamaljit, S; Jeremy, RS; Kim, F; Joel, B; Mark, SS; James, GI	2019	Education for Sustainable Development: A Study in Adolescent Perception Changes Towards Sustainability Following a Strategic Planning-Based Intervention-The Young Persons' Plan for the Planet Program	SUSTAINABILITY	11	20	10.3390/su11205817
WoS_457	Exclude	C3	Tan, HW; Chen, SQ; Shi, Q; Wang, LL	2014	Development of green campus in China	JOURNAL OF CLEANER PRODUCTION	64		10.1016/j.jclepro.2013.10.019
WoS_458	Exclude	C1	Saarinen, M; Kurppa, S; Virtanen, Y; Usva, K; Mäkelä, J; Nissinen, A	2012	Life cycle assessment approach to the impact of home-made, ready-to-eat and school lunches on climate and eutrophication	JOURNAL OF CLEANER PRODUCTION	28		10.1016/j.jclepro.2011.11.038
WoS_459	Include		Suarez, A; García-Costa, D; Perez, J; López-Iñesta, E; Grimaldo, F; Torres, J	2023	Hands-on Learning: Assessing the Impact of a Mobile Robot Platform in Engineering Learning Environments	SUSTAINABILITY	15	18	10.3390/su151813717

WoS_460	Include		Mahmud, SND; Husnin, H; Soh, TMT	2020	Teaching Presence in Online Gamified Education for Sustainability Learning	SUSTAINABILITY	12	9	10.3390/su12093801
WoS_461	Exclude	C1	Moca, M; Badulescu, A	2023	Determinants of Economical High School Students' Attitudes toward Mobile Devices Use	SUSTAINABILITY	15	12	10.3390/su15129331
WoS_462	Exclude	C3	Jiang, M; Yu, HL; He, J; Qian, GP; Bialas, M	2023	Effectiveness of Cooperative Learning Instructional Models in Training In-Service Physical Education Teachers in Southwest China	SUSTAINABILITY	15	13	10.3390/su15139993
WoS_463	Exclude	C1	Xu, GY; Jiang, PJ; Xiong, B	2024	The Impact of Online Education on Gifted Mathematics Students from Different Family Backgrounds	SUSTAINABILITY	16	19	10.3390/su16198444
WoS_464	Exclude	C1	Li, Y; Yu, HL	2024	Assessment of Pedagogical Contributions toward Enhancing Physical Activity within the Secondary School Physical Education Curricula in Southwestern China	SUSTAINABILITY	16	5	10.3390/su16051862
WoS_465	Include		Mian, SH; Salah, B; Ameen, W; Moiduddin, K; Alkhalefah, H	2020	Adapting Universities for Sustainability Education in Industry 4.0: Channel of Challenges and Opportunities	SUSTAINABILITY	12	15	10.3390/su12156100
WoS_466	Include		Butum, LC; Nicolescu, L; Stan, SO	2022	Developing Global Competences via University Internationalization Activities-A Comparative Analysis of Business Students' Opinions before and during the COVID-19 Pandemic Crisis	SUSTAINABILITY	14	21	10.3390/su142114581
WoS_467	Exclude	C1	Catalano, H; Albulescu, I; Stan, C; Mestic, G; Ani-Rus, A	2023	Child-Centered Approach through Slow Education Principles: A View to Child Personality Development in Early Childhood	SUSTAINABILITY	15	11	10.3390/su15118611