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Using sensemaking as a lens to assess student learning on corporate social responsibility and sustainability

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Abstract

Prior literature suggests that teaching corporate social responsibility (CSR) and sustainability has led to little development of students' reflexive engagement with the challenges of sustainable development. To shed light on this criticism, we apply sensemaking—as entailing the three stages of scanning for information, interpreting it and identifying alternatives of action—to CSR/sustainability education. Analysing cognitive maps of CSR, drawn by undergraduate finalists from a UK business school, we find that students are able to produce complex cognitive maps in terms of scanning for information; however, cognitive bottlenecks occur at the second and third stages of sensemaking. A key pedagogical challenge is, therefore, to support students in moving beyond scanning towards developing meaning and acting on that basis. By introducing a sensemaking lens, we add to a deeper understanding of the complexities associated with CSR education as it aids (or impedes) critical engagement and action.

KEYWORDS
business school education, cognitive maps, corporate social responsibility education, sensemaking

1 | INTRODUCTION

Education has a critical role to play in preparing students to confront the grand challenges facing humanity around sustainable development. Likewise, businesses have to navigate increasingly complex challenges relating to tensions between the economic and non-economic aspects of CSR and sustainability (Aragon-Correa et al., 2017). Crucially, the externalities of a firm are determined by the processes through which managers cognitively make sense of the underlying tensions between sustainability dimensions (Hahn et al., 2014). The very same logic applies to students: as future managers and employees, they too will face the challenge in their working lives of making sense of tensions between economic, social and environmental issues (Aichele et al., 2021; Nonet et al., 2016).

Sensemaking has been studied in several fields, like strategic management (Kaplan, 2011) or entrepreneurship (Cardon et al., 2011); likewise, it has been applied to education (Holt & Cornelissen, 2014; Janssen et al., 2021; Schwandt, 2005). According to Daft and Weick (1984), the sensemaking process entails three stages: during the first stage, decision-makers are scanning for information regarding the decision at hand; during the second stage, they interpret that information to, in the third stage, arrive at a range of possible actions to take (see also Thomas et al., 1993). From a pedagogical perspective, sensemaking can assist us in better understanding the learning process that students engage in as they interpret ideas and information for application and action (Mesa, 2019; Odden & Russ, 2019). How students construct interpretations and meaning and engage in inquiry is thus fundamental to learning whether students are to become mindful and purposeful actors (Fitzgerald & Palincsar, 2019).

We argue in this paper that building on sensemaking literature (e.g. Maitlis & Christianson, 2014; Weick, 1995) could help us to examine more thoroughly how students learn about the growing complexity associated with sustainability challenges (Colville et al., 2016; Guiette & Vandenbempt, 2016). Thus, our research question is *how students engage in a sensemaking process that develops their reflexive engagement with the challenges of CSR*. If we as educators are better able to understand the sensemaking process, we would be better able to assist our students to engage in reflexive learning that transcends 'scholarly critique' and moves into the realm of 'engaged critique and engaged action' (Parker et al., 2020, p. 293).

In terms of methodology, we analysed cognitive maps of CSR drawn by a sample of 125 undergraduate finalists from a business school in the United Kingdom. Based on our examination of these cognitive maps, we make several contributions to the development of literature. Firstly, the sensemaking approach allows us to dive beneath surface learning on CSR to draw out how the stages of the process link to each other and how this interaction brings about more or less sophisticated understandings. Secondly, we explore how educators can deepen students' understanding of the complexities associated with CSR and sustainability by drawing out the importance of moving beyond scanning for information towards developing meaning, and finally acting on that basis, which is essential if we are to address sustainability challenges. Doing so allows us to develop suggestions for a more effective pedagogy that is centred on the student as sensemaker. Thirdly, with regard to research methodology, much prior research into sensemaking in education has taken a qualitative approach (e.g. Mesa, 2019); hence, we decided to take a quantitative path. Furthermore, we apply a more comprehensive measure of cognitive maps than prior studies have done by measuring differences in terms of both content and structure, rather than—as prior studies did—just in content.

Our paper is structured as follows. The literature review summarizes work on CSR/sustainability as a topic for management education and then examines the concept of sensemaking, including its application to management education and CSR. This is followed by an explanation and justification of our research methods, where we introduce cognitive maps as a tool for studying sensemaking. Thereafter, we present the main results of the study. Our discussion then analyses the consequences of our findings in terms of student understandings of CSR and approaches to teaching this complex topic. Finally, we offer conclusions from our study.

2 | LITERATURE REVIEW

2.1 | CSR/sustainability in management education

A persistent criticism of business schools is that their teaching concentrates too narrowly on market economics and fails to foster an awareness of social and environmental externalities of business (Beddewela et al., 2021; Bunch, 2020; Ferraro et al., 2005). In response to such criticism, numerous schools have begun to integrate CSR and sustainability into their teaching practices (Aichele et al., 2021; Aragon-Correa et al., 2017) as well as their extra-curricular activities (Painter-Morland et al., 2016). Calls for attention to CSR and sustainability in business school teaching have received support from influential intergovernmental organizations, such as the Higher Education Sustainability Initiative (HESI) or the UN Global Compact's Principles for Responsible Management Education (PRME) (Forray & Leigh, 2012). Cullen (2020, p. 759) thus summarizes the emerging approach to the integration of CSR/sustainability into business school activities as comprising: '(1) Teaching Responsible Management; (2) Organising for Responsible Education; (3) Responsible Individual Learning, and; (4) Responsible Organizational Learning' (see also the recent handbook by Moosmayer et al., 2020).

The challenge of CSR/sustainability education[1] lies in the fact that this topic is a multidimensional concept, that is it deals with social, environmental and economic issues and their interdependencies (Hahn et al., 2015); it is intertemporal in nature (Slawinski & Bansal, 2015), and it is imbued with complex dynamics, that is changes in one dimension can affect other dimensions in ways that often cannot be anticipated (Whiteman et al., 2013). At the same time, insufficient attention has been placed on how responsible management learning actually proceeds in practice (Cullen, 2020). Teaching CSR/sustainability, therefore, requires taking into account its systemic nature through 'creative and holistic pedagogical approaches' (Prado et al., 2020, p. 303) that encourage action beyond theory.

Attempts to effectively integrate these complexities into business programmes range from debates about the relative merits of capitalism and the promotion of alternative means of organizing (Alajoutsijärvi et al., 2015), through a re-consideration of learning objectives in business programmes (Baden & Higgs, 2015) to the incorporation of CSR and sustainability into curricula (Bagley et al., 2020).

Overall, business schools are still by-and-large not yet effectively addressing CSR/sustainability issues (Alajoutsijärvi et al., 2015; Bunch, 2020). Indeed, promoting CSR and sustainability in business schools 'requires an emphasis and understanding of the impact of decisions and behaviours on *others*' in order to adequately address key societal and stakeholder issues (Kolodinsky et al., 2010, p. 167). This necessitates that students, as future managers, develop critical mindsets to enable them to reflect on these complexities and ambiguities and to act on them in a mindful manner.

2.2 | Sensemaking, CSR and management education

Sensemaking can be defined as the social process of 'meaning making' as people 'assign meaning to new information' to understand ambiguous, equivocal or confusing issues (Schwandt, 2005, p. 182). When encountering novel or ambiguous events, societal actors seek clarity by extracting and interpreting cues from the environment to make sense of what has happened. However, the process is more than interpreting; rather, it involves the dynamic authoring of frameworks for understanding, as people create 'intersubjective meaning through cycles of interpretation and action, and thereby enact a more ordered environment from which further cues can be drawn' (Maitlis & Christianson, 2014, p. 67). At the same time, sensemaking is a social process as it is always undertaken in the presence of others; it is therefore situated within organizational and cultural contexts (Fitzgerald & Palincsar, 2019).

According to Daft and Weick (1984), the sensemaking process entails three stages: scanning for information, interpreting that information and then identifying and evaluating alternatives of action. Triggered by an

unexpected or ambiguous event, social actors search the external environment for cues to better understand the issue or event—the scanning phase. The second stage, interpreting, is 'the act of carving out meaning from ambiguous cues' (Porac & Thomas, 2002, p. 178). During the third stage, actors then identify and evaluate alternative actions. Not least, the actions considered then form a repertoire that the actor can draw upon in the next sensemaking instance.

As a theoretical lens, sensemaking has been applied in many different contexts (see Glynn & Watkiss, 2020). In the educational context, sensemaking has been studied in terms of differences between sensemaking processes in natural and social sciences (Fitzgerald & Palincsar, 2019) or in terms of teaching accounting students (Mesa, 2019). Beyond these contexts, we suggest that the complexity of CSR makes it imperative for students, as future managers, to be able to 'reflect critically on underlying assumptions associated with the knowledge frames that they are using to make sense of both their actions and those of the organization' (Schwandt, 2005, p. 189). An emphasis on sensemaking is also crucial in terms of promoting 'deep' learning, allowing students to more build connections between the existing and newly acquired knowledge as well as aiding the process of transferring those ideas to new domains (Odden & Russ, 2019).

Providing students with the appropriate tools to resolve these tensions, in turn, requires new approaches for educationists. Following Gustafsson and Bowen (2017, p. 212), both scholars and students struggle with tensions that require going beyond linear thinking, that is 'conceptualizing with both-and; not either-or perspectives' with regard to integrating existing and new knowledge, bringing together detail-oriented and broad-brush perspective as well as combining academic rigour and practical relevance.

2.3 | Hypotheses development

Recall that sensemaking can be understood as a sequence of three stages, namely scanning, interpreting and acting (Daft & Weick, 1984; Hahn et al., 2014; Maitlis & Christianson, 2014). Scanning involves searching for cues regarding important events or issues that might affect an organization. In the workplace, prior research has shown that managers differ in the amount of information they scan for; yet the greater the amount of scanned information, the more raw material they have available to interpret and plan actions (Thomas et al., 1993). By extension, we argue that similar processes are also at work when students scan for information. More formally, we suggest:

> **Hypothesis 1.** There will be differences between students regarding how they scan information on CSR.

Interpreting is the stage of developing meaning out of ambiguous cues (Porac & Thomas, 2002). Such meaning is often the result of categories or labels that actors use to 'stabilize' the stream of cues they encounter (Weick et al., 2005). Their operation is, at least in part, influenced by the scanning stage. The higher the perceived completeness of the information, the greater the likelihood that managers in the workplace—as well as students—will perceive the underlying causes as controllable (Thomas et al., 1993). As an issue becomes less equivocal, for example more clearly interpreted as a threat or an opportunity, students become clearer in their understanding of the underlying causes. In other words, they will become more able to draw out how terms relate to each other. This leads us to our second hypothesis:

> **Hypothesis 2.** There will be differences between students regarding how they interpret information on CSR.

Having interpreted the collected information, actors proceed to identify alternatives of action (Daft & Weick, 1984; Hahn et al., 2014). As for the step from scanning to interpreting, the nature of the interpretation process impacts on the range of actions considered (Thomas et al., 1993). In the workplace, when managers interpret an issue as a threat, this interpretation is likely to trigger a rigid approach that supports the maintenance of

the status quo, like cutting costs, a contraction of activities or the concentration of decision-making powers higher up the hierarchy (Staw et al., 1981). When managers interpret an issue as an opportunity, they are likely to feel more confident about the decision and may consider a wider range strategic change actions (Thomas et al., 1993). Transposing these arguments to the student-learning process on CSR, we therefore suggest:

> **Hypothesis 3.** There will be differences between students regarding how they identify and evaluate actions on the basis of the information on CSR.

3 | RESEARCH METHODS

3.1 | Cognitive maps as tool for measuring sensemaking

Much of managerial work consists of absorbing, processing and disseminating information (Walsh, 1995). Given often complex information environments, managers need to impose a knowledge structure, a cognitive map, on the myriads of external stimuli, thereby reducing complexity and ambiguity (for overviews see Hodgkinson & Healey, 2008; Walsh, 1995).

According to Tetlock and colleagues (Levi & Tetlock, 1980; Suedfeld & Tetlock, 1977), the complexity of a cognitive map is a joint function of its differentiation and its integration. Differentiation refers to the number of characteristics or aspects of a problem that the decision-maker considers, whilst integration refers to the connections the decision-maker perceives between the differentiated characteristics. The differentiated characteristics may operate in isolation, which leads to a map with no integration; they can operate in a hierarchical interaction, giving a map with a medium level of integration; or their interaction may be characterized by complex and flexible patterns, where we arrive at a map with high complexity (Levi & Tetlock, 1980). Such higher complexity can be linked to paradoxical thinking. By keeping alive tensions between contradictory yet interrelated elements that exist simultaneously, decision-makers may be able to better serve the long-term aims of their organization than by choosing among competing tensions (Schad et al., 2016).

Prior literature has begun to investigate cognitive maps held by students of CSR and sustainability. This literature has presented some contradictory results. On the one hand, Somers et al. (2014, p. 1) compared cognitive maps of students and faculty (arguably a somewhat unfair comparison) and reported 'concerns about students' intellectual development. [...] By contrast, business school faculty developed rich cognitive maps characterized by dense connections among concepts'. On the other hand, Lourdel et al. (2007, p. 170) studied a sample of engineering students on a sustainable development (SD) course and found that 'students' perception of SD before the training seems mainly focalized on environmental and economic aspects. After the SD course, an increase in the word count [in the cognitive maps] is noted for each category' Similarly, Nonet et al. (2016) analysed how students mentally conceptualized responsible management with students highlighting critical thinking, and a broad, holistic triple-bottom-line understanding of management with a shared vision for all stakeholders.

However, there is one crucial gap in this work. Most prior studies paid attention to the complexity of cognitive maps only in terms of their content, by either counting the words they contain or by examining the spread of words across pre-determined categories. By contrast, we argue that a more systematic assessment can be generated through capturing the complexity of cognitive maps in terms of both content and structure.

The measurement of the complexity of cognitive maps can be undertaken in a number of different ways (see Huff & Jenkins, 2002). Since we are interested in measuring the structure of cognitive maps comprehensively—that is in terms of both differentiation and integration—we applied a methodology developed by Green and McManus (1995) in psychology. They asked respondents to identify all the factors that, in their view, affect the risk of a person developing coronary heart disease—differentiation of their cognitive map—and then to indicate all relevant relationships between these factors—integration of their cognitive map.

In our study, we operationalize Hypothesis 1 (scanning) through measuring student ability to demonstrate knowledge through terms that capture the essence of CSR, that is by measuring the number of words[2] a student holds in their cognitive frame. We operationalize Hypothesis 2 (interpreting) by measuring student ability to explore CSR through the number of levels of complexity a map reaches, that is counting the maximum level a student reaches in their cognitive frame. We operationalize Hypothesis 3 (acting) through measuring the extent to which students develop alternatives of action that go beyond explicit course content, which we capture through thematic coding of terms in the map (for a similar procedure, see Nonet et al., 2016). In applying thematic coding, we identify one or more of the following three areas: (i) awareness of the wider context beyond the explicit CSR terminology, (ii) questions how to assess the 'proof' for CSR activities and (iii) considerations of alternative actions. Figure 1 provides an overview of the module content and the stage 3 thematic coding. Given prior research that has considered whether the demographic characteristics of research subjects may affect their understanding of CSR (Lillo-Viedma et al., 2022; Severino-González, Gallardo-Vázquez, et al., 2022; Severino-González, Toro-Lagos, et al., 2022), we further interrogate our findings by various student demographic attributes to see whether and how they may matter for each of the three hypotheses as we describe below.

3.2 | Data collection

The cognitive maps were collected from undergraduate finalists at a business school in the South East of the United Kingdom in April 2019. The business school in question is part of a research-intensive university, which is consistently ranked in the top quartile of UK universities. At the start of the penultimate week of their CSR capstone module, students were shown examples of cognitive maps from outside the area of CSR. Students were then given blank sheets of A3 paper and were asked to produce a cognitive map on the topic of CSR from memory, that is without using any additional material.

Overall, 125 students completed their cognitive maps (male $n = 52$ (42%); female $n = 71$ (57%); two students preferred not to provide gender-related data). The sample size, whilst not exhaustive, is larger than prior studies using cognitive maps in academic settings (e.g. Lourdel et al., 2007; Nonet et al., 2016; Somers et al., 2014). Of those 125 completed cognitive maps, we were able to link 110 cognitive maps to the student's final degree result as well as their
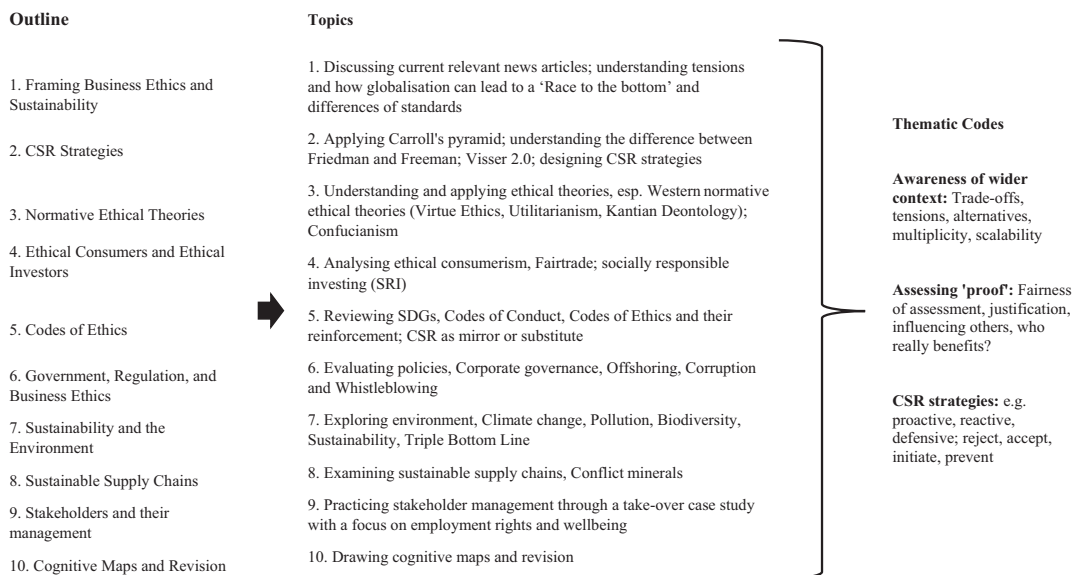
Outline	Topics	
1. Framing Business Ethics and Sustainability	1. Discussing current relevant news articles; understanding tensions and how globalisation can lead to a 'Race to the bottom' and differences of standards	
2. CSR Strategies	2. Applying Carroll's pyramid; understanding the difference between Friedman and Freeman; Visser 2.0; designing CSR strategies	**Thematic Codes**
3. Normative Ethical Theories	3. Understanding and applying ethical theories, esp. Western normative ethical theories (Virtue Ethics, Utilitarianism, Kantian Deontology); Confucianism	**Awareness of wider context:** Trade-offs, tensions, alternatives, multiplicity, scalability
4. Ethical Consumers and Ethical Investors	4. Analysing ethical consumerism, Fairtrade; socially responsible investing (SRI)	
5. Codes of Ethics	5. Reviewing SDGs, Codes of Conduct, Codes of Ethics and their reinforcement; CSR as mirror or substitute	**Assessing 'proof':** Fairness of assessment, justification, influencing others, who really benefits?
6. Government, Regulation, and Business Ethics	6. Evaluating policies, Corporate governance, Offshoring, Corruption and Whistleblowing	
7. Sustainability and the Environment	7. Exploring environment, Climate change, Pollution, Biodiversity, Sustainability, Triple Bottom Line	**CSR strategies:** e.g. proactive, reactive, defensive; reject, accept, initiate, prevent
8. Sustainable Supply Chains	8. Examining sustainable supply chains, Conflict minerals	
9. Stakeholders and their management	9. Practicing stakeholder management through a take-over case study with a focus on employment rights and wellbeing	
10. Cognitive Maps and Revision	10. Drawing cognitive maps and revision	

FIGURE 1 Module outline and stage three thematic coding.

assessment results for the CSR module ($n = 52$ UK home students with English as a first language (representing 47% of study sample); $n = 58$ international students with English as an additional language (53%); females $n = 61$ (55%); males $n = 49$ (45%)). Both the average degree result and the CSR module result for the 110 students was an upper second-class mark of 65%. Within the CSR module, the CSR examination result average was 63%.

3.3 | Data analysis

As outlined, we study the complexity of a cognitive map in terms of both differentiation and integration. To follow our analysis, consider the two examples in Appendices 1 and 2, by a male student with English as additional language, and by a female student with English as first language. For example, in the map in Appendix 1 a link from the core term 'CSR' leads to the term 'Ethics' at about 8 o'clock, which forms level 1. From the word 'Ethics', a further link, at 7 o'clock, leads to the term 'Traditional [ethical theories]', which forms level 2. From the work 'Traditional', another link leads to the word 'Western', which forms level 3. Furthermore, we examined antecedents that might affect differences in map complexity.

Using statistical tools, we performed correlation analyses to check for statistically significant differences and to calculate effect sizes. Statistically significant difference is defined here as a level of confidence with a probability of a null hypothesis being rejected at a p-value of less than .05. Effect sizes are a quantitative measurement to explain the magnitude of the difference independent of sample sizes, and we tested this with Cohen's d effect size. Cohen's d compares the mean difference between two groups divided by the pooled standard deviation. A d of 1 indicates that the compared groups differ by 1 standard deviation or 1 z-score. An effect size between 0.2 and 0.5 is considered small, between 0.5 and 0.8 is considered medium, and an effect size of 0.8 and above is considered a large effect (Harris, 2008).

4 | FINDINGS

4.1 | Testing our hypotheses

In line with Hypothesis 1, we first applied our operationalization of differentiation and measured the complexity of cognitive maps in terms of the words that were used by participants to capture the essence of CSR. Across all students, the average number of words used in the cognitive maps was 33 words. When reviewing these words, 'Ethics' appeared most frequently and was mentioned by 43% of the students, followed by 'Carroll's Pyramid', and 'Stakeholders' by 28% each (Table 1).

Secondly, following Hypothesis 2, we measured the complexity of cognitive maps through examining the levels in the map reached by the student. For the 110 participants for whom we could identify the degree result, the average number of levels was 3.5. Table 2 provides the average word count per level and the number of students that reached those levels in their cognitive maps. We found considerable differences in map complexity, as more than half of the students reached level 3, but only 16% reached level 5 or higher.

Thirdly, as expressed by Hypothesis 3, we captured alternatives of action through measuring the extent to which student terms go beyond course content. Here, very few students referred to knowledge that is outside the content of this particular course, either being taken from other courses of their degree programme or derived through independent thinking. Our thematic coding examined (i) students' awareness of the wider CSR context and possible trade-offs and challenges; (ii) their assessment of CSR initiatives; and (iii) their active consideration of alternative strategies concerning CSR. Only 10% of all students reached the third aspect of our thematic coding. In other words, only every 10th student demonstrated a complexity of cognitive frames that exceeded explicit course content.

TABLE 1 Word categories in cognitive maps.

Key concepts at L2	Mentions by students	% share n = 125
1 Ethics	54	43%
2 Carroll's pyramid	35	28%
3 Stakeholders	35	28%
4 Globalization	31	25%
5 Corruption	28	22%
6 Socially responsible investing	28	22%
7 Environment	21	17%
8 Sustainability	20	16%
9 Triple-bottom line	16	13%
10 Supply chain	12	10%

TABLE 2 Average word count per level and number of students per level.

Levels[a]	Average number of words for this level	Average no of words (female)	Average no of words (male)	Number of students reaching this level	Share of students reaching this maximum level	Cumulative share of students reaching *up to* this maximum level	Cumulative share of students reaching *at least* this level
1	7.6	8.3	6.9	0	0%	0%	
2	14.6	15.6	13.5	21	17%	17%	100%
3	7.8	8.3	7.2	45	36%	53%	83%
4	2.2	2.1	2.3	39	31%	84%	47%
5	0.5	0.4	0.7	13	10%	94%	16%
6	0.1	0.1	0.1	6	5%	99%	6%
7	1	1	0	1	1%	100%	1%

[a]1 = first level/'circle' beyond 'CSR' as focal word.

In sum, we found that, at the stage of scanning for information (Hypothesis 1), students have cognitive frames of considerable complexity when measured in terms of differentiation, that is they are able to hold a large number of words in their cognitive frames. When moving to the next stage of interpreting the scanned information (Hypothesis 2), we found rather less evidence of complexity in terms of integration: After high scores of 36% and 31% of students reaching levels 3 and 4, respectively, the scores drop to 10% and 5% for levels 5 and 6. Finally, we compared the words used in the maps with the content of the module (Hypothesis 3) and discovered that students relied heavily on CSR module-specific words. Students seem to think more about specific CSR concepts, such as Carroll's Pyramid, rather than thinking about strategies to bring concepts together and/or to apply them in a wider context.

4.2 | Post-hoc analysis

In addition to testing our hypotheses, we conducted several further analyses of our data. Chiefly, we examined whether and how our results were affected by various antecedents, including gender, English as first or additional language and the professional work experience of the professors. Table 3 provides a statistical analysis of

the cognitive maps for these variables. In terms of map complexity, home students outperformed students with English as an additional language across the average number of words by a third. However, once we move into the third stage of sensemaking, we found that the language of instruction no longer influenced the complexity of the cognitive maps. We checked whether the professional work experience of the professor had any bearing on the complexity of the cognitive maps. The overall class was divided into five groups and four professors, with one professor teaching two groups. The latter, professor A, was the oldest (mid 50s) and had the most professional work experience outside of academia (25 years). Both his groups outperformed all the other groups in all dimensions of their cognitive maps. In Table 3, we compare the results from professor A (we averaged his two groups) with those of professor B who had the least amount of work experience outside of academia and was also one of the younger professors (early 30s). The students taught by professor A outperformed those of professor B by 80% and 33% in terms of number of words and levels, respectively, and these results were statistically significant. Furthermore, as Table 4 shows, whilst only 10% of all students demonstrated complexity at stage three of the sensemaking process, for professor A, this proportion increased to 19%, whilst none of the students of professor B demonstrated this level of sensemaking.

5 | DISCUSSION

We found that the complexity of student's cognitive maps was greatest in the first stage of sensemaking, that is scanning for information. Here, most students produced substantial cognitive frames—measured in terms of differentiation. At the second stage, that is interpreting that information, the complexity of students' cognitive maps dropped—this time measured in terms of integration. At the third stage, that is identifying and evaluating alternatives of action, complexity was particularly low across all students—measured in terms of the extent to which students go beyond course content.

Resonating with critics of management education (e.g. Bunch, 2020; Davies & Starkey, 2020), our paper provides further evidence that business students show limited signs of complex reasoning. When drawing their cognitive maps, students demonstrated 'silo thinking', typically illustrated by linear star-type maps with few cross-connectors. This finding raises concern regarding a superficial grasp students develop of the intricacies of CSR. As the sensemaking literature (Daft & Weick, 1984; Hahn et al., 2014; Maitlis & Christianson, 2014) stresses, noticing and perceiving cues, as well as creating interpretations of ambiguous issues are the first two steps that shape the cognitive map upon which actors will then act. Hence, the complexity of CSR requires cognitive frames of greater cognitive diversity with regard to both their content and structure. In our sample, students only mentioned concepts that were taught in the module concerned, rather than drawing on other modules—even though the CSR module was designed as a capstone course. However, the problems that students will face in the real world will require them to draw on different views and different sources (Wei et al., 2020); silo thinking, by contrast, will inhibit meaningful reflexion.

Our findings suggest an urgent need to search for strategies that could aid students to move from the first stage of sensemaking to the second, and from there to the third. Possible solutions for improving the move from the first to the second stage might come from a sensemaking pedagogy that is built on dialogic comprehension (Aukerman, 2013). Here, learning is encouraged by nurturing student's interpretative responses, for example by stressing that there is no 'right' or 'wrong' answer, but then in particular by focussing on how 'understandings are transformed through encountering the understandings of others' (Aukerman, 2013, p. 7). Corresponding pedagogical strategies could then concentrate on making connections among students' ideas and/or discursively exploring connections among ideas as they emerge over time (Fitzgerald & Palincsar, 2019).

Regarding the move from the second to the third stage of sensemaking, students seem to need clearer guidance on identifying promising outcomes (Mesa, 2019). We suggest to build here on the definition of teaching practice by Lampert (2010) where she draws a distinction between having an idea and carrying out that

TABLE 3 Antecedents of the complexity of students' cognitive maps: statistical analysis.

All (count $n = 110$)	Mean	Standard deviation	Lecturer A and B	Mean	Standard deviation	Count	Cohen's d	F/p/F crit	Language
Words	33.30	14.41	Lecturer A	38.63	14.79	52	1.318	23.06428 0.00001***	English
			Lecturer B	21.48	10.95	21		3.97581	Engl. add
Levels	3.54	1.10	Lecturer A	3.75	1.22	52	0.868	10.10244 0.00219**	English
			Lecturer B	2.81	0.93	21		3.97581	Engl. add
CSR examination	0.63	0.15	Lecturer A	0.64	0.15	52	0.304	1.45429 0.23184	English
			Lecturer B	0.59	0.16	21		3.97581	Engl. add
Degree result	0.65	0.08	Lecturer A	0.66	0.08	52	0.242	0.90583 0.34445	English
			Lecturer B	0.64	0.09	21		3.97581	Engl. add

Note: Cohen's d effect size: $d > 0.2$ = small, $d > 0.5$ = med, $d > 0.8$ large. Statistical significance: $p < .001$***, $p < .01$**, $p < .05$*.

TABLE 4 Antecedents of the complexity of students' cognitive maps: professorial experience, gender and language.

Stage 3 analysis	Number of students at stage 3 (count)	Share of students (all)	CSR exam stage 3 (all = 63%)	Degree result stage 3 (all = 65%)
All students at Stage 3	13	10%	72%	69%
Professor A	10[a]	19%	70%	68%
Professor B	0[a]	0%	n/a	n/a
English	7	13%	76%	72%
Engl. add	6	10%	66%	65%
Female	10	14%	73%	70%
Male	3	6%	69%	67%

[a]The remaining three students taught by a professor with length of work experience between professor A and B, not measured here.

idea, with the latter being an integral part of practice. This distinction would invite professors to challenge students more, not least to elaborate on their responses in terms of probable consequences of their proposed solutions (Fitzgerald & Palincsar, 2019). This recommendation receives support from the 'professor effect' we identified, where we saw greater complexity in students' cognitive frames in classes taught by a professor with greater professional experience gained outside higher education. At the third stage, in particular, students taught by this professor outperformed the others (19% of students mentioning terms that go beyond course content, against 0% for the comparison professor). Our data thus suggest that having professors with extensive work experience can help students to engage in more critically reflective learning on CSR as well as other business practices more generally.

This finding connects with prior studies that found that more experienced professors are able to increase student achievement (Podolsky et al., 2019). The importance of bringing 'the real world' into the classroom has been

Mean	Standard deviation	Count	Cohen's d	$F/p/F$ crit	Gender	Mean	Standard deviation	Count	Cohen's d	$F/p/F$ crit
38.37	14.19	52	0.703	13.59584 0.00036***	Female	34.79	13.78	61	0.231	1.46436 0.22888
28.76	13.13	58		3.92901	Male	31.45	15.09	49		3.92901
3.71	1.09	52	0.305	2.54691 0.11343	Female	3.52	1.12	61	0.024	0.01561 0.90081
3.38	1.09	58		3.92901	Male	3.55	1.08	49		3.92901
0.68	0.13	52	0.775	16.35752 0.00010***	Female	0.63	0.17	61	0.047	0.05824 0.80975
0.57	0.15	58		3.92901	Male	0.62	0.12	49		3.92901
0.69	0.06	52	1.178	37.63591 0.00000***	Female	0.67	0.07	61	0.545	8.33353 0.00470**
0.61	0.08	58		3.92901	Male	0.62	0.09	49		3.92901

increasingly highlighted (Bartunek & Reynes, 2014; Sales de Aguiar & Paterson, 2018), especially in professional domains. One proposed solution is to use 'professors of practice', or 'pracacademics', to better connect students with industry and professional practice (Ramsay & Brua, 2017). Such attempts to bridge the tension between theory and practice have also gained traction within higher education, captured here as the difference between 'knowing how' and 'being able' to assist students in negotiating the meanings of reflective practice (Niblock, 2007, p. 20). Prior research thus pointed to the role that professors with real-world experience can play to help students navigate the complexities associated with decisions in the real world and to encourage critical thinking. As our data showed, this suggestion is particularly important with regard to teaching CSR, given its inherent tensions and ambiguities.

5.1 | Implications of our findings

Based on our findings, we argue that sensemaking can indeed be a useful lens to investigate student-learning processes of complex topics. Whilst students in our sample demonstrated solid scanning skills, they struggled with the interpretation of knowledge, which is necessary to understand the consequences of strategic responses by (future) managers. We therefore need to find innovative ways through which students engage in deep learning that moves beyond access to knowledge to a more comprehensive *reflection* as well as *reflexion* in a wider context.

Our findings tally with the distinction by educationalists between three domains within curriculum models, namely knowledge, action and self (Barnett et al., 2001). The knowledge domain refers to those elements of the curriculum that represent discipline-based competencies, whilst action includes competencies acquired through doing and the self develops a reflective education identity in relation to the subject. From this perspective, education requires an increasing emphasis on performativity (use-value) as opposed to knowledge itself. This performativity may take various forms, including epistemological, pedagogical, educational and self-monitoring performativity (Barnett et al., 2001; Mathiasen & Andersen, 2020). At the educational level, the skills internal to the discipline need to be redefined in terms of their value to the world of practice. In terms of teaching CSR, a shift

may be required from an internal, knowledge- and proposition-based learning to an external, applied, issue- and action-based experiential learning (Parker et al., 2020).

Our finding that students who were taught by professors with greater work experience developed more complex cognitive maps also invites further research. Such professors can help expose the challenges inherent in complex subjects, 'not through overt abstraction and application of theoretical models', but through a critical approach that 'illuminates the processes and decision-making from within', thus providing 'critical, reflexive accounts' of contemporary professional practices (Niblock, 2007, p. 23). Various proposals have been put forward to enhance students' problem-solving skills, including consulting projects, field trips, guest speakers, role-plays and service-based learning through volunteering and internships (Sales de Aguiar & Paterson, 2018). A potentially less resource-intensive approach is promised by new technologies and medias (Zhang et al., 2021) that may help students with scanning, interpreting and acting so that they can engage with the underlying tensions in a more systematic fashion.

5.2 | Limitations and opportunities for further research

Our study was conducted in a UK business school; hence, widening the study, especially to the global South, might yield different understandings. This limitation is important because the very notion of CSR generally being 'positive' has been challenged by some scholars who argue that it often overlooks historical, social and political contexts in the global South and that there is a danger of 'CSR as imperialism' (Hamann et al., 2020). In light of this argument, examining student sensemaking in a developing country context could provide valuable insights into how students process such ambiguities and might also help inform attempts to de-colonize curricula by incorporating alternative perspectives.

We are also mindful that a connection, association or correlation does not necessarily explain the causation of the relationship (Zhang & VanDyke, 2022). Therefore, when we observed a 'professor effect', that is a greater complexity in students' cognitive frames at the second and third stage of sensemaking in classes taught by a professor with greater professional experience gained outside higher education, this was linked to a statistically significant correlation between number of words and levels drawn by students taught by different professors, rather than a causal link. Multiple factors influence student outcomes, not just those that we focused on in this study. For example, further research into whether the aforementioned 'professor effect' diminishes when teaching mature students with extensive work experiences, rather than pre-experience students, might bring further insights.

Finally, cognitive maps are one step removed from actual cognition; hence, future studies could apply techniques that directly capture cognition, such as scanning actors' brains and/or using cognitive encoding models (Walters et al., 2022). In our current study, we were unable to implement such techniques due to resource constraints.

6 | CONCLUSION

The goal of this paper was to examine students' sensemaking of sustainability and CSR. The challenges that students, as future managers, will face require them to develop critical mindsets to enable them to reflect on complex issues and to act in a mindful manner. This ability is essential if we are to meet the challenges of sustainability and to prepare our students to be meaningful contributors towards addressing them. Having comprehensively analysed cognitive maps by a sample of undergraduate students on CSR/sustainability, our results point—overall—to a lack of deep sensemaking. Whilst students demonstrated solid scanning skills regarding CSR concepts, they struggled with the interpretation of this knowledge and then also with the identification and evaluation of alternatives of action. One immediate upshot of our application of sensemaking as a lens to analyse student learning is that

we as educators need to increase our efforts to get students to move beyond scanning for information into the realms of interpreting and responding.

We thus contribute to the education literature on critical thinking by demonstrating that relatively little improvement has taken place, at least at the undergraduate level in business studies, in terms of complex reasoning. Our findings also allowed us to develop some ideas on teaching strategies that should foster more comprehensive sensemaking. Overall, these centre around positioning students as sensemakers in the classroom and providing resources and contexts to develop their sensemaking skills, in particular with regard to interpreting knowledge and identifying and evaluating alternatives of action.

Methodologically, we contributed towards research on cognitive maps and its application to the ambiguities associated with CSR. Prior quantitative studies (of which there are few) have examined the complexity of cognitive maps in terms of content only, whereas we make the case for a more systematic investigation that captures their complexity in terms of both content and structure. Last but not least, although our application of sensemaking has been specifically to CSR and sustainability education, our work carries wider importance in terms of how students make sense of multidimensional, intertemporal concepts with complex dynamics as they are associated with the grand challenges facing humanity.

AUTHOR CONTRIBUTIONS

Lutz Preuss: Conceptualization; Methodology; Investigation; Writing—review & editing; Writing—original draft; Formal analysis. **Isabel Fischer**: Conceptualization; Methodology; Investigation; Writing—original draft; Writing—review & editing; Formal analysis. **John M. Luiz**: Investigation; Methodology; Formal analysis; Writing—original draft; Writing—review & editing.

CONFLICT OF INTEREST STATEMENT

No author has any conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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ENDNOTES

[1] Much of this debate is carried out under the heading of responsible management education (RME). RME is in particular linked to the six principles of the UN PRME initiative: purpose, values, method, research, partnership and dialogue (see e.g. Beddewela et al., 2021). By comparison, our purpose is narrower, to use sensemaking to examine cognitive processes underlying CSR teaching and learning. Hence, we use the narrower term CSR/ sustainability education.

[2] Word combinations that are a single entity are counted as one word, for example the 'UN Global Compact'.

REFERENCES

Aichele, C., Hartig, J., & Michaelis, C. (2021). Assessing learning progress: Validating a test score interpretation in the domain of sustainability management. *Studies in Higher Education*, 46(10), 2047–2062.

Alajoutsijärvi, K., Juusola, K., & Siltaoja, M. (2015). The legitimacy paradox of business schools: Losing by gaining? *Academy of Management Learning & Education*, 14(2), 277–291.

Aragon-Correa, J. A., Marcus, A. A., Rivera, J. E., & Kenworthy, A. L. (2017). Sustainability management teaching resources and the challenge of balancing planet, people, and profits. *Academy of Management Learning & Education*, 16(3), 469–483.

Aukerman, M. (2013). Rereading comprehension pedagogies: Toward a dialogic teaching ethic that honors student sensemaking. *Dialogic Pedagogy: An International Online Journal*, *1*, 1–31. https://dpj.pitt.edu/ojs/index.php/dpj1/article/view/9/17

Baden, D., & Higgs, M. (2015). Challenging the perceived wisdom of management theories and practice. *Academy of Management Learning & Education*, *14*(4), 539–555.

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.

Barnett, R., Parry, G., & Coate, K. (2001). Conceptualising curriculum change. *Teaching in Higher Education*, *6*(4), 435–449.

Bartunek, J. M., & Reynes, S. L. (2014). Academics and practitioners are alike and unlike: The paradoxes of academic–practitioner relationships. *Journal of Management*, *40*(5), 1181–1201.

Beddewela, E., Anchor, J., & Warin, C. (2021). Institutionalising intra-organisational change for responsible management education. *Studies in Higher Education*, *46*(12), 2789–2807.

Bunch, K. J. (2020). The state of undergraduate business education: A perfect storm or climate change? *Academy of Management Learning & Education*, *19*(1), 81–98.

Cardon, M. S., Stevens, C. E., & Potter, D. R. (2011). Misfortunes or mistakes?: Cultural sensemaking of entrepreneurial failure. *Journal of Business Venturing*, *26*(1), 79–92.

Colville, I., Pye, A., & Brown, A. D. (2016). Sensemaking processes and Weickarious learning. *Management Learning*, *47*(1), 3–13.

Cullen, J. G. (2020). Varieties of responsible management learning: A review, typology and research agenda. *Journal of Business Ethics*, *162*, 759–773.

Daft, R. L., & Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review*, *9*(2), 284–295.

Davies, J., & Starkey, K. (2020). Can we save the business school? Shut down the business school. What's wrong with management education, by Martin Parker, 2018, London: Pluto Press, 198 pages. *Academy of Management Learning & Education*, *19*(1), 116–120.

Ferraro, F., Pfeffer, J., & Sutton, R. I. (2005). Economics language and assumptions: How theories can become self-fulfilling. *Academy of Management Review*, *30*(1), 8–24.

Fitzgerald, M. S., & Palincsar, A. S. (2019). Teaching practices that support student sensemaking across grades and disciplines: A conceptual review. *Review of Research in Education*, *43*(1), 227–248.

Forray, J. M., & Leigh, J. S. (2012). A primer on the principles of responsible management education: Intellectual roots and waves of change. *Journal of Management Education*, *36*(3), 295–309.

Glynn, M. A., & Watkiss, L. (2020). Of organizing and sensemaking: From action to meaning and back again in a half-century of Weick's theorizing. *Journal of Management Studies*, *57*(7), 1331–1354.

Green, D., & McManus, I. (1995). Cognitive structural models: The perception of risk and prevention in coronary heart disease. *British Journal of Psychology*, *86*(3), 321–336.

Guiette, A., & Vandenbempt, K. (2016). Learning in times of dynamic complexity through balancing phenomenal qualities of sensemaking. *Management Learning*, *47*(1), 83–99.

Gustafsson, A., & Bowen, D. E. (2017). The curious case of interdisciplinary research deficiency: Cause or symptom of what truly ails us? *Journal of Business Research*, *79*, 212–218.

Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2015). Tensions in corporate sustainability: Towards an integrative framework. *Journal of Business Ethics*, *127*(2), 297–316.

Hahn, T., Preuss, L., Pinkse, J., & Figge, F. (2014). Cognitive frames in corporate sustainability: Managerial sensemaking with paradoxical and business case frames. *Academy of Management Review*, *39*(4), 463–487.

Hamann, R., Luiz, J., Ramaboa, K., Khan, F., Dhlamini, X., & Nilsson, W. (2020). Neither colony nor enclave: Calling for dialogical contextualism in management and organization studies. *Organization Theory*, *1*(1), 1–21. https://doi.org/10.1177/2631787719879705

Harris, P. (2008). *Designing and reporting experiments in psychology*. McGraw-Hill Education.

Hodgkinson, G. P., & Healey, M. P. (2008). Cognition in organizations. *Annual Review of Psychology*, *59*(1), 387–417.

Holt, R., & Cornelissen, J. (2014). Sensemaking revisited. *Management Learning*, *45*(5), 525–539.

Huff, A. S., & Jenkins, M. (2002). *Mapping strategic knowledge*. Sage.

Janssen, S., van Vuuren, M., & de Jong, M. D. (2021). Sensemaking in supervisor-doctoral student relationships: Revealing schemas on the fulfillment of basic psychological needs. *Studies in Higher Education*, *46*(12), 2738–2750.

Kaplan, S. (2011). Research in cognition and strategy: Reflections on two decades of progress and a look to the future. *Journal of Management Studies*, *48*(3), 665–695.

Kolodinsky, R. W., Madden, T. M., Zisk, D. S., & Henkel, E. T. (2010). Attitudes about corporate social responsibility: Business student predictors. *Journal of Business Ethics*, *91*(2), 167–181.

Lampert, M. (2010). Learning teaching in, from, and for practice: What do we mean? *Journal of Teacher Education*, *61*(1/2), 21–34.

Levi, A., & Tetlock, P. E. (1980). A cognitive analysis of Japan's 1941 decision for war. *Journal of Conflict Resolution*, *24*(2), 195–211.

Lillo-Viedma, F., Severino-González, P., Santander-Ramírez, V., García, L. Y., Guiñez-Cabrera, N., & Astorga-Bustos, N. (2022). Corporate social responsibility and social network analysis: Unionized workers' perceptions. *Sustainability*, *14*(7), 4320.

Lourdel, N., Gondran, N., Laforest, V., Debray, B., & Brodhag, C. (2007). Sustainable development cognitive map: A new method of evaluating student understanding. *International Journal of Sustainability in Higher Education*, *8*(2), 170–182.

Maitlis, S., & Christianson, M. (2014). Sensemaking in organizations: Taking stock and moving forward. *Academy of Management Annals*, *8*(1), 57–125.

Mathiasen, H., & Andersen, H. L. (2020). Development of critical thinking in higher education. *Journal of European Education*, *10*(1–2), 38–52.

Mesa, W. B. (2019). Accounting students' learning processes in analytics: A sensemaking perspective. *Journal of Accounting Education*, *48*, 50–68.

Moosmayer, D. C., Laasch, O., Parkes, C., & Brown, K. G. (2020). *The Sage handbook of responsible management learning and education*. Sage.

Niblock, S. (2007). From 'knowing how' to 'being able' negotiating the meanings of reflective practice and reflexive research in journalism studies. *Journalism Practice*, *1*(1), 20–32.

Nonet, G., Kassel, K., & Meijs, L. (2016). Understanding responsible management: Emerging themes and variations from European business school programs. *Journal of Business Ethics*, *139*(4), 717–736.

Odden, T. O. B., & Russ, R. S. (2019). Defining sensemaking: Bringing clarity to a fragmented theoretical construct. *Science Education*, *103*(1), 187–205.

Painter-Morland, M., Sabet, E., Molthan-Hill, P., Goworek, H., & de Leeuw, S. (2016). Beyond the curriculum: Integrating sustainability into business schools. *Journal of Business Ethics*, *139*(4), 737–754.

Parker, S., Racz, M., & Palmer, P. (2020). Reflexive learning and performative failure. *Management Learning*, *51*(3), 293–313.

Podolsky, A., Kini, T., & Darling-Hammond, L. (2019). Does teaching experience increase teacher effectiveness? A review of US research. *Journal of Professional Capital and Community*, *4*(4), 286–308.

Porac, J. F., & Thomas, H. (2002). Managing cognition and strategy: Issues, trends and future directions. In A. M. Pettigrew, H. Thomas, & R. Whittington (Eds.), *Handbook of strategy and management* (pp. 165–181). Sage.

Prado, A. M., Arce, R., Lopez, L. E., García, J., & Pearson, A. A. (2020). Simulations versus case studies: Effectively teaching the premises of sustainable development in the classroom. *Journal of Business Ethics*, *161*, 303–327.

Ramsay, C. M., & Brua, C. (2017). Understanding professors of practice: Leveraging expertise, empowering potential. *Journal of Faculty Development*, *31*(3), 25–30.

Sales de Aguiar, T. R., & Paterson, A. S. (2018). Sustainability on campus: Knowledge creation through social and environmental reporting. *Studies in Higher Education*, *43*(11), 1882–1894.

Schad, J., Lewis, M. W., Raisch, S., & Smith, W. K. (2016). Paradox research in management science: Looking back to move forward. *Academy of Management Annals*, *10*(1), 5–64.

Schwandt, D. R. (2005). When managers become philosophers: Integrating learning with sensemaking. *Academy of Management Learning & Education*, *4*(2), 176–192.

Severino-González, P., Gallardo-Vázquez, D., Ortuya-Poblete, C., Romero-Argueta, J., Tunjo-Buitrago, E., Arenas-Torres, F., & Sarmiento-Peralta, G. (2022). Social responsibility: Sustainable development goals and COVID-19—Perception scale of students from higher education institutions. *International Journal of Environmental Research and Public Health*, *19*(9), 5323.

Severino-González, P., Toro-Lagos, V., Santinelli-Ramos, M. A., Romero-Argueta, J., Sarmiento-Peralta, G., Kinney, I. S., Ramírez-Molina, R., & Villar-Olaeta, F. (2022). Social responsibility and spiritual intelligence: University students' attitudes during COVID-19. *International Journal of Environmental Research and Public Health*, *19*(19), 11911.

Slawinski, N., & Bansal, P. (2015). Short on time: Intertemporal tensions in business sustainability. *Organization Science*, *26*(2), 531–549.

Somers, M. J., Passerini, K., Parhankangas, A., & Casal, J. (2014). Using mind maps to study how business school students and faculty organize and apply general business knowledge. *International Journal of Management Education*, *12*(1), 1–13.

Staw, B. M., Sandelands, L. E., & Dutton, J. E. (1981). Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, *26*(4), 501–524.

Suedfeld, P., & Tetlock, P. (1977). Integrative complexity of communications in international crises. *Journal of Conflict Resolution*, *21*(1), 169–184.

Thomas, J. B., Clark, S. M., & Gioia, D. A. (1993). Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes. *Academy of Management Journal*, *36*(2), 239–270.

Walsh, J. P. (1995). Managerial and organizational cognition: Notes from a trip down memory lane. *Organization Science*, *6*(3), 280–321.

Walters, J., King, M., Bissett, P. G., Ivry, R. B., Diedrichsen, J., & Poldrack, R. A. (2022). Predicting brain activation maps for arbitrary tasks with cognitive encoding models. *NeuroImage*, *263*, 119610. https://doi.org/10.1016/j.neuro image.2022.119610

Wei, C. A., Deaton, M. L., Shume, T. J., Berardo, R., & Burnside, W. R. (2020). A framework for teaching socio-environmental problem-solving. *Journal of Environmental Studies and Sciences*, *10*(4), 467–477.

Weick, K. E. (1995). *Sense making in organizations*. Sage.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization science*, *16*(4), 409–421.

Whiteman, G., Walker, B., & Perego, P. (2013). Planetary boundaries: Ecological foundations for corporate sustainability. *Journal of Management Studies*, *50*(2), 307–336.

Zhang, W., & VanDyke, M. S. (2022). Association versus causation. In L. A. Schintler & C. L. McNeely (Eds.), *Encyclopedia of big data*. Springer. https://doi.org/10.1007/978-3-319-32010-6_15

Zhang, X., Zhou, S., Yu, Y., Cheng, Y., de Pablos, P. O., & Lytras, M. D. (2021). Improving students' attitudes about corporate social responsibility via 'Apps': A perspective integrating elaboration likelihood model and social media capabilities. *Studies in Higher Education*, *46*(8), 1603–1620.

APPENDIX 1
COGNITIVE MAP OF A MALE INTERNATIONAL STUDENT

APPENDIX 2
COGNITIVE MAP OF A FEMALE HOME STUDENT