

Article

Not peer-reviewed version

Adopting Sustainability Competencies in Management Education - A Scoping Review of Progress

[Anshuman Khare](#) * and [Patricia MacNeil](#)

Posted Date: 9 October 2024

doi: 10.20944/preprints202410.0652.v1

Keywords: Sustainability; sustainability competencies; business schools; higher education institutions; change



Preprints.org is a free multidiscipline platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Article

Adopting Sustainability Competencies in Management Education-A Scoping Review of Progress

Patricia MacNeil ¹ and Anshuman Khare ^{2,*}

¹ Dalhousie University, Canada

² Athabasca University, Canada

* Correspondence: anshuman@athaascau.ca

Abstract: There is a growing urgency to address society's complex issues, many of which are incorporated within the Sustainable Development Goals (SDGs). Higher education has a special role and responsibility to support and promote these goals. The SDG framework helps students understand SDGs, but special competencies are necessary to address them effectively. Sustainability competencies impart the personal/emotional development missing from current programming, but higher education institutions have been reluctant to introduce them into the curricula. This study examines the ongoing debate about integrating sustainability competencies into higher education curricula. We employed a scoping review to synthesize the current issues and highlight key barriers to changing the curricula. Contrary to a commonly expressed theme in the literature, scholarly opinion has converged around a singular model for sustainability competencies, the framework proposed by Wiek et al. (2011) and the 2021 update. Integrating sustainability competencies into management education responds to SDG-4 (quality education) and yields far-reaching impacts. The interconnectedness of the goals means that students acquire the competency to understand, address, and promote various SDGs. Given the absence of a policy decision to integrate sustainability competencies into higher education curricula, this paper provides a timely summary of the issues to focus on discussion and potential action. The focus is on business schools and changing management education. Business schools have been selected given the heightened demand from society for businesses to be more involved in and share responsibility for complex global issues like sustainability.

Keywords: Sustainability; sustainability competencies; business schools; higher education institutions; change

We live in an age of uncertainty. Before COVID-19, the standing list of complex global issues included: increasing economic disparities, geopolitical instability, diminishing democratic values, wavering social cohesion, and a looming climate crisis (Bates et al., 2022; Risopoulos-Pichler, 2020; Weber, 2021; World Economic Forum (WEF), 2022). Now we find these issues have become exacerbated and in need of more urgent attention (WEF, 2022). Complex issues must be addressed, not only for their inherent risks but also because they can hamper essential progress toward achieving societal sustainability (Bates & Brenner, 2022; Risopoulos-Pichler et al., 2020; Weber et al., 2021). The Sustainable Development Goals (SDGs) were developed to urge the world to act on a number of complex issues related to sustainability (UN, 2015). The SDGs are a set of 17 global goals adopted by the UN member states in 2015, aiming to address various social, economic, and environmental challenges by the year 2030. However, given the complexity within and across the entire 17 goals, there is a need for capacity building if progress is to be made in a timely manner.

Education has a crucial role in all of the SDGs and specifically SDG-4, quality education. Higher Education (HE) is particularly important as this is the stage of life where students are preparing for their future roles in society (de Lange, 2013; Disterheft et al., 2013 as cited in Stough et al., 2018). Of significance to this paper is SDG-4 and the essential role of education in leading the transformation of systems and structures to support change. We focus on the enhancement of education for

Education for Sustainable Development (ESD), particularly its relevance to curricula, mindsets, and the education of students. The paper contributes to this goal by highlighting the urgency of exposing business graduates to values, knowledge, and skills that advance a different type of corporate manager who understands and is motivated to address sustainability and other complex issues more effectively (Risopoulos-Pichler, 2020).

Students must be competent in various areas when they graduate so they are prepared to assume roles and responsibilities in their professional lives. Generally, we say someone is competent when they have the ability to do something well. In education, competencies are defined as “a complex combination of knowledge, skills, understanding, values, attitudes, and desire which lead to effective, embodied human action in the world in a particular domain” (Crick, 2008, p. 312). Core or key competencies are the ones that bring about the essential behaviours expected by a particular organization or in a specific situation (UNESCO, 2016).

Education is being called upon to adopt key Sustainability Competencies (SCs) that advance one’s capacity to understand and address sustainability and other complex problems in higher education institutions (HEIs) (Abdelgaffar, 2020). SCs would be taught alongside traditional competencies that strengthen students’ cognitive/intellectual capacities (Abdelgaffar, 2020; Redman & Wiek, 2021).

Blending the traditional competencies with SCs that build personal/emotional strengths for real-life issues and challenges represents a more holistic approach to management education (ME). SCs also foster an ethical mindset that facilitates a broad understanding of the complexity and interconnectedness of the world today (Filho et al., 2019; Kassel et al., 2016; Lozano & Barreiro Gen, 2019). The student who is both intellectually and emotionally competent is prepared to solve complex issues that go beyond the sustainability context, making their adoption highly practical for students of all disciplines (Risopoulos, 2020; Weber, 2022).

However, despite their unique position as change agents for sustainability, HEIs have not promoted SCs to any significant degree (Aung & Hallinger, 2022; Leal Filho, 2020). Multiple international efforts have been launched to coax the education system to move forward with sustainable practices and programs, but rather than transformative change, we see limited progress within single institutions or one faculty or programme (Abdelgaffar, 2020; Bagley, 2020; Marathe, 2020). Progress on the SDGs has grown since the appearance of the Times Higher Education (THE) Impact Rankings (2023). However, the majority of schools are not engaging in the process and there is a notable absence of high-ranking global universities. Furthermore, if the universities involved are not embedding sustainability into core programming or across disciplines, their efforts towards sustainability will tend to be superficial (Bautista-Puig et al., 2022; Weybrecht, 2022).

The challenge to integrate ESD and adopt SCs in curricula may provide a genuine opportunity for business schools. Business is often criticized for its neglect of societal issues and business schools have been held responsible for their part in producing executives whose unethical decisions and unsustainable practices have led to the corporate scandals that have become commonplace (Abdelgaffar, 2020; Bagley, 2020; Marathe, 2020). Consequently, business schools are under growing pressure to develop future managers and leaders who will make responsible decisions and have a positive impact on society (Figureo & Raufflet, 2015 as cited in Stough et al., 2018).

Blending traditional business competencies with SCs that build personal/emotional strengths for real-life issues and challenges represents a more holistic approach to ME. By mastering both intellectual and emotional competency, business graduates are not just better prepared to make sustainability-minded decisions but also are equipped to manage other complex challenges that arise in the business environment (Risopoulos, 2020; Rychen, 2019; Weber, 2022).

While a compelling proposition, there are barriers to moving forward with integration. In business schools, ME continues to reflect the long-standing economic paradigm of shareholder value and the pursuit of profit, often glossing over or even completely neglecting societal issues and impacts (Tufano, 2020). Furthermore, the ESD literature reveals confusion and an ongoing debate about what the SCs should look like and how to integrate them into the curricula, stalling any real progress (Aung & Hallinger, 2022; Bates et al., 2022; Dzhengiz & Niesten, 2020; Gómez-Olmedo et al.,

2020; Munn et al., 2018; Sanchez-Carrillo et al., 2021). Interestingly, our study will show that not only are there key competencies available, but also recent papers (2019-2023) clearly refer to the competency framework developed by Wiek et al. (2011) and the updated version (Redman & Wiek, 2021) as the leading instrument in the ESD field (Annelin & Boström, 2022; Brundiers et al., 2021; Eberz et al., 2023; Evans, 2019; McCarthy and Eagle, 2021; Redman & Wiek, 2021). Table 1 shows the eight competencies included in the 2021 version of Redman and Wiek’s SC framework. The table also identifies the scholars whose work has been incorporated into the overall framework, a clear demonstration of unity among scholars throughout the ESD field.

Table 1. Recommended Sustainability Competencies¹

Sustainability Competency	Brief Definition of Competency
Systems-thinking	Ability to apply modeling and complex analytical approaches to analyse: (1) complex systems and sustainability problems, and (2) the impacts of sustainability action plans (strategies) and interventions.
Futures-thinking	Ability to carry out or construct simulations, forecasts, scenarios, and visions: (1) to anticipate future states and dynamics of complex systems and sustainability problems, and (2) to anticipate how sustainability action plans (strategies) might play out in the future (if implemented).
Values-thinking	Ability to identify, map, specify, negotiate, and apply sustainability values, principles, and goals: (1) to assess the sustainability of current/future states of complex systems; (2) to construct sustainability visions for these systems; and (3) to assess the sustainability of action plans (strategies) and interventions.
Strategies-thinking	Ability to construct and test viable strategies (action plans) for interventions, transitions, and transformations toward sustainability.
Implementation	Ability to put sustainability strategies (action plans) into action, including implementation, adaptation, transfer, and scaling, in effective and efficient ways.
Inter-personal	Ability to (1) to collaborate successfully in inter-disciplinary and professional teams; and (2) involve diverse stakeholders, in meaningful and effective ways, in advancing sustainability transformations.
Intra-personal	Ability to avoid personal health challenges and burnout in advancing sustainability transformations through resilience-oriented self-care (awareness and self-regulation).
Integration	Ability to apply collective problem-solving procedures to complex sustainability problems: (1) to develop viable sustainability strategies (action plans); and (2) successfully implement them.

¹ Note: Table 1 reflects information derived from Redman and Wiek, 2021.

The purpose of our study was to understand the reluctance among scholars and practitioners (e.g., Aung & Hallinger, 2022; Bates et al., 2022; Dzhengiz & Niesten, 2020; Gómez-Olmedo et al., 2020; Munn et al., 2018; Sanchez-Carrillo et al., 2021) to confirm this framework as a singular model for integration and to identify the main barriers preventing progress within business schools specifically, and HEIs generally. Based on the findings we propose that business schools become the change agents for other HEIs, given the prominence of business in society and the calls for change in business principles and practices (Abdelgaffar, 2020; Filho et al., 2019; Rimanoczy & Klingenberg, 2021; Tavanti & Davis, 2019). The paper highlights SDG-4 (quality education) and the enhancement of ESD, in this case, adopting competencies for sustainability in business programmes. Since ESD is recognized as a natural and essential connection to all SDGs, we also describe potential gains for other goals should decisive action for integration be taken.

The scoping review process is defined in the following section. The findings are identified in the literature review which provides the essential themes that give rise to the relevant issues and clarifies

the core information and events leading to this point in time. The discussion reaffirms the findings and provides essential information for action. Throughout the paper, we underline the urgency in equipping students with the competencies to effectively address complex problems like the SDGs and other global issues. The targeted approach provides a timely and uniquely annotated summary of the current impasse in adopting ESD and SCs in education programmes and outlines an approach to aid its advancement.

1. Research Design and Methods

Students need to be prepared to address complex problems like those reflected in the SDGs and new challenges they will face as future leaders, managers, and citizens (Bates et al., 2022; Risopoulos et al., 2020; Weber et al., 2021). SCs engender the necessary personal and interpersonal values, knowledge, and skills that complement and extend the competencies currently included in ME and other disciplines.

2. Scoping Reviews

The purpose of a scoping review is to scope out a body of literature pertaining to the research question, identify knowledge gaps, clarify concepts, investigate research conduct, or inform a systematic review (Munn et al., 2018). They also draw on various research methodologies and may include non-research sources, like policy (Peters et al., 2017). We chose the scoping review as the method is increasingly used to inform decision-making and research based on a particular topic or issue.

To ensure trust in the results, scoping reviews require a series of methods that employ rigour and transparency (Munn et al., 2018). This paper reflects the updated guidelines of the JBI Scoping Review Methodology Group that were endorsed by *JBI's International Scientific Committee in 2020* (Peters et al., 2017).

2.1. Steps in the Review

We used the five-stage framework recommended by Arksey and O'Malley (2005) as our approach namely, (1) identify the research question, (2) identify relevant sources, (3) study selection, (4) chart the data, (5) collate, summarise, and report the findings.

Step 1: Research Question(s). The research question has two parts: (1) Is there sufficient evidence that there is scholarly unity regarding the key SCs so that implementation in business school curricula can proceed? (2) Given the lack of progress in adopting and integrating sustainability education generally, and SCs specifically, what are the key barriers to be overcome?

Step 2: Indices, Databases, and Search Engines. We used Google Scholar to pilot the search strategy and provide some indication of the potential size of the response (Arksey and O'Malley, 2005). The number and expansive nature of the findings directed our focus to high-impact journals that offered more robust search capabilities. Two clear areas of study were highlighted in the initial pilot: education and environment. The library indices selected were Education Source Complete and Environment Source Complete.

The Education Source Complete database includes educational research and policy studies. The Environment Direct database was selected to ensure coverage of sustainability-related literature. Each of these library indices provided access to several related databases that added to the comprehensiveness of the search.

2.2. Search Process

The timeframe for the search was 2011-2022 (plus a few papers that emerged in 2023 as the paper was being written). We chose the starting date of 2011, given the release of the UN's *Learning for the future: Competences in education for sustainable development* (UNECE, 2011). This was followed by another key publication, Wiek et al.'s (2011) paper titled, *Key competencies in sustainability: A reference framework for academic program development*. The SCs recommended in Wiek et al.'s (2011) paper are

highly regarded in the literature, it is the most cited in the sustainability competency segment of the field and have been used as foundational for numerous research studies (e.g., interviews) (Eberz et al., 2023; Evans, 2019; Redman & Wiek, 2021).

The first series of searches was purposefully broad, including ESD (and synonyms) in the search string to ensure the capture of anything relating to learning objectives that might inform the specific area of competency. This resulted in far too many hits but provided us with an understanding of the interest in the subject and the general tenor of the discussions. The next series of searches removed ESD (and synonyms) and focused on SCs. The final search yielded 92 hits - a more manageable number and much-improved accuracy.

The final search string used was sustainability leadership, sustainability competencies (SCs and synonyms provided by the relevant search engine), higher education institutions (HEIs and synonyms provided), business schools or colleges (and synonyms provided), and reviews of literature (and synonyms provided).

Step 3: Study Selection. A series of steps were taken to include/exclude various papers. Figure 1 shows the steps and the corresponding results.

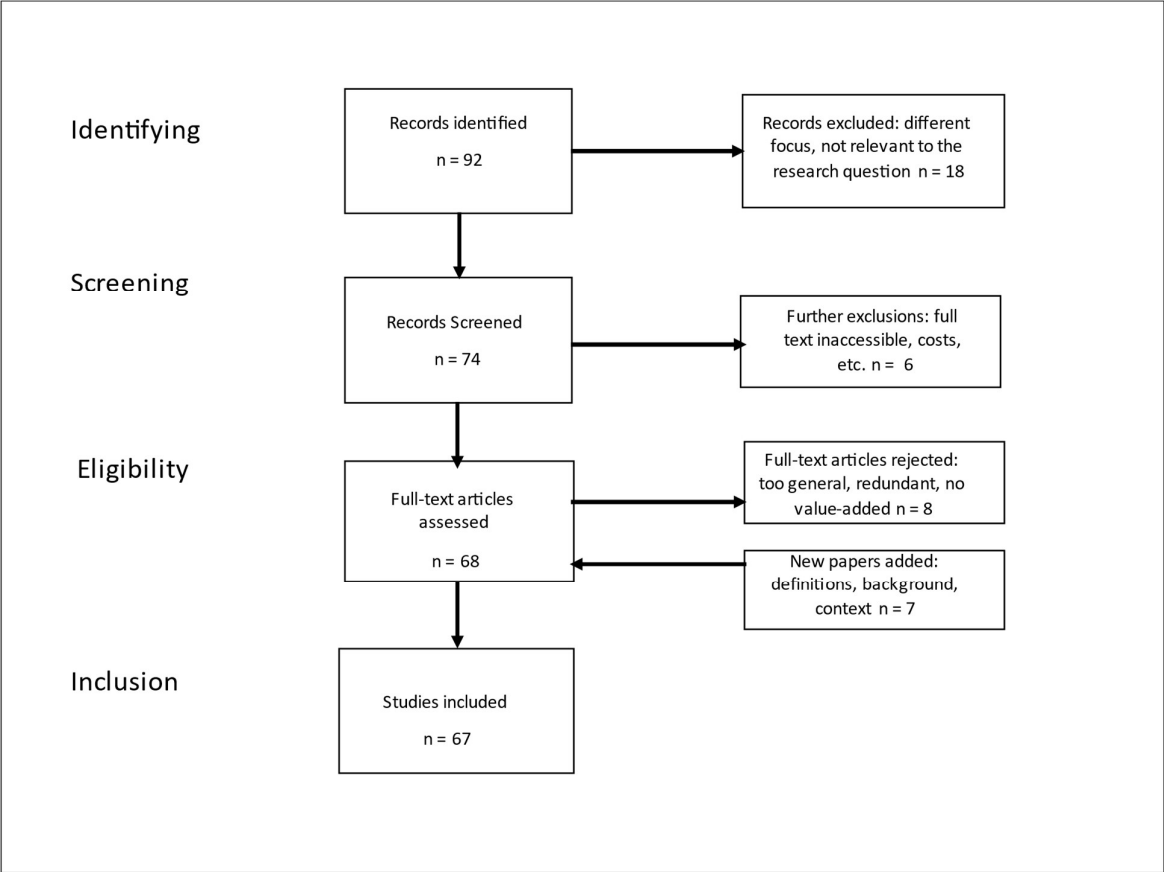


Figure 1. Inclusion/Exclusion Process for Scoping Review.

Steps 4 and 5: Charting the Data and Summarising the Findings. In the final steps of the process, we mapped the data and interpreted the findings applying a themes analysis. Thematic analysis is a method or practice used throughout a variety of disciplines (Mihas, 2023). There are both deductive and inductive approaches to thematic analysis; we used the inductive approach and worked our way through the following six steps for social science outlined by Braun and Clarke (2006): (1) become familiar with the data, (2) generate codes, (3) generate themes, (4) review themes, (5) define and name themes, and (6) locate exemplars.

The above steps were followed by two independent researchers who consulted regularly to reach a consensus on process and inclusion/exclusion decisions. We limited the searches to sources

in English, a select number of databases, a limited timeframe for current research, and keywords. The next section reflects the relevant literature (2011–2022). We then discuss the findings, clarifying the state of SC development, and offering suggestions to overcome deemed barriers to change.

3. Themes Emerging from the Literature

The following themes emerged from the review and are provided to inform, define, and clarify the issues and challenges relevant to the research question.

3.1. *Complex Real-World Problems and the UN SDGs (2015)*

Complex issues lack clear definitions and may not be able to be solved through traditional methods and decision-making (Weber 2023). The issues and challenges we face in the 21st century are complex and urgent; many are unprecedented and can even pose an existential threat to our health and well-being as a society (Risopoulos-Pichler et al., 2020; WEF, 2022).

A global approach to many of these complex issues is provided by the UN's framework for the 17 SDGs (2015). Each of these goals either represents a global complex issue (e.g., climate action) or is interlinked with one or more of the others (e.g., sustainable economic growth). Achieving progress on these goals brings us closer to sustainability.

3.2. *Sustainability*

As a concept, "sustainability" is based on the understanding of sustainable development established in *Our Common Future* (Brundtland, 1987). Sustainability is a complex issue of mega proportions. Sustainability challenges involve almost every aspect of society and are among the main concerns of the world today (Weber, 2023). The framework provided for the 17 SDGs is a type of blueprint for achieving sustainability by addressing the complex issues that comprise each goal. Progress is also possible by managing other complex issues that interconnect with sustainability (Metcalf & Benn, 2012; Risopoulos-Pichler, 2020). In other words, effectively managing real-world complex issues, like the ones relayed earlier in the paper, is aligned with progress toward sustainability.

Sustainability is at risk given the growing number of complex issues that require urgent attention (Bates et al., 2022; Weber et al., 2021). Business is expected to support efforts to achieve sustainability but has been lagging in this role (Risopoulos-Pichler, 2020). Urgent action is needed from corporate managers and leaders who are capable of understanding and accepting broad responsibility for their actions and society. However, this will require values, knowledge, and skills that are different from those typically demonstrated in business, particularly corporations, today (Montiel et al., 2020).

3.3. *Different Competencies Required for Complex Issues*

The COVID-19 pandemic has accentuated already existing challenges and increased the urgency to find solutions (Bates et al., 2022; Risopoulos-Pichler, 2020; WEF, 2022). This has heightened the demand for a different type of businessperson, one who is more ethical, responsible, and sustainability-minded (Abdelgaffar, 2020; Miska & Mendenhall, 2018; Montiel et al., 2020).

The financial crisis of 2008-2009 was a prime example of corporate greed and hubris (Abdelgaffar, 2020; Bagley, 2020). Corporate scandals and other misbehaviour began well before 2008; what is noteworthy is that they continue to this day, supporting the need for change in how business operates (Bagley, 2020). Corporate executives in power today were taught the principles and practices of the dominant economic model in business programmes, shareholder capitalism (Smith, 2019; Tavanti, 2022). Business students can be educated to be different and to have values, knowledge, and skills that lead them to accept greater responsibility for societal problems to which their corporations often contribute.

3.4. *Competencies for Sustainability and Other Complex Issues*

While SCs have been under development for decades, incorporating them in HE has become more urgent as societal issues have grown and intensified (Bates & Brenner, 2022; Redman & Wiek, 2021). SCs emphasize personal/emotional factors relating to human elements like judgment, ethics, and morality (Bagley, 2020; Tufano, 2020). Such competencies help students to self-regulate their emotions and engage in interpersonal relationships, enabling them to be more considerate of the needs of others (Gómez-Olmedo & Carrero, 2020). The increased emotional intelligence helps students who enter the business world to become more adept at solving complex problems that involve many systems, structures, and stakeholders (Metcalf & Benn, 2013).

Competencies in education became popular more than two decades ago through efforts such as the OECD-led initiative on the *Definition and Selection of Competencies (DeSeCo)* (Rychen & Salganik, 2001). SCs are intended to complement the traditional competencies that are already compulsory for business and other professions and programmes, such as critical thinking and basic communication skills. HEIs, including business schools, are responsible for delivering education for sustainable development (ESD) by raising awareness and providing the necessary competencies to manage complex problems such as sustainability (Risopoulous-Pichler, 2020). The problem is that progress to adopt SCs in educational programmes has been slow and lacking in coordination. There are several reasons for the delay but the key issues are the ongoing debate among academics regarding what the actual competencies should look like and how to adopt them in educational programmes (Wiek et al., 2011).

3.5. Effectiveness of SCs

Businesses are being challenged to respond to the many complex issues in the world today and corporate managers and leaders are expected to build sustainability into the solutions they put forward (Edelman, 2023; Muff et al., 2020). There is ample evidence for expanding management programmes to integrate sustainability and SCs into curricula. For example, Griswold (2022) found that students who engage in sustainability education continue to demonstrate sustainability in their professional careers. Wang and colleagues (2022) examined the delivery process for sustainability courses and found that, depending on how the courses were taught, students' beliefs in sustainability practices were affected and this helped in forming sustainability mindsets. Their findings further indicate that systematically linking pedagogies to teaching practices enhances students' success in developing a sustainability mindset along with appropriate competencies for sustainability management. Caldana et al. (2022) demonstrated how a hybrid learning approach that involves formal and informal learning is an effective way to educate future responsible leaders while maximizing the development of SCs.

In contrast, empirical research clearly shows the inadequacies of current business management programmes regarding sustainability awareness and real-world preparedness. Studies in various university business programmes found that the current curriculum supports and builds competency in the so-called generic or "hard" skills (e.g., assessing, analyzing, and evaluating) and reduces students' responsiveness to "softer" skills and behaviours that are needed for a sustainability-minded manager/leader (e.g., general empathy, self-reflection, collaboration) (Abdelgaffar, 2020; McCarthy & Eagle, 2021). For example, Marathe et al. (2020) conducted a study of a current two-year, full-time MBA programme—when students entered and again when they graduated—that indicated the impact of ME on cognitive and affective empathy. The authors reported a positive impact on cognitive empathy, but a reduction in affective and general empathy when the students graduated from the programme.

3.6. Convergence

While a continuous stream of SCs—mostly reinvented—appears in the literature, there is also substantial convergence on an existing framework (Brundiers et al., 2021; Eberz et al., 2023; Frank, 2021; Redman & Wiek, 2021), namely, Wiek et al.'s 2011 paper titled, *Key competencies in sustainability: A reference framework for academic program development*.

3.7. SC Framework, Version 1.0

The 2011 framework is a synthesis of the literature up to 2011 and recommends five key competencies: systems-thinking, anticipatory, normative, strategic, and interpersonal competence. This framework has received the most citations by far of any similarly focused research and has been recognized as “the most influential paper” in a bibliometric review of ESD research from 1992 to 2018 (Grosseck et al., 2019, p 26). The framework has also been applied in research interviews (Eberz, 2023) and as a guide for students working with the 2015 SDGs (UNESCO, 2017). Its status as a leading work continues with the updated and even more comprehensive version of the framework released by Redman and Wiek in 2021, *Competencies for Advancing Transformations Towards Sustainability*. We refer to this newer framework as *Version 2.0*.

3.8. SC Framework, Version 2.0

In 2021, two of the authors of the first SC framework (Version 1.0) updated and expanded the 2011 paper. Redman and Wiek (2021) conducted a systematic review relevant to ESD and sustainability and found a high level of convergence in the SCs put forward by various scholars over the previous decades (1997-2021). Therefore, even though a number of scholars continue to focus on inventing and reinventing competencies, there is evidence of a cooperative effort among scholars as early as the 2011 paper.

In the new version, the authors expand on the five key competencies presented in 2011, adding three new competencies based on their synthesis of studies done since 2011: intra-personal, implementation, and integration competence. The 2021 competencies are displayed in Table 1.

3.9. From Convergence to Agreement

Scholars have demonstrated their unity in various ways: contributing to each of the competencies (see Table 2), making statements in support of the work of Wiek and colleagues in the literature, and applying both frameworks in academic and practitioner environments (Annelin & Boström, 2023; Brundiens et al., 2021; Eberz et al., 2021; Evans, 2019).

Table 2. Sustainability Competencies and Convergence.

SC COMPETENCY	AUTHORS CONTRIBUTING TO SC FRAMEWORK (RESEARCH AND DEVELOPMENT)
Systems-thinking	Connell et al., 2012; Sandri, 2013; Gray, 2018; Levy et al., 2018; Schuler et al., 2018; Mahaffy et al., 2019
Futures-thinking	Withycombe, 2010; Gardiner and Rieckmann, 2015; Ojala, 2017
Values-thinking	Remington-Doucette et al., 2014; Verma et al., 2016; Komasinkski and Ishimura, 2017
Strategies-thinking	de Haan, 2006; Wesselink et al., 2015; Fukushima et al., 2017
Implementation	de Haan, 2006; Perez Salgado et al., 2018; Schank and Rieckmann, 2019
Inter-personal	Ulrich, 2016; Brundiens and Wiek, 2017; Sarpin et al., 2018
Intra-personal	Glasser, 2016; Lozano et al., 2017; Giangrande et al., 2019
Integration	Jegstad and Sinnes, 2015; Hull et al., 2016; Wiek et al., 2016

Note: The information in this table was derived from Redman and Wiek, 2021, p. 6.

Convergence tends to approximate agreement in the narratives of recent scholarly papers, specifically Evans (2019), Brundiens et al. (2021), Eberz et al. (2023), and Annelin & Boström (2023). Each of these authors selected the framework of Wiek et al. (2011) or the more recent framework of Redman and Wiek (2021) as foundational for their studies. These studies demonstrate the broad application of the framework, as authors have applied it successfully in sustainability program development (Brundiens et al., 2021), in the pairing of pedagogies to specific competencies (Evans, 2019), as an application with decision-makers in a variety of fields (Eberz et al., 2023), and with the development of assessment tools to measure students’ sustainability competence.

3.10. Readiness of HEIs to Adopt New Competencies

A second key reason for the delay concerns the process of implementing and integrating new SCs into HEIs and in this case, business schools. Like other HEIs, business schools have been slow to make changes to the curriculum, and the systems and structures that are needed to support sustainability (Abdelgaffar, 2020; Bagley, 2020; Tavanti, 2022). Current accounts of ESD in business schools show that a number of schools have included sustainability and/or ethics courses in management programmes, but there is a lack of coordination and courses tend to be unique or stand-alone instead of integrated across the discipline (Singh & Segatto, 2020). Bates et al. (2022) noted that an issue as simple as understanding concepts, like competence and sustainability, may be slowing progress within and across disciplines.

There is some progress. An increasing number of universities have begun to participate in THE Impact Rankings (2023). While this is encouraging, there are many universities, especially high-ranking schools, that have yet to become involved. Furthermore, some controversy has risen regarding how effectively the university results address the SDGs as the same schools continue to be slow to adopt sustainability principles and practices in any profound way (Bautista-Puig et al., 2022; Weybrecht, 2022).

HEIs have been vested with the responsibility to teach sustainability internally and to share their knowledge with businesses and the community (Kestin et al., 2017; Sanchez-Carrill et al., 2021). However, the tendency has been to focus sustainability efforts on environmental concerns rather than assessing internal structures that support sustainability, being more involved in societal issues, or developing strategies to engage and collaborate more effectively with communities, businesses, and other institutions (Sanchez-Carrillo et al., 2021).

4. Why Focus on Business Schools?

Business plays a crucial role in society and large businesses—like corporations—influence our daily lives (Belinchón & Moynihan, 2018). Business schools are responsible for preparing future managers and leaders who will be called upon to make wide-ranging decisions that impact not only business but the environment and society as well. Too often businesses have failed to honour their discretionary responsibilities to society and the environment, resulting in calls to overhaul mainstream ME to promote more responsible behaviour and sustainable corporate practices (Abdelgaffar, 2020).

Curiously, business schools and educators used to prepare students for challenges related to business AND society but by the mid-1980s, they narrowed their focus to maximizing profits for shareholders. As delivering shareholder value became the singular purpose of business, business schools adapted to the change (Bagley et al., 2020; McDonald, 2017). Currently, even when business programmes include courses that discuss stakeholder theory as an alternative paradigm, the lack of integration across the discipline tends to be more confusing than enlightening to students. If the behaviour of corporate managers and leaders is to change, the process must begin in the educational system (Bagley et al., 2020).

4.1. Societal Feedback

Annual global surveys of trust and credibility in institutions have continued to indicate that people want more engagement from businesses, particularly around societal issues like climate change and economic inequality (Edelman, 2023). Business schools can kickstart the change in curricula for all HEIs by offering new competencies to students who will become the corporate leaders of tomorrow and integrating sustainability concepts across the discipline.

4.2. Business Schools Need Transformative Change

Business schools continue to use a teaching model for ME that dates back to the late 1950s (Tufano, 2020). As the demands for businesses to be more involved with complex societal issues continue to grow, business schools are becoming dated (Bagley, 2020; Roller, 2022; Tufano, 2020).

Consider for example, that in 2019 the Business Roundtable changed its long-standing commitment to maximizing shareholder value to stakeholder capitalism (Roller, 2022). The competencies that align with the shareholder approach are cognitive/intellectual, not personal/emotional. Students become experts at analyzing, evaluating, and assessing, but lack inter-/intra-personal qualities that generate empathy and collaboration (Sanchez-Carrillo et al., 2021). The slow pace of change in curricula and pedagogy means that students are increasingly ill-prepared for sustainability and other complex challenges they will face in the real world (Aung & Hallinger, 2022; Leal Filho, 2020).

4.3. Urgency Has Been Growing

The state of the world has greatly changed, with an increasing number of societal issues that need solutions (Tufano, 2020). The pressure on business schools to change has been increasing as well, given the need for new knowledge and skills to solve complex issues (Killion et al., 2022; Marathe et al., 2020; Roller, 2022; Tufano, 2020). Students are changing, too. Younger generations of students are demanding new systems and programmes that emphasize different mindsets and competencies, especially competencies relevant to sustainability values and social responsibility (Bratianu et al., 2020 as cited in Tavani et al., 2022). Educators and administrators must understand the urgency of being competent in multiple areas that have not been emphasized in business school programmes to date (Singh & Segatto, 2020; Tufano, 2020).

5. Discussion

The research question for this study focussed on determining the state of SCs and understanding the lack of progress in integrating these competencies into business schools. Business schools have a moral obligation to provide the best learning for the needs of the time (Aung & Hallinger, 2022). Should they agree to the challenge of integrating SCs, business schools can set the pace for transformational change across all HEIs.

While an impasse still exists in the literature regarding advancing SCs in HE curricula (Aung & Hallinger, 2022; Bates et al., 2022; Dzhengiz & Niesten, 2020; Gómez-Olmedo et al., 2020; Munn et al., 2018; Sanchez-Carrillo et al., 2021), there is clear evidence that numerous scholars and practitioners have converged around a particular framework, using it as a foundation and guide for their work (Annelin & Boström, 2022; Brundiens et al., 2021; Eberz et al., 2023; Evans, 2019; McCarthy and Eagle, 2021; Redman & Wiek, 2021).

Our objective in this discussion is to take the next step and address integration, the second problem to be overcome. As no high-level policy has been announced to date (Mochizuki, 2016) and no guidance is included in SDG-4 (4.7) which calls for global ESD (Redman & Wiek, 2021), we offer some suggestions for overcoming the slow progress in integrating SCs in business schools, should agreement to move forward be decided. Again, while we focus on business schools and ME, the application to all HEIs is expected to follow.

6. Proceeding with Implementation

A number of scholars believe sustainability adoption has had sufficient time to be researched and understood and should be broadly integrated into educational programs now (Aung & Hallinger, 2022; Brundiens et al., 2021; Eberz et al., 2023; Pacis & VanWynsberghe, 2020; Redman & Wiek, 2021). We have incorporated some of the suggestions for advancing integration from select scholars and added some of our own while identifying areas where adjustments can be made to improve success.

7. Enhance Sustainability Courses

Management Education (ME) is being criticized for producing business managers and future leaders who have been involved in unsustainable and unethical business decisions and practices that have led to an ongoing list of corporate scandals (Abdelgaffar, 2020). More sustainability courses should be added to ME and an integrated approach must be advanced across the discipline. The more

visible sustainability is throughout the institution, the more it will be seen as legitimate. Moreover, studies have demonstrated that students are better prepared when sustainability is embedded in their everyday coursework and in a way that is useful and relevant to them (Weybrecht, 2017).

8. Provide Educator Supports

It is imperative that we continue to build educators' capacity to be successful in teaching students about sustainability (Pacis & VanWynsberghe, 2020). There is growing acceptance of the competencies that educators should possess and the pedagogies to employ, but a deficit can still be observed in terms of educators' capacity to teach students about sustainability (Aung & Hallinger, 2022; Redman et al., 2021; Weybrecht, 2017). Bates et al. (2022) included the potential lack of understanding of the concept of sustainability and how to teach it as a major stumbling block for integrating ESD.

Training and development should be offered to enhance the knowledge levels and mindsets of educators. This will better prepare them for teaching students about sustainability and the competence required to be sustainability-minded professionals. Educators can learn to shift their values and understanding to a sustainability-oriented mindset and model the values and competencies that are necessary for learners to become sustainability-minded as well (Aung & Hallinger, 2022; Pacis & VanWynsberghe, 2020).

There are various supports available, including a range of competencies developed by the *Expert Group on Competences in Education for Sustainable Development*, part of a strategy released by the United Nations Economic Commission for Europe (UNECE, 2005) to promote ESD and incorporate key sustainable development themes into education systems. Also, there is a website for the OECD's (2005) *Definition and Selection of Competencies (DeSeCo) Project* which includes some of the earliest material and guidelines for competencies. More recently, the Joint Research Center (JRC) published the *European Sustainability Competence Framework (GreenComp)* to support educators and learners in understanding sustainability and SCs (Bianchi et al., 2022).

9. Continue to Evaluate and Develop Assessment Tools

Students' readiness to understand and master the new competencies and their success in acquiring the competencies is another area of sustainability education that continues to develop. A systematic review by Redman et al. (2021) provides guidance for educators interested in knowing more about assessing students' competencies in sustainability. The authors provide an overview of over 120 assessment tools currently in use and organize them into eight categories: scaled self-assessment, reflective writing, scenario/case test, focus group/interview, performance observation, concept mapping, conventional test, and regular coursework. Researchers and scholars can help by generating more evidence about what works best in practice so assessment tools can continue to improve.

9.1. Internal and External Engagement

Educators should expand their influence in the community, engaging with businesses and other stakeholders on ESD and the relevance of SCs in educational programmes (Bagley, 2020).

9.2. Business Engagement

Business must be onside if the change is to be successful. Research indicates that while businesspeople may acknowledge the importance of SCs and be aware that sustainability is relevant for businesses to succeed, they may be less supportive of changing the curricula (McCarthy & Eagle, 2021). By expanding sustainability teachings to the community and to the businesses that may employ graduating students, there is an opportunity to demonstrate the benefits of changing the curricula. For example, Dzhengiz and Niesten (2020) found that offering sustainability training to current management teams in the corporate world can help them develop responsible competencies that have a positive effect on their overall performance. Another study by Haney et al. (2020) showed

how sustainability education can be practical and effective for the corporate world when sustainability is made personal for participants. The training focused on leading change for sustainability and developing or honing SCs that helped them meet challenges related to sustainability and other complex problems that affected them.

9.3. Community Engagement

HEIs have an ethical responsibility and moral obligation to support and promote sustainability throughout their communities and globally (Farner, 2019 as cited in Aung & Hallinger, 2022). As business schools integrate SCs and build sustainability into the curriculum, a key follow-up task is to reinforce a positive relationship with society. The benefits can be considerable, as engagement with external stakeholders promotes business continuity and corporate sustainability and may even encourage community development that fosters sustainability (Kantabutra, 2019 as cited in Aung & Hallinger, 2022).

10. Implications and Limitations

The focus of the paper is on business schools so they can lead the transformation process that is necessary for all HEIs. This is a strategy, on our part, to kickstart change within a discipline that has been subject to continuous demands to change the way students are educated (Aung & Hallinger, 2022; Leal Filho, 2020). Eventually, all HEIs should proceed with a full transformation.

Business schools are responsible for preparing future managers and leaders who will make decisions that affect not just the financial system, but also communities and the environment. However, businesses have often ignored their responsibilities to the broader society, causing harm to communities and the environment. The urgency for change in management behaviour has been growing within society, and the education system is where change can have substantial positive effects. Integrating SCs into mainstream ME makes it possible to foster management behaviour that is more ethical, responsible and sustainability-minded (Abdelgaffar, 2020). Business graduates will be better equipped to work effectively with stakeholders and more open to sharing responsibility for sustainability and other complex societal issues.

11. Conclusions

We live in uncertain times, with numerous complex issues needing urgent attention and a changing world order that threatens our sustainability on multiple levels (Bates et al., 2022; Risopoulos-Pichler et al., 2020; Weber, 2021; WEP, 2022). As we continue to recover from a deadly pandemic, we must make the time and space to consider how we educate future corporate managers and leaders in business programmes.

In this paper, we explored the state of the literature regarding competencies for dealing with sustainability, the SDGs, and other complex world problems. We wanted to understand the lack of progress in integrating SCs into HEI curricula. While all HEIs can and should be involved in the integration of SCs in curricula we selected business schools as the potential change agents, given the role of business in the world and societal demands for better business behaviour and more involvement in global issues.

Business schools need to change their approach to ME if they are to develop more responsible managers and future leaders. Graduates of business schools are destined to be involved in operations and negotiations that impact the economy, environment, and communities. Mastering SCs that broaden mindsets and build personal/emotional skills will help balance management decisions and enrich stakeholder relationships, much needed qualities for effectively addressing sustainability and other complex issues today (Eberz, 2023).

However, while an important goal within the 2015 SDGs, no policy decision or action plan to integrate SCs into HEIs has been forthcoming. Much of the impasse is related to a persistent theme in the literature that points to a lack of agreement around the competencies to be selected. Despite

this interpretation, our scoping review provided evidence of substantial scholarly convergence around the SC framework first developed by Wiek et al. (2011) and updated in 2021.

Our review also identified key barriers that could stall integration in the institutions, prompting us to explore possible solutions and approaches that could overcome these issues. Finally, we demonstrated how incorporating SCs into management development can assist both new and current managers to better understand and address the SDGs and other complex issues. Their enriched capacity could then lead to progress being made on multiple SDGs, given the interconnectivity of goals and potential solutions.

SCs impart the core values, knowledge, and skills needed for the complex world we live in now (Muff et al., 2020). Integrating them into ME fosters a new breed of business graduate who is more likely to support and promote sustainability and be better prepared to address other complex real-world issues that they will face. On a strategic level, taking the lead on integrating SCs in ME provides business schools with an opportunity to honour a long-standing but discounted commitment to deliver graduates whose responsibility is to both business and society. They could also contribute to significant SDG progress and kickstart the much-needed ESD transformation in HEIs around the world.

References

1. Anderson, M. H., & Sun, P. Y. T. (2017). Reviewing leadership styles: Overlaps and the need for a new 'full range' theory. *International Journal of Management Reviews*, 19(1), 76–96. <https://doi.org/10.1111/ijmr.12082>
2. Annelin, A., & Boström, G.-O. (2023). An assessment of key sustainability competencies: a review of scales and propositions for validation. *International Journal of Sustainability in Higher Education*, 24(9), 53–69. <https://doi.org/10.1108/IJSHE-05-2022-0166>
3. Arksey, H., & O'Malley, L. (2005). Scoping Studies: Towards a methodological framework. *International Journal of Social Research Methodology: Theory & Practice*, 8(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
4. Aung, P. N., & Hallinger, P. (2022). Research on sustainability leadership in higher education: a scoping review. *International Journal of Sustainability in Higher Education*, 24(3), 517–534. <https://doi.org/10.1108/IJSHE-09-2021-0367>
5. Bagley, C. E., Sulkowski, A. J., Nelson, J. S., Waddock, S., & Shrivastava, P. (2020). A path to developing more insightful business school graduates: A systems-based, experimental approach to integrating law, strategy, and sustainability. *Academy of Management Learning & Education*, 19(4), 541–568. <http://10.0.21.89/amle.2018.0036>
6. Bates, R., Brenner, B., Schmid, E., Steiner, G., & Vogel, S. (2022). Towards meta-competences in higher education for tackling complex real-world problems – a cross disciplinary review. In *International Journal of Sustainability in Higher Education* (Vol. 23, Issue 8, pp. 290–308). Emerald Publishing. <https://doi.org/10.1108/IJSHE-06-2021-0243>
7. Bautista-Puig, N., Orduña-Malea, E., & Perez-Esparrells, C. (2022). Enhancing sustainable development goals or promoting universities? An analysis of the Times Higher Education Impact Rankings. *International Journal of Sustainability in Higher Education*, 23(8), 211–231. <https://doi.org/10.1108/IJSHE-07-2021-0309>
8. Belinchón, F., & Moynihan, R. (2018). 25 giant companies that are bigger than entire countries. *Business Insider España*. <https://www.businessinsider.com/25-giant-companies-that-earn-more-than-entire-countries-2018-7>
9. Bianchi, G., Pisiotis, U., & Cabrera Giraldez, M. (2022). GreenComp: The European sustainability competence framework, Punie, Y. and Bacigalupo, M.(Eds.). Luxembourg. <https://doi.org/https://dx.doi.org/10.2760/13286>
10. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. <https://doi.org/10.1191/1478088706qp0630a>
11. Brundiars, K., Barth, M., Cebrián, G., Cohen, M., Diaz, L., Doucette-Remington, S., Dripps, W., Habron, G., Harré, N., Jarchow, M., Losch, K., Michel, J., Mochizuki, Y., Rieckmann, M., Parnell, R., Walker, P., & Zint, M. (2021). Key competencies in sustainability in higher education—toward an agreed-upon reference framework. *Sustainability Science*, 16(1), 13–29. <https://doi.org/10.1007/s11625-020-00838-2>
12. Brundtland Commission. (1987). Our common future. <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>
13. Caldana, A. C. F., Eustachio, J. H. P. P., Lespinasse Sampaio, B., Gianotto, M. L., Talarico, A. C., & Batalhão, A. C. da S. (2021). A hybrid approach to sustainable development competencies: the role of formal, informal

- and non-formal learning experiences. *International Journal of Sustainability in Higher Education*, ahead-of-p(ahead-of-print). <https://doi.org/10.1108/IJSHE-10-2020-0420>
14. Crick, R. (2008). Key Competencies for Education in a European Context: narratives of accountability or care. *European Educational Research Journal*, 7. <https://doi.org/10.2304/eej.2008.7.3.311>
 15. Dzhengiz, T., & Niesten, E. (2020). Competences for environmental sustainability: A systematic review on the impact of absorptive capacity and capabilities. *Journal of Business Ethics*, 162(4), 881–906. <https://doi.org/https://doi.org/10.1007/s10551-019-04360-z>
 16. Eberz, S., Lang, S., Breitenmoser, P., & Niebert, K. (2023). Taking the lead into sustainability: Decision makers' competencies for a greener future. *Sustainability*, 15(6), 4986. <https://doi.org/10.3390/su15064986>
 17. Edelman Trust Barometer. (2023). Global report. <https://www.edelman.com/trust/2023/trust-barometer>
 18. Evans, T. (2019). Competencies and pedagogies for sustainability education: A roadmap for sustainability studies program development in colleges and universities. *Sustainability*, 11, 5526. <https://doi.org/10.3390/su11195526>
 19. Frank, P. (2021). A proposal of personal competencies for sustainable consumption. *International Journal of Sustainability in Higher Education*, 22(6), 1225–1245. <https://doi.org/http://dx.doi.org/10.1108/IJSHE-01-2020-0027>
 20. Filho, N. de P. A., Hino, M. C., & Beuter, B. S. P. (2019). Including SDGs in the education of globally responsible leaders. *International Journal of Sustainability in Higher Education*, 20(5), 856–870. <https://doi.org/http://dx.doi.org/10.1108/IJSHE-01-2019-0032>
 21. Gómez-Olmedo, A. M., Valor, C., & Carrero, I. (2020). Mindfulness in education for sustainable development to nurture socioemotional competencies: A systematic review and meta-analysis. *Environmental Education Research*, 26(11), 1527–1555. <https://doi.org/10.1080/13504622.2020.1777264>
 22. Griswold, W. (2022). "We can't wait anymore:" Young professionals engaging in education for sustainability. *Adult Education Quarterly*, 72(2), 197–215. <http://10.0.4.153/07417136211044153>
 23. Grosseck, G., Țiru, L. G., & Bran, R. A. (2019). Education for sustainable development: Evolution and perspectives: A bibliometric review of research, 1992–2018. *Sustainability*, 11(21), 6136. <https://doi.org/10.3390/su11216136>
 24. Kestin, T., Lumbreras, J., & Puch, M. C. (2017). Getting started with the SDGs in universities: A guide for universities, higher education institutions, and the academic sector. Sustainable Development Solutions Network (SDSN). https://resources.unsdsn.org/accelerating-education-for-the-sdgs-in-universities-a-guide-for-universities-colleges-and-tertiary-and-higher-education-institutions?_ga=2.261400526.272020531.1620857304-379500870.1620857304
 25. Haney, A. B., Pope, J., & Arden, Z. (2020). Making It Personal: Developing Sustainability Leaders in Business. *Organization & Environment*, 33(2), 155–174. <https://doi.org/10.1177/1086026618806201>
 26. Kassel, K., Rimanoczy, I., & Mitchell, S. (2016). The sustainable mindset: Connecting being, thinking, and doing in management education. *Academy of Management Proceedings*, 2016, 16659. <https://doi.org/10.5465/AMBPP.2016.16659abstract>
 27. Killion, A. K., Ostrow Michel, J., & Hawes, J. K. (2022). Toward identifying sustainability leadership competencies: Insights from mapping a graduate sustainability education curriculum. *Sustainability*, 14(10). <https://doi.org/10.3390/su14105811>
 28. Leal Filho, W., Eustachio, J. H., Caldana, A. C., Will, M., Lange Salvia, A., Rampasso, I. S., Anholon, R., Platje, J., & Kovaleva, M. (2020). Sustainability leadership in higher education Institutions: An overview of challenges. *Sustainability* (12), 9. <https://doi.org/10.3390/su12093761>
 29. Leicht, A., Heiss, J., & Byun, W. J. (2018). Issues and trends in education for sustainable development. United Nations Educational, Scientific and Cultural Organization (UNESCO), UNESCO Publishing. ISBN 978-92-3-100244-1.
 30. Lozano, R., Barreiro-Gen, M., Pietikäinen, J., Gago-Cortes, C., Favi, C., Jimenez Munguia, M. T., Monus, F., Simão, J., Benayas, J., Desha, C., Bostanci, S., Djekic, I., Moneva, J. M., Sáenz, O., Awuzie, B., & Gladysz, B. (2022). Adopting sustainability competence-based education in academic disciplines: Insights from 13 higher education institutions. *Sustainable Development*, 30(4), 620–635. <https://doi.org/10.1002/sd.2253>
 31. Marathe, G. M., Dutta, T., & Kundu, S. (2020). Is management education preparing future leaders for sustainable business?: Opening minds but not hearts. *International Journal of Sustainability in Higher Education*, 21(2), 372–392. <https://doi.org/10.1108/IJSHE-02-2019-0090>
 32. McCarthy, B., & Eagle, L. (2021). Are the sustainability-oriented skills and competencies of business graduates meeting or missing employers' needs? Perspectives of regional employers. *Australian Journal of Environmental Education*, 37(3), 326–343. <https://doi.org/10.1017/aee.2021.11>
 33. McDonald, D. (2017). The Golden Passport: Harvard Business School, the limits of capitalism, and the moral failure of the MBA elite. Harper Business. <https://doi.org/10.3166/rfg.2017.00146>
 34. Metcalf, L., & Benn, S. (2013). Leadership for sustainability: An evolution of leadership ability. *Journal of Business Ethics*, 112, 369–384. <https://doi.org/10.1007/s10551-012-1278-6>

35. Mihas, P. (2023). Qualitative research methods: approaches to qualitative data analysis. In *International Encyclopedia of Education*, 4th ed., 302–313. <https://doi.org/https://doi.org/10.1016/B978-0-12-818630-5.11029-2>
36. Miska, C., & Mendenhall, M. E. (2018). Responsible leadership: A mapping of extant research and future directions. *Journal of Business Ethics*, 148(1), 117–134. <https://doi.org/10.1007/s10551-015-2999-0>
37. Mochizuki, Y. (2016). Educating for transforming our world: Revisiting international debates surrounding education for sustainable development. *Current Issues in Comparative Education*, 19(1), 109–125. <https://eric.ed.gov/?id=EJ1128155>
38. Montiel, I.; Gallo, P. J.; & Antolin-Lopez, R. (2020). What on earth should managers learn about corporate sustainability? A threshold concept approach. *Journal of Business Ethics*, 162 (4), 857–880. <https://doi.org/10.1007/s10551-019-04361-y>
39. Muff, K., Liechti, A., & Dyllick, T. (2020). How to apply responsible leadership theory in practice: A competency tool to collaborate on the sustainable development goals. *Corporate Social Responsibility & Environmental Management*, 27(5), 2254–2274.
40. Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1). <https://doi.org/10.1186/s12874-018-0611-x>
41. OECD. (2005) Executive Summary: Definition and selection of competencies (DeSeCo). <https://www.deseco.ch/bfs/deseco/en/index/02.html> Accessed: June 2023.
42. Pacis, M., & VanWynsberghe, R. (2020). Key sustainability competencies for education for sustainability: Creating a living, learning and adaptive tool for widespread use. *International Journal of Sustainability in Higher Education*, 21(3), 575–592. <https://doi.org/10.1108/IJSHE-12-2018-0234>
43. Peters, M. D. J., Godfrey, C., McInerney, P., Baldini Soares, C., Khalil, H., & Parker, D. (2017). Scoping reviews. In E. Aromataris & Z. Munn (Eds.), *Joanna Briggs Institute Reviewer's Manual*. <https://reviewersmanual.joannabriggs.org/>
44. Redman, A., & Wiek, A. (2021). Competencies for advancing transformations towards sustainability. In *Frontiers in Education* (Vol. 6). Frontiers Media S.A. <https://doi.org/10.3389/feduc.2021.785163>
45. Redman, A., Wiek, A., & Barth, M. (2021). Current practice of assessing students' sustainability competencies: A review of tools. *Sustainability Science*, 16(1), 117–135. <http://0-search.ebscohost.com.aupac.lib.athabascau.ca/login.aspx?direct=true&db=edb&AN=147967938&site=eds-live>
46. Rimanczy, I., & Klingenberg, B. (2021). The sustainability mindset indicator: A personal development tool. *Journal of Management for Global Sustainability*, 9(1), 43–79. <https://doi.org/10.13185/jm2021.09103>
47. Risopoulos-Pichler, F., Daghofer, F., & Steiner, G. (2020). Competences for solving complex problems: A cross-sectional survey on higher education for sustainability learning and transdisciplinarity. *Sustainability*, 12, (15). <https://doi.org/10.3390/su12156016>
48. Roller, R. H. (2022). Finance and business ethics in an era of stakeholder capitalism. *Journal of Education for Business*, 97(7), 490–496. <https://doi.org/10.1080/08832323.2021.1997883>
49. Rychen, D. S. (2019). Alignment with OECD Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo) Project. https://www.oecd.org/education/2030-project/teaching-and-learning/learning/transformational-competencies/Thought_leader_written_statement_Rychen.pdf
50. Rychen, D. S., & Salganik, L. H. (Eds.). (2001). *Definition and selection of competencies—Theoretical and conceptual foundations*. Hogrefe & Huber Publishers.
51. Sanchez-Carrillo, J. C., Cadarso, M. A., & Tobarra, M. A. (2021). Embracing higher education leadership in sustainability: A systematic review. *Journal of Cleaner Production*, 298, 126675. <https://doi.org/https://doi.org/10.1016/j.jclepro.2021.126675>
52. Singh, A. S., & Segatto, A. P. (2020). Challenges for education for sustainability in business courses. *International Journal of Sustainability in Higher Education*, 21(2), 264–280. <https://doi.org/http://dx.doi.org/10.1108/IJSHE-07-2019-0238>
53. Smith, A. M. (2019). Innovative approaches to teaching sustainable development. In W. Leal Filho (Ed.), *Encyclopedia of Sustainability in Higher Education* (pp. 954–964). Springer International Publishing. https://doi.org/10.1007/978-3-030-11352-0_18
54. Stough, T., Ceulemans, K., Lambrechts, W., & Cappuyns, V. (2018). Assessing sustainability in higher education curricula: A critical reflection on validity issues. *Journal of Cleaner Production*, 172, 4456–4466. <https://doi.org/https://doi.org/10.1016/j.jclepro.2017.02.017>
55. Tavanti, M., Sfeir-Younis, A., & Wilp, E. A. (2022). Sustainability initiatives for management education: A roadmap for institutional integration. *Journal of Management for Global Sustainability*, 10(1), 87–118. <https://doi.org/10.13185/JM2022.10106>
56. Times Higher Education (THE). (2023). Impact rankings. <https://www.timeshighereducation.com/impactrankings>

57. Tufano, P. (2020). A Bolder Vision for Business Schools. *Harvard Business Review*. <https://hbr.org/2020/03/a-bolder-vision-for-business-schools>
58. United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. <https://sdgs.un.org/2030agenda/>
59. United Nations Economic Commission for Europe (UNECE). (2011). Learning for the future: Competences in education for sustainable development. <http://www.unece.org/env/welcome.html>
60. United Nations Educational, Scientific, and Cultural Organization (UNESCO). (2016). UNESCO competency framework. <https://unesdoc.unesco.org/search/92be328d-7167-4312-8487-d9ee8530ffee>
61. United Nations Educational, Scientific and Cultural Organisation (UNESCO). (2017). Education for sustainable development goals: learning objectives. UNESCO. unesdoc.unesco.org/images/0024/002474/247444e.pdf.
62. Wang, Y., Sommier, M., & Vasques, A. (2022). Sustainability education at higher education institutions: pedagogies and students' competences. *International Journal of Sustainability in Higher Education*, 23(8), 174–193. <https://doi.org/10.1108/IJSHE-11-2021-0465>
63. Weber, J. M., Lindenmeyer, C. P., Liò, P., & Lapkin, A. A. (2021). Teaching sustainability as complex systems approach: a sustainable development goals workshop. *International Journal of Sustainability in Higher Education*, 22(8), 25–41. <https://doi.org/10.1108/IJSHE-06-2020-0209>
64. Weybrecht, G. (2017). From challenge to opportunity – Management education's crucial role in sustainability and the sustainable development goals – An overview and framework. *The International Journal of Management Education*, 15(2, Part B), 84–92. <https://doi.org/https://doi.org/10.1016/j.ijme.2017.02.008>
65. Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science*, 6(2), 203–218. <https://doi.org/10.1007/s11625-011-0132-6>
66. World Economic Forum. (2022). The global risks report 2022, 17 edition. wef.ch/risks22
67. Žalėnienė, L., & Pereira, P. (2021). Higher education for sustainability: A global perspective. *Geography and Sustainability*, 2(2), 99–106. <https://doi.org/10.1016/J.GEOSUS.2021.05.001>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.