RESEARCH ARTICLE

Unlocking the potential of responsible management education through interdisciplinary approaches

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Abstract

Business schools are crucial to integrating sustainable development into management thought and practices, thereby promoting a paradigm shift toward responsible management education. Despite many business schools pledging to adopt the United Nations' Principles for Responsible Management Education, they have been criticized for failing to develop change agents toward sustainability. To fill this gap, this paper demonstrates how interdisciplinarity can be connected to responsible management education through critical and instrumental perspectives. To this end, we apply an interdisciplinarity model to 37 Principles for Responsible Management Education Schools' Reports, using content analysis, text-mining, and network theory tools. As a result, our findings suggest: (i) a taxonomy of critical and instrumental interdisciplinary studies and (ii) a framework of Principles for Responsible Management Education schools engaged in critical and instrumental interdisciplinarity. The framework we develop can serve as a diagnostic and prognostic tool for assessing how interdisciplinary can improve responsible management education in business schools. Our findings contribute to theory advancing research on the intersection of responsible management education and interdisciplinary approaches.

KEYWORDS
business school, interdisciplinary studies, principles for responsible management education, responsible management education, sustainable development

1 | INTRODUCTION

Business schools have become increasingly important and numerous since the mid-20th century. In the late 19th century, managerial education was developed by a managerial elite with the aim of training professionals for organizations in a manner similar to that of medical and law schools (Khurana, 2007). Initially, managerial education had a dual purpose of training practitioners and developing academic research, but it prioritized the former at the expense of the latter. Essentially, it focused on training personnel on the daily demands of organizations (Gosling & Mintzberg, 2004). Business schools were akin to trade schools (Bennis & O'Toole, 2005), with professors who were renowned managers but not necessarily with academic credentials.

In the 1960s, criticisms of business schools began to arise. The lack of academic rigor in the management curriculum was seen as a problem by businesses that were increasingly demanding trained managers (Bennis & O'Toole, 2005). This perception led to a reform in business schools, guided by reports from the Ford and Carnegie foundations (Pierson, 1959), and a shift in focus toward research. By the end of the 1990s, the most prominent business schools had curricula of academic excellence. However, despite their academic and market success, business schools' reforms did not build societal trustworthiness. Criticisms regarding business schools' emphasis on profits over society began to emerge, particularly after the 2008 global financial and economic crisis (Dyllick, 2015).

From a market perspective, corporate stakeholders have increasingly been calling for a rebranding of business education (Ramboarisata & Gendron, 2019), arguing that business schools can lead to a paradigm shift (Hughes et al., 2018) through their influence on future managers and leaders (Anderson et al., 2018; Muff et al., 2017). We assume that academic business education can play a strategic role in integrating sustainability in organizations (Hart, 1997) as change drivers and that it can be a nesting ground for managers who are capable of incorporating the principles of citizenship into corporations (Haertle et al., 2017).

Business schools have faced significant legitimacy challenges, with questions raised about their academic rigor and societal trustworthiness. Dyllick (2015) and Khurana (2007) highlight a pressing dual-wield conundrum known as the "tyranny of the markets" and the "tyranny of the faculty." The former underscores the immense pressure on schools to prioritize branding and pursue accreditations, which can potentially overshadow genuine knowledge development and scholarly pursuits. Meanwhile, the latter issue underscores the concern that business education often prioritizes teaching over fostering true learning, and research is perceived as an internal obligation rather than a broader societal responsibility. These legitimacy issues must be addressed as they shape the perception and relevance of business schools in the modern world. However, amidst these challenges, there is an emerging body of research advocating for the integration of sustainable development principles, addressing critical topics such as ethics and corporate social responsibility (CSR) (Mousa et al., 2020; Nwagwu, 2020; Winfield & Ndlovu, 2019).

This paper draws from a debate initiated by Gosling and Mintzberg (2004), Bennis and O'Toole (2005), and Khurana (2007) and focuses on the responsible management education (RME) path and its institutional representation: principles for responsible management education (PRME) (www.unprme.org; Hayes et al., 2017). RME is a topic that has been attracting attention in recent years (Haski-Leventhal et al., 2020; Mason & Rosenbloom, 2021; Pucciarelli & Kaplan, 2021). An emerging opinion is that business schools have "lost their way" (Bennis & O'Toole, 2005), which has generated research questions such as "Why business schools may not walk their talk?" (Rasche & Gilbert, 2015) or "Do business schools walk their talk?" (Maloni et al., 2021). Despite the growing interest, when sustainability education is addressed in the business school context, it is often limited to a CSR perspective (Hughes et al., 2018).

Our research aims to address the challenge of conceptualizing sustainability in business education, independent of, yet integrated within the realm of RME and/or CSR-based education frameworks. The incorporation of an interdisciplinary approach is paramount for effectively integrating RME principles into business schools. Evidence from recent research indicates that an interdisciplinary approach is crucial for effective RME integration in business schools. Laasch et al. (2020) highlight the importance of transdisciplinary practices in the responsible management learning field, emphasizing the need to integrate knowledge across disciplines (interdisciplinarity) and sectors (intersectorality) to address complex responsible management issues. Additionally, Alm et al. (2021) demonstrate that an interdisciplinary pedagogical approach enhances students' problem-solving competencies for sustainability-related challenges and fosters a deeper understanding of the sustainable development goals (SDGs) through systems thinking and anticipatory competencies.

By drawing on insights from scholars advocating for interdisciplinary connections, such as Klein (2010) and Weingart (2000), our study aims to bridge knowledge gaps between disciplines in business education. This approach will equip future managers with critical thinking and problem-solving skills needed to navigate the complexities of sustainability challenges in the corporate world (Gosling & Mintzberg, 2004). While business education has faced criticism for its failure to integrate siloed knowledge areas into managerial activities, our research aims to elevate the concept of interdisciplinarity, transcending traditional disciplinary boundaries, and fosters collaboration to cultivate a more holistic and forward-thinking perspective on sustainable practices (de Paula Arruda Filho, 2017; Parkes & Blewitt, 2011).

Specifically, our study aims to answer the following research question: "What type of interdisciplinarity practices are available in the Sharing Information in Progress (SIP) reports?" How can an interdisciplinary approach help integrate RME into business education? To answer this question, we draw on the instrumental approach, which focuses on problem-solving and responding to market demands (Weingart, 2000), as well as the critical perspective, which seeks to restructure academic dimensions by questioning their role and purpose (Klein, 2010).

Using a proposed model based on a review of interdisciplinarity research, we analyzed reports from the 33 PRME Champions' business schools responsible for promoting and benchmarking RME among the other signatories. We conducted a content analysis, aided by text-mining tools, to bridge two knowledge areas and contribute to the theory surrounding the RME construct. The proposed framework is a diagnostic and prognostic tool for improving business training, aligning it with RME principles in business schools.

Our work contributes to the ongoing debate regarding the role and nature of business schools (Dyllick, 2015), and whether their curriculum addresses topics of global relevance (Doherty et al., 2015; Walsh et al., 2021). Our findings offer practical guidance to business schools aiming to incorporate PRME goals and outcomes, particularly those related to sustainability, into their programs by embracing specific aspects of interdisciplinarity.

This study is divided into six sections outlining, a theoretical framework, which addresses the role of business schools and the interplay with interdisciplinarity; the methods used and the context of PRME schools; the results with graphical representations; and a discussion and conclusions on how sustainability can be embedded in core curricula and the role of PRME.

2 | THEORETICAL BACKGROUND

2.1 | The role of business schools in promoting RME through sustainable development

In recent years, the significance of sustainable development and RME in the business world has grown significantly.

Sustainable development, as defined by Brundtland (1987), entails meeting present needs without compromising future generations' ability to meet their own needs. On the other hand, RME focuses on educating business students about their social and environmental responsibilities in their future careers (Moratis & Melissen, 2022).

Business schools play a crucial role in integrating sustainable development principles into management thought and practices. As graduates of business schools become future business leaders, they have the potential to make substantial contributions to the planet's sustainability. Through education on sustainable development and RME, business schools can equip their students with the essential knowledge, skills, and values needed to foster a sustainable future (Yadav & Prakash, 2022). One of the core aspects of RME lies in its emphasis on ethical decision-making, social responsibility, and environmental stewardship, shaping future change agents dedicated to sustainability.

Recent research has focused on examining the impact of RME on business students' values, attitudes, and behavioral intentions. Drawing on socialization theory, these studies reveal that RME fosters students' self-transcendence, nurtures conservation values, and cultivates positive attitudes toward CSR (Holmes et al., 2021). Notably, RME has been found to positively influence students' CSR behavioral intentions through the mediation of values and attitudes, underlining the pivotal role of business schools in shaping students' pro-social and ethical values (Holmes et al., 2021). Moreover, by addressing the civilizational challenges of modern times, business school graduate leaders demonstrate heightened awareness of the social and environmental impacts of their decisions and actions (Khilji, 2022).

The United Nations' Principles for Responsible Management Education (UN-PRME) serve as a crucial framework that facilitates the integration of sustainable development and RME within business school curricula (Godemann et al., 2023). The UN-PRME's primary purpose is to establish a global standard for RME, with a specific focus on promoting sustainable development and responsible management practices (de Paula Arruda Filho, 2017). The adoption and implementation of the UN-PRME principles play a pivotal role in shaping a more sustainable world and addressing issues related to the legitimacy of business practices.

Business schools, as key stakeholders, hold a significant responsibility in preparing future leaders who are not only well-versed in traditional management principles but also equipped with the knowledge and values to contribute to the planet's sustainability. By integrating sustainable development and RME into their educational programs, business schools can better equip their graduates to make informed, ethically-driven decisions that take into account the broader social and environmental impacts of their actions (de Paula Arruda Filho, 2017). This approach fosters a generation of responsible leaders who are attuned to the challenges of the modern world and are committed to promoting positive social and environmental change.

Additionally, the UN-PRME framework provides a comprehensive structure that includes six essential principles: purpose, values, method, research, partnership, and dialog (Goumaa et al., 2023). These principles serve as guiding pillars for business schools worldwide, promoting a shared vision and commitment to RME and sustainable practices. As a result, numerous institutions from diverse regions, including Brazil and the Middle East, have embraced and implemented the UN-PRME framework as a means to enhance RME and contribute to a more sustainable and responsible business environment.

A study conducted by Peschl et al. (2023) sheds light on the significance of benchmarking and best practices frameworks as valuable tools to assess and enhance the performance of business schools in terms of sustainability and adherence to the PRME. Through a meticulous analysis of SIP reports from Canadian business schools and PRME Champions, the research identifies existing gaps in sustainability performance. This analytical approach provides signatories with an opportunity to benchmark their progress against global best practices, enabling them to identify areas for improvement and refine their strategies for effectively integrating sustainability principles into their academic programs.

The UN-PRME initiative serves as a pivotal force in the global transformation of management education, aiming to address corporate responsibility and sustainability comprehensively. This initiative emphasizes the ongoing commitment required from stakeholders and highlights the progress achieved by PRME signatories through their SIP reports. By providing a structured framework for responsible management practices, PRME plays a central role in promoting responsible business conduct within business schools, nurturing a culture of sustainability and ethical decision-making (Godemann et al., 2014).

Furthermore, Godemann et al. (2023) offer insights into the progress made by business schools in implementing sustainability principles through the adoption of PRME. While commendable strides have been taken in various areas, the study identifies the need for a comprehensive framework that addresses all aspects of the integration process, with an emphasis on the active involvement of stakeholders. By embracing such a comprehensive approach, business schools can conduct a thorough evaluation of their potential for change, devise well-structured transformation strategies, and augment their capacity to incorporate underrecognized dimensions of sustainability and RME. Ultimately, the amalgamation of benchmarking and best practices frameworks, combined with interdisciplinary approaches, provides business schools with a pathway to enhance their credibility, make substantial contributions to RME, and contribute significantly to sustainable development.

Many business schools have embraced the UN-PRME, successfully integrating sustainable development and RME into their academic curricula. As exemplified by some institutions, students are required to complete dedicated courses on sustainability and ethics, and certain schools offer specialized majors and concentrations with a focus on sustainability (Aaltonen & Siltaoja, 2022). Additionally, several business schools have established research centers that prioritize sustainability and foster partnerships with businesses and organizations that advocate sustainable practices. The pivotal role of sustainable development and RME in shaping a sustainable future necessitates the active involvement of business schools in educating the next generation of responsible business leaders. Frameworks like

the UN-PRME play a crucial role in guiding and supporting this transformative endeavor.

2.2 | Challenging the legitimacy of business schools: The urgent need for innovation and ethical education

Business schools present several conflicting legitimacy expectations. In the market, they are expected to be the rite of passage for soon-to-be managers that will be relevant in the business world, while at the same time, they are constantly criticized for their failures. In the world of higher education, they are seen by some as legitimate academic departments, while others dismiss them for a perceived lack of rigor and substance (Grey, 2007). These criticisms have been built over the last few years and suggest that business schools may not be preparing leaders with purposeful skills and embedding ethical norms (Bennis & O'Toole, 2005). There is an urgent call for innovation and reform of business education, as Schlegelmilch (2020) argues that the "business as usual education era" is over for business education. To stay relevant, business schools need to address concerns such as:

1. The digital paradigm shift: the rise of highly customized content and channels of communication that are mainly outside of business schools.
2. Deglobalization: the epicenter of the economic world is gradually shifting to Asia in a new Higher Education Silk Road (Kirby & Van der Wende, 2019) which influences scientific and academic exchanges, alongside movements such as Brexit and multilateral trade impasses.
3. Cash cows: legitimacy concerns always haunt business schools especially when they are embedded in a university context, there is a constant need to prove their worth as a serious academic area as opposed to an engine of revenue generation for the university.
4. "Who are we?": many business schools are still searching for their identities, mostly struggling with the tension between scientific rigor and practical relevance (Schlegelmilch, 2020, p. 2).
5. Diversity of the sector: Business schools not only compete and/or cooperate with other business schools, but also with different actors, like online learning platforms, social network learning initiatives, and corporate universities.

This study argues that blame for "extreme ethical events," could be added to the discussion. Quoting renowned business school provosts, Bennis and O'Toole (2005), point out how business students spend the majority of their time learning "how to maximize wealth" and just a small amount on developing leadership character and suggest the business education model as one of the factors in scandals such as Enron, Arthur Andersen, WorldCom, and Tyco. To these, we could add the 2008/09 subprime financial crisis (Prandini et al., 2012; Rasche & Escudero, 2009) and many recent social and environmental incidents related to poor or unethical management decisions, as well as resistance to commitments to fighting the climate crisis, such as the Paris Climate Agreement. However, it is essential to disentangle the impact of business education from other potential contributing factors. A recent empirical study of 1773 bachelor's and 501 master's students in economics and business studies suggests that university education, in general, does not significantly foster students' moral development (Hummel et al., 2018). Nevertheless, pedagogical outcomes are not always linked to pedagogical intentions: unintentional learning often occurs despite not being pedagogically structured (Bernstein & Solomon, 1999). If business schools neglect their role in (not) training leaders in a responsible management way (Rasche & Escudero, 2009), there is also no room for a unified criticism of business education that is accountable for all the "evil" companies' practices.

2.3 | Interdisciplinary approaches to enhancing RME

Interdisciplinary approaches play a crucial role in advancing sustainable development and RME within business schools. By integrating diverse disciplines like ethics, sociology, and environmental science (MacLeod & Nagatsu, 2018), these approaches foster a comprehensive understanding of RME, considering its intricate complexities. Audebrand and Pepin (2022) recommend adopting a values-based approach to address the ambiguity of incorporating "the values of global social responsibility" in business education, offering valuable guidance for implementing RME in business schools. Such an approach can empower students with the necessary knowledge and principles to become responsible and socially conscious business leaders contributing to sustainable development.

Transitioning to different interdisciplinary perspectives, among many approaches, critical and instrumental perspectives are particularly relevant in enhancing RME. Critical interdisciplinary perspectives challenge established theories and practices by questioning their underlying assumptions and power relations. This helps to challenge the dominant paradigm of economic growth and provides a more holistic view of sustainable development. On the other hand, instrumental interdisciplinary perspectives aim to use the knowledge and methods of different disciplines to solve practical problems related to sustainability. By combining critical and instrumental perspectives, business schools can develop a more comprehensive approach to RME that addresses both theoretical and practical aspects, ultimately contributing to a more sustainable future (Falcus et al., 2019; Klein, 2010).

Higher education institutions (HEIs) and business schools are goal-oriented human activity systems delineated by boundaries that facilitate their actions. In HEIs, the goals and boundaries manifest themselves in disciplines as departmental structures. Thus, they can be analyzed by their organizational and pedagogical dimensions. Cezarino and Corrêa (2019) address the fragilities of management education through a two-fold lens of business school material structure and academic variables where the dimensions are informed by theories of interdisciplinarity (Fazenda, 1994; Klein, 2010).

Despite the greater expansion of business schools in the 1960s and 1990s concomitantly with the development of interdisciplinarity studies, there is little understanding of how interdisciplinarity could inform sustainability business education. This gap reflects the mismatch observed between real-world organizations and the education received by students.

Business schools have applied interdisciplinary approaches in various ways to promote sustainable development and RME (Avelar et al., 2022). For example, some schools have created interdisciplinary courses that combine disciplines to address sustainability challenges (Annan-Diab & Molinari, 2017). Other schools have established interdisciplinary research centers that bring together researchers from different fields to collaborate on sustainability research.

The potential benefits of interdisciplinary approaches include a more comprehensive understanding of sustainability challenges, innovative solutions to sustainability problems, and the development of cross-disciplinary collaboration and communication skills However, challenges can include disciplinary boundaries and language barriers, power dynamics between disciplines, and the need for a common understanding of key concepts and frameworks (Nayak & Kayarkatte, 2022).

Management education is one of the educational pillars of many business schools, usually paired with economics and accounting. Among the many categorizations of interdisciplinarity, one could view management studies as bridge-building among disciplines that gradually developed into a new "interdisciplinary domain." (Klein, 2010). This integrative view has its analytical power and theoretical convergence on management education's place and role in the space of knowledge development.

We argue that putting business schools under the combined critical and instrumental interdisciplinarity lens demonstrates how they can improve pedagogically to fulfill their goal of meeting the professional demands of companies in a way that does not stress the environmental limits of the planet or neglect civilizational demands.

Overall, interdisciplinary approaches are crucial in advancing research on the intersection of RME and sustainable development. By integrating different disciplines, business schools can develop a more comprehensive understanding of sustainability challenges and provide practical solutions that promote responsible management practices.

3 | METHODOLOGICAL APPROACH

3.1 | Interdisciplinary model selection

In this paper, we applied an interdisciplinary model of education for sustainable development (Martins et al., 2022) (Figure 1) to a pool of the SIP reports s from business schools. The aim was to provide both a model to which business schools seeking to integrate PRME goals/ outcome around sustainability into their curricula could compare their progress/success against and then use a guidance as they, using an interdisciplinarity model, adopt practices successfully used elsewhere. The model relies on the two interdisciplinarity dimensions addressed

in the interdisciplinary taxonomy of Klein (2010). The critical interdisciplinary is strongly linked to societal needs and self-reflection toward changing educational models, disciplines, and organizations. Instrumental interdisciplinarity is also called methodological interdisciplinarity, and its primary goal is problem-solving. The two dimensions are not exclusive to each other, and there is a gradient and a level of intensity.

For the application of the model, 37 reports were analyzed using content analysis supported by text-mining tools. The content analysis looked for textual matchmaking with the categories from the model with two main results as outputs: (I) a heatmap of the sample and (II) a network graph linking responsible management principles and interdisciplinarity categories. We used Leximancer Software for text mining and Gephi for network graph building. These tools are widely used in a broad range of topics (Pucihar, 2020; Roblek et al., 2020) and are useful for dealing with heterogeneous qualitative data. The methodological flowchart of the research can be observed in Figure 2.

3.2 | Sample description and data collection

The selection of reports followed a purposeful and theoretical sampling approach (Coyne, 1997) of the PRME Champions Business Schools, which have been studied from various perspectives, including organizational change theories (Greenberg et al., 2017), ethics, and values in management education (Fougère et al., 2014). This esteemed group of Champions holds the responsibility of advancing the PRME agenda and setting a benchmark for RME in business schools.

The dataset consists of 37 institutional SIP reports submitted by PRME Champions. These reports are a mandated requirement for signatory schools and must be submitted within a 24-month timeframe. The SIP reports play a pivotal role in reaffirming the commitment of business schools to PRME Principles and highlighting their efforts in implementing responsible management practices (Godemann et al., 2014). Offering a comprehensive overview of practical actions taken by the signatory schools over the course of 24 months, these reports assess outcomes and outline specific objectives for the subsequent 24 months.

For research purposes, the SIP reports offer an invaluable resource for studying the best practices and approaches implemented by leading business schools. Scholars can analyze the reports to identify effective strategies and interventions that contribute to sustainable development and responsible management practices. Furthermore, the SIP reports can serve as a source of inspiration for other institutions, enabling knowledge sharing and fostering collaboration to achieve common sustainability goals. As valuable documentary data, SIP reports facilitate thorough research on business schools' dedication to RME and their contributions to sustainable development.

The reports were collected between February and April of 2021 and considered the most up-to-date report submitted, referring to the previous 24 months. Previous studies have used SIPs as secondary data for documental research (de Assumpção & Neto, 2020; Hervieux et al., 2017). The SIP reports serve to renew the commitment of
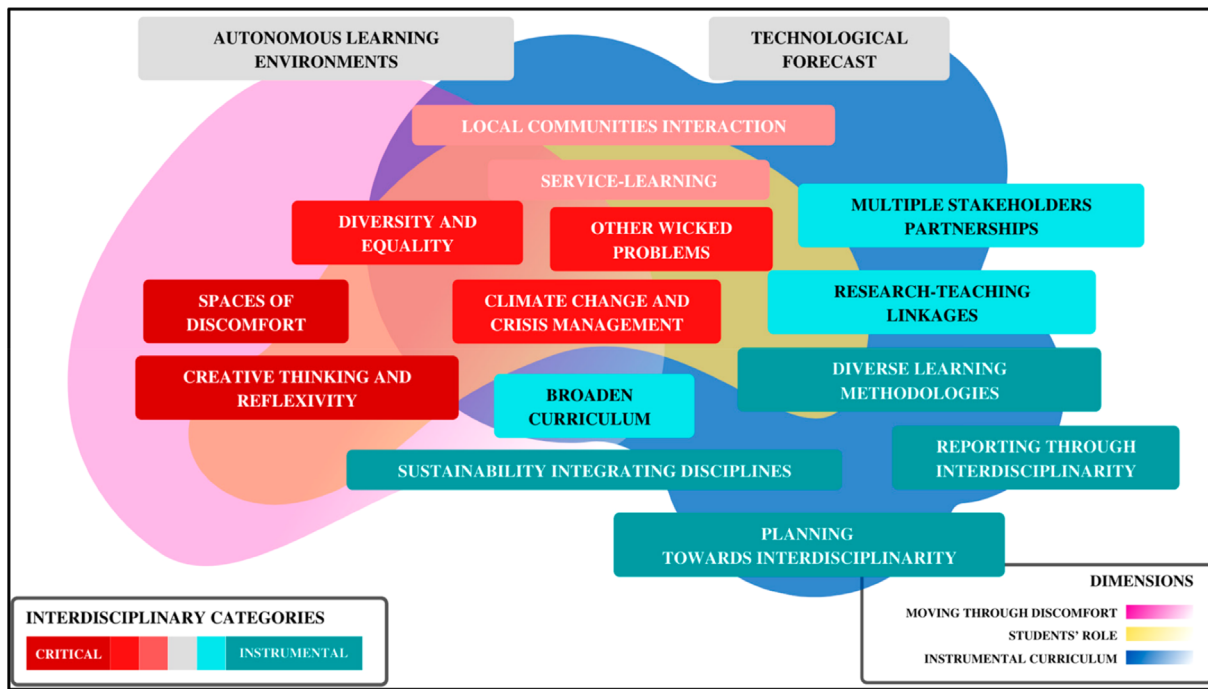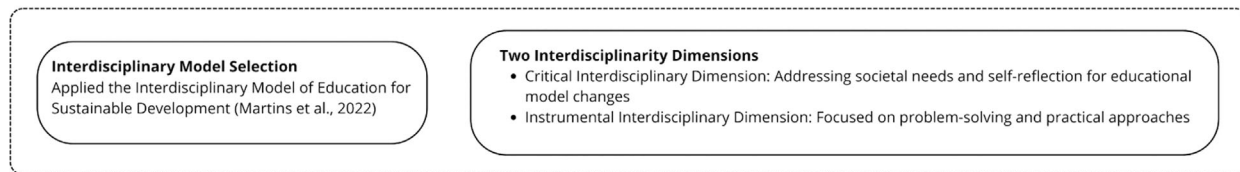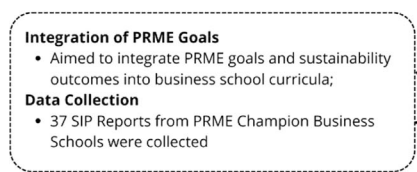
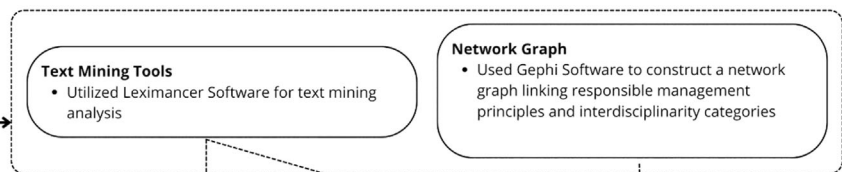**FIGURE 1**   Model for critical and instrumental interdisciplinarity. *Source*: Martins et al. (2022).

FIGURE 2   Methodological flowchart. PRME, principles for responsible management education.

business schools to the PRME Principles and showcase their efforts in implementing these principles. The reports should include a letter from the highest executive expressing commitment to PRME, a description of practical actions taken in the past 24 months, an assessment of outcomes, and specific objectives for the next 24 months. The format and methodology of the reports can vary, and they are intended as a tool for sharing and communication rather than a ranking or comparison instrument.

3.3 | Data analysis—Text mining and guided screening

The downloaded reports were analyzed with text-mining tools. Studies show that the SIP reports are creative and innovative document verifiable practices, yet, they have some inconsistency and vagueness about how the RME implementation process could be carried out (Abdelgaffar, 2021). The heterogeneity of the reports suggests it can

TABLE 1 Categories intensity level reasoning.

Intensity level	Criteria
Prominent	Category keywords are extensively present (i.e., ≥1 occurrence/page) OR The report has a dedicated section for the category (i.e., Section depicting service learning in the local community) OR Institution won a specific certification, award, or holds a chair for that category (i.e., Athena Swan Award) OR Presence of multiple events for the category (i.e., a hackathon, an artificial intelligence lecture, and a workshop on bitcoin) OR Presence of the category in different dimensions of the school (i.e., a published paper on climate tipping points + a student-led event in partnership with Fridays For Future + a community open course climate literacy)
Present	The category is noticeable in the statements as a value, a principle, or a future goal. OR The category appears in a single event/practice (i.e., a single paper published on the theme or a single workshop held)

Source: Elaborated by authors.

benefit from text-mining processing tools. The tool used here is Leximancer Sotiriadou et al., 2014), a text-mining online-based dashboard that performs keyword in context (KWIC) analysis Wilk et al., 2019). A more detailed description of how the software works can be found in Appendix I—Text-mining Tool.

3.3.1 | Data analysis: Heatmap

The content analysis of each report ranked the categories' presence according to the intensity criteria described in Table 1. The heatmap is a visual matrix between two intensity vectors: (i) Critical-interdisciplinarity gradient and (ii) Intensity of categories present in each report.

3.3.2 | Data analysis: Graph

The data analysis involved observing both the intensity and placement of categories in the report. The reports are structured to follow the six PRME principles, and we linked the categories to their corresponding principle, using Gephi software (Madan et al., 2016) to create a network graph. The principles and categories were represented as nodes and edges, respectively based on their placement within the report.

4 | RESULTS

4.1 | Reports categorization on interdisciplinary dimensions

One report comprises a unique format, resembling a law or juridic text, which was also not included in the analysis. Therefore, at the end, a total of 33 reports were considered for the categorization and mapping. The schools' practices, projects, and actions mentioned in their reports were screened and put into the 16 categories proposed in our study. The categories used in the analysis were drawn from the framework depicted in Figure 1, the "Model for critical and instrumental interdisciplinarity" by Martins et al. (2022). The schools' practices, projects, and actions mentioned in their reports were screened and classified into the 16 categories proposed in our study. To measure the intensity levels of these categories, "prominent" and "present" were used. The criteria for defining these intensity levels were adjusted during the evaluation process to ensure accuracy and consistency.

Figure 3 presents the results of the analysis, showcasing the interdisciplinarity categories and their respective intensity levels. The horizontal axis portrays the interdisciplinarity categories groupings in the "Intensity Interdisciplinarity Heatmap" (ID). The grouped bar charts display the sum of the presence and intensity of each category in the evaluated reports. The horizontal axis portrays the interdisciplinarity categories groupings ID: Intensity Interdisciplinarity Heatmap. Categories: Autonomous learning environments (I), Broader curriculum (II), Creative thinking and reflexivity (III), Spaces of discomfort (IV), Sustainability integrating disciplines (V), Diverse learning methodologies (VI), Diversity and equality (VII), Extra-class, experiential and/or service-learning (VIII), Technological Forecast (IX), Local communities interaction (X), Multiple stakeholders partnerships (XI), Planning toward interdisciplinarity (XII), Reporting through interdisciplinarity (XIII), Research-teaching linkages (XIV), Climate change and crisis management (XV), and Other wicked problems (XVI). The grouped bar charts show the sum of the presence and intensity of each one of the categories in the reports evaluated.

The majority of the categories appear in all the evaluated reports. Among the results, we highlight the categories VI and XI, "Diverse Learning Methodologies" and "Multiple stakeholders' partnerships," are the only ones that appeared in 100% of the reports—followed by categories II, "Broader curriculum" (96%), VIII, "Extra-class, experiential and/or service-learning" (96%) and XVI, "Other wicked problems" (96%). The lowest recurrent categories are the I—"Autonomous learning environments" (78%), IX—"Technological Forecast" (69%), and XIV—"Research-teaching linkages" (69%).

Regarding the intensity, the category with the most "Prominent" indicators is the VI—Diversity and equality (72%). And the ones with the lowest scores are the XIV—Research and Teaching Linkage (15%) and Technological Forecast (24%). The category IV—Spaces of discomfort (57%) is the one with higher "Presence."
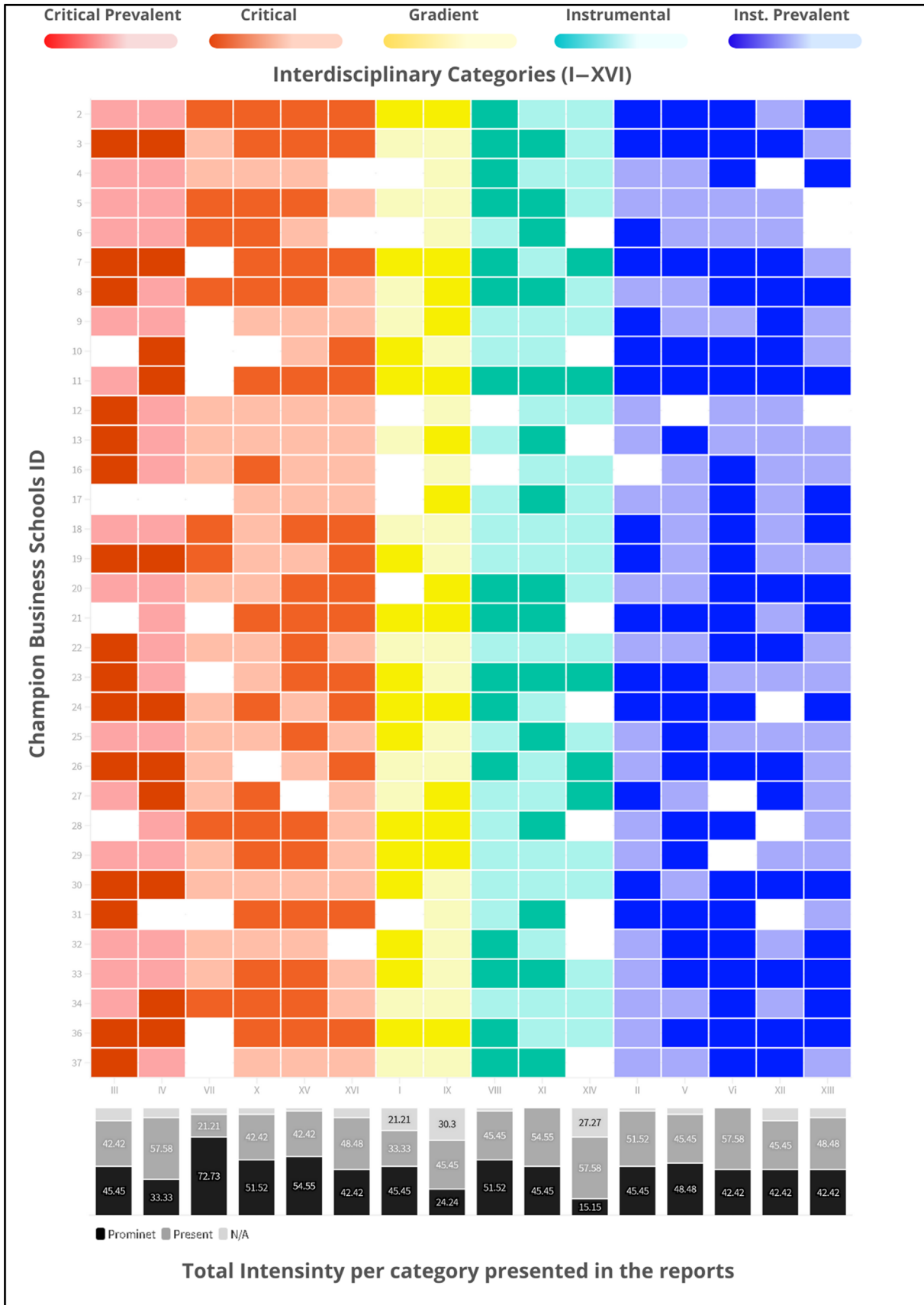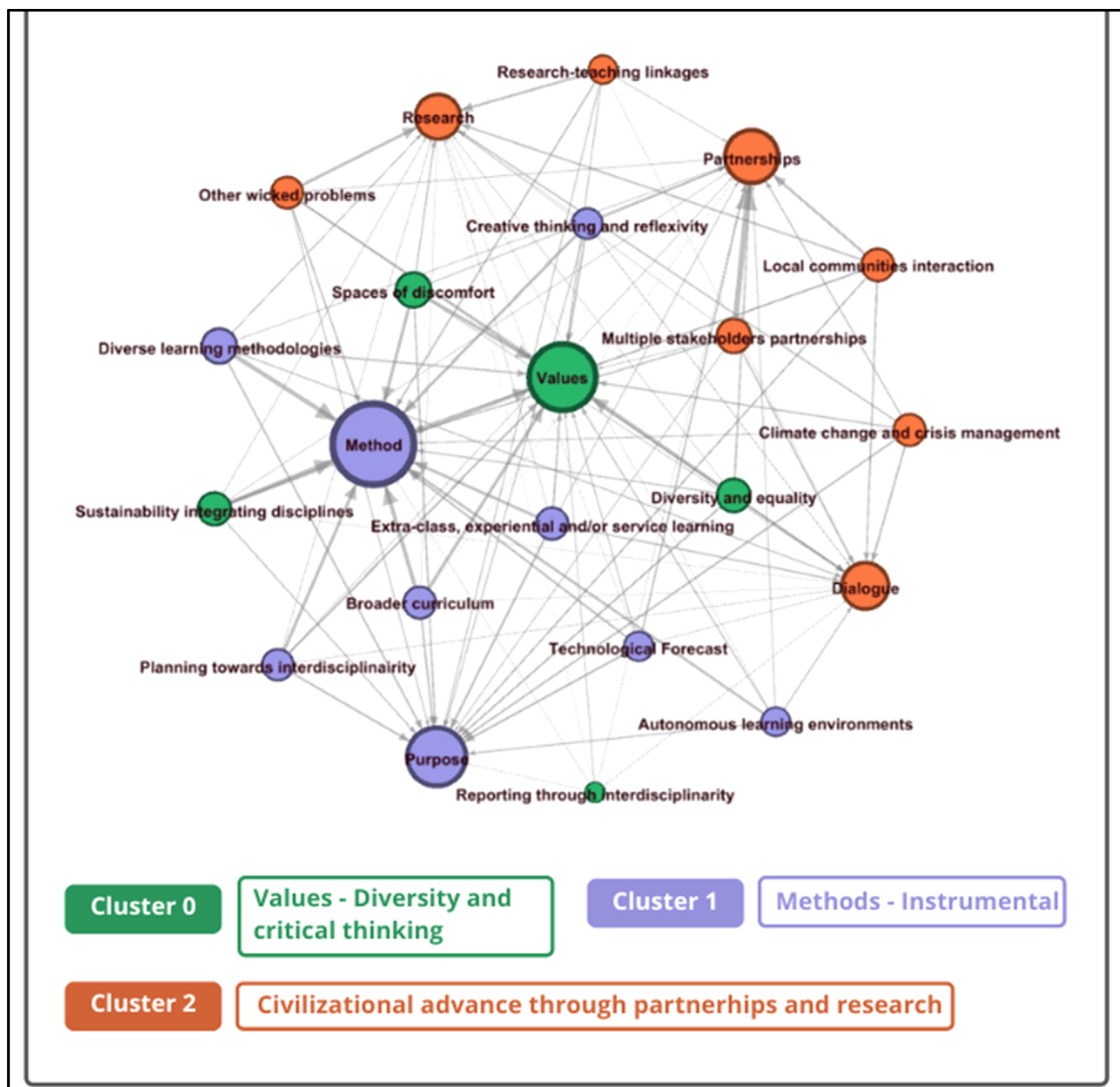
FIGURE 3 Legend on next page.

FIGURE 4 Main clusters are formed by principles and categories. *Source*: Elaborated by authors.

4.2 | PRME principles

The categories' presence was also linked with the PRME principles. Since the reports address the principles in different ways, we looked at patterns in the categorization of the activities under each principle. This information was addressed through Gephi, software for network analysis, and the results can be observed in Figure 4. The clustering analysis from modularity allows us to observe that Cluster 01 is formed mainly by the "Instrumental" label categories connected to the "Method Principle" node. The "method" node is also the one with the higher weighted grade (161), followed by "Values" (126) and

"Purpose" (106). Cluster 0 represents a transition cluster with "Values" bound to the diversity and critical thinking categories. Cluster 2 informs a community formed by the three least graded principles: Dialog, Research, and Partnerships, alongside the categories associated with wicked problems and with stakeholders' interactions.

Most schools report their progress under the dual axis of PRME Principles and SDGs. However, there is a lack of an effective way of using the SDGs', targets, or indicators as truly key performance indicators. Reports come in different forms, such as intensely visual, interactive, and textual oriented, but this does not hinder the communication utility of the documents. Some schools did not use the six principles

FIGURE 3 Intensity Interdisciplinarity Heatmap. Categories: Autonomous learning environments (I), Broader curriculum (II), Creative thinking and reflexivity (III), Spaces of discomfort (IV), Sustainability integrating disciplines (V), Diverse learning methodologies (VI), Diversity and equality (VII), Extra-class, experiential and/or service-learning (VIII), Technological Forecast (IX), Local communities interaction (X), Multiple stakeholders partnerships (XI), Planning toward interdisciplinarity (XII), Reporting through interdisciplinarity (XIII), Research-teaching linkages (XIV), Climate change and crisis management (XV), and Other wicked problems (XVI). *Source*: Elaborated by authors.

to scope the initiatives. Instead, they portray them at the beginning of the report as a foundation of the whole system.

By exploring the various approaches to implementing the PRME principles, we can gain insights into how business schools are promoting responsible and sustainable management education. Furthermore, understanding these approaches can help schools identify best practices and areas for improvement in their own implementation efforts. Many schools address Principles 1 (purpose) and 2 (values) as intrinsically bound, while Principles 5 (dialog) and 6 (partnerships) are considered as a dyad that comprises the same initiatives. This dyad perspective is identified in the report from EGADE Business School.

There is no clear definition of what the schools consider inside the frame of each principle. For example, George Mason University describes its broader curriculum dimension, with the many undergraduate thematics that are approached under the umbrella of second Principle, Values. Deakin Business School focuses on integrating SDGs explicitly in the curriculum and strengthening the nexus between sustainability capability and employability skills across core units along the third Principle, Method. The same vision is shared by Fordham University, Gabelli School of Business, and TAPAI Management Institute. IESEG School of Management, uses the SDGs to frame the initiatives, while the Six Principles are only addressed at the beginning of the report. Another example of a merging of the Six Principles is the Gordon Institute report: the school divides its report into narratives whose principles and strategic areas are interconnected so that, throughout the text, it is no longer possible to identify which principles that action is referring to.

4.2.1 | Cluster 0—Values, diversity and critical thinking

Interdisciplinarity is a key factor in achieving sustainable development education. However, the educational organization type and structure significantly impact how interdisciplinarity is tailored toward sustainability. The PRME framework's transversal nature implies that it cannot be appropriately addressed by isolated departments within an institution. As such, the same vectors that carry sustainability integration also carry the PRME principles through different institutional levels, merging with interdepartmental and interpersonal cooperation. This interdisciplinary dimension is exemplified by the Kemmy Business School's joint course with departments of Physical Education and Sport Sciences and Psychology for High-Performance Leadership. The school's approach to bringing together mental health, fitness, and nutrition shows a keen interest in a diverse curriculum.

The relevance of the organizational structure role on interdisciplinarity is also highlighted by Cezarino and Corrêa (2019), and it is identified in the content analysis of PRME reports. Copenhagen Business School, Newcastle University Business School, University of Applied Sciences of the Grisons, and Stockholm School of Economics use a seventh PRME principle to frame their reports: the "Organizational Practices" principle. These schools signal an equivalent level of attention to this dimension, highlighting the relevance of organizational practices for the whole PRME agenda. This dimension includes sustainable campuses, sustainable buildings, campuses working as living labs, or testbeds for sustainability, certifications for sustainability, green procurement practices, and circular economy approaches inside the campus.

Moreover, the Newcastle report stresses that this is a way for schools to "walk their talk" and embed sustainability in their operations. The decoupling effect is a major fault line in management education, and the signaling of organizational commitment reverberates and overextends the structure dimension into the direction of academic outcomes. Thus, being part of a parent organization impacts interdisciplinarity and facilitates the widening of curricula. A business school inside a university structure can facilitate closer contact and an administrative bond with different knowledge areas. This way, interdisciplinarity can be better tailored toward sustainability, ultimately resulting in more effective education.

The organizational structure of a business school impacts interdisciplinarity and sustainability integration in education. The PRME framework's seventh principle of "Organizational Practices" highlights the relevance of this dimension for the whole agenda. Schools that embed sustainability in their operations "walk their talk" and signal their organizational commitment, ultimately leading to better academic outcomes. Therefore, the development of a diverse curriculum and interdisciplinary cooperation are essential components in achieving sustainable development education.

4.2.2 | Cluster 1—Methods—Instrumental

This study analyzed 33 champion schools and found that 16 are part of a university structure, while 17 are standalone business schools. The broadening of the curriculum is a prevalent category among the reports evaluated, appearing in 90% of them, but with low prominence in 33%. In general, the reports mention courses that aim to foster sustainability through interdisciplinarity, but often end up being the usual CSR and Business Ethics courses.

However, there are some exceptions. For example, George Mason University offers 14 undergraduate and 12 graduate courses addressing sustainability and emphasizes its five liberal-arts-based courses called "Foundations," which introduce students to the social, global, professional, historical, and legal contexts of business.

One significant difference noticed is whether these courses are mandatory or optional. Many schools offer sustainability courses or disciplines that are not essential for completing the business curricula. However, schools like Hanken School of Economics take a solid approach by making the "Global Competences" module mandatory for second-year master's students. Similarly, Stockholm School of Economics increased the sustainability presence in its core curriculum by 20% through its "Global Challenges Track" and by putting sustainability as one of the four pillars in its curricular and pedagogical planning, alongside core management disciplines of finance, retailing, and innovation.

This highlights the importance of mandatory sustainability education in business schools and the need to integrate sustainability across the core curriculum. By doing so, schools can move beyond the usual CSR and Business Ethics courses and create a more comprehensive education on sustainability that prepares students for the challenges of a rapidly changing world. The integration of sustainability into core courses could also lead to more interdisciplinary and integrated teaching, further enhancing students' learning experiences.

Overall, these findings underscore the need for business schools to take a more holistic approach to sustainability education, moving beyond optional courses and embracing sustainability as an integral part of their curricula. By doing so, they can prepare students for the changing needs of society and the business world.

4.2.3 | Cluster 2—Civilizational advance through partnerships and research

PRME can foster interdisciplinarity along two dimensions. First, the structure of PRME, which consists of six principles, inherently promotes an interdisciplinary approach to education. Second, the partnerships that the PRME network provides offer an opportunity to connect with educators from diverse backgrounds, facilitating cooperation between stakeholders. To avoid siloed knowledge areas, schools often seek expertise from neighboring colleges or beyond, resulting in a strong interplay between PRME and stakeholders.

Partnerships facilitated by PRME can be unique and contextual, fitting into the broader scope of the United Nations' 2030 Agenda for Sustainable Development (UN, 2015). George Mason University's Honey Bee Initiative (HBI) exemplifies such a partnership. HBI empowers local communities through sustainable beekeeping while fostering research and education outputs for students. This partnership requires expertise outside the business core curriculum and is connected to one of the wicked problems, namely the biodiversity crisis.

Partnering up has a strong linkage with addressing "Climate change and crisis management" and "Other wicked problems" categories, as evident from the clustering of these categories in Figure 1. Glasgow Caledonian University's GCU's Centre for Climate Justice, for example, contributes to addressing climate change issues through partnerships with various organizations, including UNESCO. The Hanken School of Economics partnered with the International Food Waste Coalition, Ikea, Sodexo France, and Sodexo Sweden to develop a course on food waste issues. The Deakin Business School also has its own Centre for Energy, Environment, and Natural Disaster (CEEND), which integrates business knowledge with energy, environment, and natural disaster issues, partnering with the government and industry to do so.

PRME can foster interdisciplinarity through its six principles and the partnerships it facilitates. Partnering with organizations from outside the business core curriculum and addressing wicked problems can help break down silos and promote cooperation between stakeholders.

5 | DISCUSSION

5.1 | Embedding sustainability into business schools' core curricula

One of the central questions in understanding the role of universities in promoting sustainable development is the extent to which they can facilitate interdisciplinary collaboration and curricular change. While there is no direct evidence to suggest that universities with broader curricula are more effective in promoting sustainability, some independent business schools have demonstrated a commitment to sustainability by widening their curricula. For instance, Hanken and Stockholm School of Economics are considered standalone business schools that prioritize sustainability. In contrast, universities often face challenges in embedding changes to their fundamental structures to address issues like CSR and sustainability. Such topics are typically added as peripheral components of the curriculum rather than integrated into the core management program (Sharma & Hart, 2014; Sroufe et al., 2021). This observation aligns with previous research, which found that students often gain interdisciplinary skills and experience through extracurricular activities rather than the formal curriculum (Høgdal et al., 2019). Furthermore, the lack of interaction between undergraduate and post-graduate students in research and teaching is a critical challenge to interdisciplinary collaboration. The present study identifies a significant gap in the research-teaching linkage category, with few reports indicating active interactions between post-graduate and undergraduate students. This lack of interaction is identified as the central fault line, as one of the main dimensions of interdisciplinarity refers to the intensity of interaction between specialists (Fazenda et al., 2013). This finding highlights the challenges that academia faces in being truly interdisciplinary, as themes such as the pressure to publish in mono-disciplinary journals associated with the "publish or perish" call (Hughes et al., 2018) may contribute to a lack of interest from post-graduates in engaging with undergraduate education. Therefore, it is crucial to explore ways to foster active and meaningful interactions between post-graduate and undergraduate students to promote interdisciplinary learning and research in academia.

COVID-19 has highlighted the need for business schools to manage crises and has created opportunities to integrate crisis management skills with sustainability efforts. Climate change and pandemics are among the most pressing wicked problems addressed by business schools. Recent reports suggest that disaster and crisis management have become recurrent themes in business school curricula. COVID-19 has had a significant impact on how business schools interact with society and students. It has also shown that managing systemic and global crises requires interdisciplinary skills and perspectives, often beyond those typically included in the core management curriculum. The subprime crisis in 2008 offered a similar opportunity for business schools to demonstrate their commitment to ethics and governance. The current pandemic serves as a laboratory for business schools to educate leaders to manage unprecedented and systemic crises.

The proactive commitment of independent business schools to prioritize sustainability through curricular expansion enhances their legitimacy among stakeholders, such as professional associations (Sharma & Stewart, 2022), while effectively managing crises like the COVID-19 pandemic and integrating crisis management with sustainability efforts bolsters their reputation as preparers of future leaders. Hogan et al.'s (2021) study underscores the value of business education in Australia and advocates for finding alternative arguments for legitimacy amid emerging challenges. By addressing these aspects, business schools can strengthen their position as vital contributors to sustainable development and RME.

5.2 | Analyzing the role of PRME principles in business school reports

Business schools have a significant role in promoting sustainability and reflecting on their societal impact through philanthropic-like initiatives. The PRME initiative emphasizes the importance of fostering cooperation between stakeholders and promoting the United Nations' 2030 Agenda for Sustainable Development (UN, 2015). To achieve this goal, business schools need to change their operational methods toward a business model that prioritizes sustainability (Dietler et al., 2019).

PRME Champion schools can play a vital role in promoting the 2030 Agenda among different stakeholders, including class associations, alumni, sector organizations, unions, companies, city halls, other universities, or NGOs, thus contributing to raising general awareness of sustainability issues. By doing so, these schools can foster cooperation between stakeholders, aligning with the UN's Sustainable Development Goal 17 of "partnerships for the goals" (UN, 2015).

While sustainability actions are usually considered an add-on to the curriculum, interdisciplinary centers are becoming more integrated to address sustainability issues in a more comprehensive and cross-disciplinary way (Hughes et al., 2018). However, these structures can become decoupled and act as standalone research centers or service-learning hubs, limiting their integration with the core curriculum.

Interdisciplinary centers act as bridging structures, detached from bureaucratic constraints, to generate impact in a perspective that is geographically, attitudinally, stakeholder-oriented, or timely different. (Klein & Newell, 1997). These centers serve as specialized research and community outreach nodes, detached from the universities' bureaucracy, to expand the school's grasp beyond the business core curriculum. For example, the Mistra Centre for Sustainable Markets at the Stockholm School of Economics (2020) is a specialized center that focuses on sustainable development in markets and business. These centers are not only specialized college units but also student initiatives that take shape autonomously and organically, promoting innovation and collaboration.

Despite the potential of partnerships, there are barriers to their effectiveness. PRME is primarily focused on education rather than research, and schools show a substantial diversity and quantity of partners, including academic-close, academic-like, or non-academic partners. While some schools easily partner up for research goals, very few integrate themselves to improve education methodologies, which is essential to promote sustainability education (Avelar et al., 2022). Therefore, PRME is primarily conceived as an enabler for partnerships and education methodologies, emphasizing the importance of academic and non-academic partnerships to promote sustainability in business education.

In addition, business schools' philanthropic-like initiatives to aid vulnerable local communities and safeguard students' health and permanence are critical reflections of the school's role in society. If the school cannot afford to aid its surroundings in a moment of peril, it is an indication that the school's structure is disconnected from the community. These initiatives serve as case studies for a unique crisis management context, highlighting the importance of community engagement and sustainability in business education (de Assumpção & Neto, 2020). For instance, the La Trobe Business School partnered with Medibank, Red Cross, and St. Vicent de Paul to support students in need with grocery vouchers during the COVID-19 pandemic.

6 | CONCLUSION

The challenges faced by universities in promoting interdisciplinary collaboration and embedding sustainability into the core curriculum are significant. While some independent business schools have taken steps to widen their curricula and promote sustainability, universities as a whole struggle to integrate changes into their fundamental structures. However, the COVID-19 pandemic has highlighted the importance of crisis management skills and interdisciplinary approaches to address global challenges. This presents a unique opportunity for business schools to play a leadership role in preparing future leaders to manage systemic crises and promote sustainability.

Business schools have a crucial role to play in promoting sustainability through their operational methods, interdisciplinary centers, and partnerships with stakeholders. Philanthropic initiatives serve as critical reflections of the school's role in society, emphasizing the importance of community engagement and sustainability in business education. The presented frameworks offer practical guidance for implementing education for sustainable development across diverse categories, which can benefit from benchmarked practices. However, promoting sustainability education requires an attitudinal shift toward interdisciplinarity (Fazenda, 1994), both from organizations and individuals, and strategic changes toward sustainability transition are only possible with a workforce that has the education and mindset to do so. Thus, the proposed 16-category framework is only meaningful if it is tailored to the school or educational project to which it is applied.

AUTHOR CONTRIBUTIONS

The authors confirm their contributions to the paper as follows: Flavio Martins: Responsible for data collection, manuscript writing, and interpretation of results. Luciana Cezarino: Study conception, interpretation of results, and critical review. Lara Liboni: Study conception, interpretation of results, and critical review. Trevor Hunter: Provided

critical reviews, assisted in manuscript writing, and contributed to the interpretation of results. Andre Batalhao: Assisted in critical reviews, manuscript writing, and interpretation of results. Marco Catussi: Provided critical reviews, assisted in manuscript writing, and contributed to the interpretation of results. Each author's distinct contributions have been integral to the development and completion of the paper.

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APPENDIX I: TEXT-MINING TOOL

The KWIC is used here in two main features of the software: I) Concept maps and II) Topic Guides. Both features have been used in recent research to enhance qualitative findings (Lemon & Hayes, 2020). The concept map portrays, in a visual way, three tiers of keyword association: concepts, themes, and the spanning tree. Respectively, concepts are words that travel together through the text, they are clustered in a higher level of association, which are called "themes," below which, a spanning tree shows the "road" connecting the concepts through the themes (Leximancer, 2019). For instance, if the keywords "sustainability" and "entrepreneurship" are among the most recurrent in the report, and at some point there is a description of an entrepreneurship center that fosters a service-learning activity in the community, the Concept map will probably portray significant nodes (concepts) referring to "sustainability" and "entrepreneurship," at the second level of detail it will show the themes: service-learning, entrepreneurship, and students, connecting the nodes (spanning tree).

The "Topic Guides" feature is an AI-powered algorithm that summarizes the main points of the text in new sentences, differing verbs, nouns, name-like keywords (i.e., Entrepreneurship Centre) and work-like keywords (i.e., sustainable, research, areas) and measures the intensity of recurrence in the text and a direct indication of where it is located. For instance, using the same example, if the report also mentions that the service-learning activity takes place in the X community, on the outskirts of Sao Paulo, a topic guide will probably be formed with the title: "Sustainability for entrepreneurship at X community". Both of these features provide automated guidance for the content analysis of the reports. We screened the concept maps and topic guides of the 37 reports. We searched for matchmaking keywords related to the categories described in Figure 1.

APPENDIX II: BUSINESS SCHOOLS

Business school	Parent organization	Organization type	Country	Topic guides
Copenhagen Business School		Business school	Denmark	Responsible related; PRME; Knowledge Education; Future; Social Impact
Deakin Business School		University	Australia	Awareness students; Leadership DBS; Environmental sustainability; Ethics Ers (engage responsibility social)
EGADE Business School	Tecnologico de Monterrey University System	Business school	Mexico	Global Principle; Environmental impact; Chile; Inclusion International; Responsibility Social
Gabelli School of Business	Fordham University	Business school	United States of America	Education Business; Responsibility Issues; Corporate Impact; Work Community
George Mason University School of Business	George Mason University	University	United States of America	Government Business; Change Center; Understanding Social; Community-engaged
Glasgow Caledonian University		University	United Kingdom	Report Information; Challenges Sustainability; Common good community; Aims Knowledge; Impact Economic
Gordon Institute of Business Science	University of Pretoria	Business school	South Africa	Student SDGs; Model Assessment; Improvement Future; Data Specific; Learning Society
Gordon S. Lang School of Business and Economics	University of Guelph	Business school	Canada	Issues Students; Business Economics; Course Related; Issues Environmental; Program Education
Hanken School of Economics*		Business school	Finland	Responsible Education; Students Course; Research Impact; Social Sustainability
IEDC-Bled School of Management		Business school	Slovenia	Conferences better; Successful education; Development Faculty; Society economies; Economies activities
IESEG School of Management			France	Responsibility business; Companies Topics; ICOR Environmental; Community IESEG; Activities education
Institute of Business Studies - Moscow, RANEPA		Business school	Russia	During Actions; Behavior Prevent; Management Account; Behavior tasks; Effective business
IPM Business School		Business school	Belarus	Knowledge Challenges; Economy circular; Entrepreneurs women; Development Circular; International Government
ISAE Brazilian Business School		Business school	Brazil	Criteria Ab; Programs initiatives; Employees Related; SDGs PRME; Mechanisms Related
Kemmy Business School, University of Limerick		Business school	Ireland	Global international; Change Module; kbs Faculty; Including range; Responsability Management; Social Teaching
Kristianstad University	Kristianstad University	Business school	Sweden	Prme Kristianstad University; Issues Areas; Wil business; Course Program; Society life

Business school	Parent organization	Organization type	Country	Topic guides
La Trobe Business School	La Trobe University	Business School	Australia	Economic Environmental; Lbs SDGs; CDAC Build; Economic Year; Report Covid; Report Education.
Leeds School of Business	University of Colorado at Boulder	Business school	United States of America	Online Lab; Responsability Social; Leaders Environmental; Lab Cesr; Cu Cesr Fellows; Environmental Business
Newcastle University Business School		Business school	United Kingdom	Ethical Critical; Global Perspectives; Environmental Social; School Range; Context Students
Nottingham Business School	Nottingham Trent University	Business school	United Kingdom	Impact Waste; Ethics Sustainable; Rsb Lab Address; Core Issues; Integrated Example
Nottingham University Business School		Business school	United Kingdom	Engagement Companies; Business Management; Professional Equality; Financial Development; Social Business
Nova School of Business and Economics	Universidade Nova de Lisboa	Business school	Portugal	Future create; Knowledge community; Development corporate; Program faculty; Change Impact
Queen's Management School		Business school	United Kingdom	Activities Responsibility; Rights Human; ERS Data; Environmental Economic; Global Society
Rohrer College of Business, Rowan University		Business school	United States of America	Graduate Business; General Awareness; Responsible Leadership; Reporting Period; Focused Community
School of Business, Government, and Economics	Seattle Pacific University	Business school	United States of America	Global Business; Global Economics; Graduate program; Business issues; Leaders Faith
Sobey School of Business	Saint Mary's University	Business school	Canada	Service Learning; Social Business; Learning course; Global Responsible; Leadership Leaders; Impact Environmental
Stockholm School of Economics		Business school	Sweden	Misum Finance; Students Faculty; Learning Aims; Misum research; Sweden School
T A PAI Management Institute		Business school	India	Financial Access; Effective Coverage; SDGs Goal; Management Better; Better Products.Business Local
Universidad Externado de Colombia School of Management	Externado University	Business School	Colombia	N/A
University of Applied Sciences of the Grisons		University	Switzerland	Further competence; Diversity Areas; Diversity Uas Grisons; Integrity Role; Education Competence; Hotel Approach.
Graduate School of Business	University of Cape Town		South Africa	
Winchester Business School	The University of Winchester	Business School	United Kingdom	Principle Education; Staff; Management Ethics; Community Work; Business Social; Values Report; Higher Future.
ZHAW School of Management and Law	Zurich University of Applied Sciences	School of Management and Law	Switzerland	Sml Law; Responsibility Initiative; Responsability Management; Development Initiative; Knowledge Business; Events Alumni

Source: UN PRME (2023).

APPENDIX III: BUSINESS SCHOOL STUDENT ORGANIZATIONS

Business school	Student organization
Copenhagen Business School	CBS Diversity and Inclusion; CBS Feminist Society; CBS Building Tomorrow; CBS Volunteering; Dansic; Oikos; CBS Blockchain Society; CBS Climate Club; CBS Model United Nations; Female Invest; Onde Danmark; 180 Degrees
Glasgow Caledonian University	Enactus
Gordon S. Lang School of Business and Economics	Lang Student Association
Gothenberg School of Business, Economics, and Law	Handels Students for Sustainability (HaSS)
Hanken School of Economics	Hanken Business Lab
IESEG School of Management	Enactus; Responsible Leaders
Kemmy Business School, University of Limerick	Enactus
Leeds School of Business, University of Colorado Boulder	CSR Fellows (Net Impact Affiliated)
Nottingham Business School, Nottingham Trent University	The Oath Project; Enactus; Aiesec
Nottingham University Business School	Enactus
Nova School of Business and Economics	CEMS Club Lisbon; The Economics Without Borders; NOMA Marketing Consulting Student Club; NOVAFRICA Student Group; Nova Case Team; Nova Creative Hub; Nova Debate Club; Nova Economics Club; Nova Investment Club; Nova Junior Consulting; Portfolio Management Club; Oikos; Nova SBE Awareness Club; Nova SBE China Club; Nova SBE FinTech Club; Nova SBE Hospitality Student Club; Nova SBE Leadership for Impact Student Club; Nova SBE Mindspace Student Club; Nova SBE Startup Club; Nova SBE Students' Union; Nova SBE Venture Capital and Private Equity Club; Nova Skills Association; Nova Social Consulting Club; Nova-Tech Club; Nova Women in Business; Social Investment Club; Tuna for Tuna
Sobey School of Business, Saint Mary's University	Enactus
Stockholm School of Economics	Students Association (Sasse)
University of Applied Sciences of the Grisons	Student-Hub

Source: Elaborated by authors.

APPENDIX IV: DEGREES OF PRINCIPLES AND CATEGORIES.

Nodes	Type	Weighted grade	Modularity class
Method	Principle	161.0	1
Values	Principle	126.0	0
Purpose	Principle	106.0	1
Partnerships	Principle	93.0	2
Dialog	Principle	77.0	2
Research	Principle	73.0	2
Diverse learning methodologies	Instrumental prevalent	49.0	1
Spaces of discomfort	Critical prevalent	49.0	0
Multiple stakeholders partnerships	Instrumental	47.0	2
Diversity and equality	Critical	45.0	0
Sustainability integrating disciplines	Instrumental prevalent	44.0	0
Local communities interaction	Critical	43.0	2
Broader curriculum	Instrumental prevalent	42.0	1
Extra-class, experiential, and/or service-learning	Instrumental	42.0	1
Other wicked problems	Critical	41.0	2
Climate change and crisis management	Critical	41.0	2
Planning toward interdisciplinarity	Instrumental prevalent	40.0	1
Creative thinking and reflexivity	Critical prevalent	38.0	1
Technological Forecast	Transition	35.0	1
Autonomous learning environments	Transition	34.0	1
Research-teaching linkages	Instrumental	33.0	2
Reporting through interdisciplinarity	Instrumental prevalent	13.0	0

Source: Elaborated by authors.