Re-thinking the Role of Corporate Reporting: Supporting Students in the Transition

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We are living in a changing business world in which sustainability strategies are increasingly integrated into core business operations. As business models evolve to reflect these changes, corporate reporting must evolve too, requiring future employees to develop novel competencies. Considering that defining and reporting material environmental and social topics is critical to credible sustainability reporting, we developed a learning module (used either online or as a class presentation) that addresses key materiality concepts. Furthermore, our analysis adds to the literature relating to the effectiveness of online or in-person sustainability education modules. Student reviewers completed pre- and post-surveys assessing their own knowledge and opinions about material environmental and social topics and their connection to financial reporting. The analysis of the responses showed a significant increase in learning and a change in some opinions about corporate reporting after the student reviewers completed the materiality segments. We found that such resources (online or in-person) can support students' learning about the changing corporate reporting context, which could lead to more in-depth discussions in appropriate courses.

Keywords: sustainability reporting, material topics, sustainability education, transformative learning, online modules

INTRODUCTION

Organizations are re-thinking their business models to implement a more sustainable approach to their operations by transitioning toward an increasing emphasis on environmental and social concerns. As a result, the reporting of their performance must change. As sustainability indicators (environmental and social, along with financial) are becoming the responsibility of the Chief Financial Officer (CFO), post-secondary students must develop competencies related to a changing corporate reporting model that also includes specific Sustainable Development Goals that fit under the three broad dimensions of sustainability: economic, environmental, and social. Butcher (2022) explained that the CFO's responsibility for sustainability is shifting from an emphasis on just compliance, reporting, and disclosure to a strategic initiative that includes all functional areas. The finance function recognizes sustainability as connected to risk and the organization's resilience and is therefore integrating sustainability into strategy and budgets.

Consequently, we developed an innovative teaching module to assess students' knowledge levels and opinions about the materiality and risk assessments that organizations undertake to determine significant reporting topics, as well as mandatory reporting on significant topics determined by regulation. The module is flexible and can be used as online preparation prior to class (with audio) or as a PowerPoint presentation for in-class instruction, depending on time available and the type of course. Accordingly, our research question follows:

> *To what extent do modular instructional resources improve post-secondary students' understanding of the transition in corporate reporting, particularly materiality, and shape their perceptions of corporate reporting responsibilities?*

Studies have shown that the financial community depends on clear, concise, and credible reporting on the environmental and social dimensions of sustainability, as well as the financial dimension, to make sound investment decisions, especially regarding risk. Research by Lackmann et al. (2012) found that the market reacts positively to reliable sustainability reporting, especially for companies that tend to carry higher risk. Additionally, they proposed that in times of economic uncertainty, the reliability of sustainability reporting is a differentiating factor used by investors. Consequently, professional accounting and finance associations are also progressing toward developing sustainability competencies by offering programs and certificates in sustainability. For example, the Chartered Financial Analyst (CFA) Institute offers three programs related to sustainability: Climate Risk, Valuation, and Investing Certificate; Sustainable Investing Certificate; and Climate Finance (CFA Institute, 2025). The Chartered Professional Accountants (CPA) includes key sustainability topics in competency maps and offers a Sustainability Certificate (CPA, 2022).

Beamond et al. (2024) performed a systematic review of sustainability content in business education, finding it lacking. If faculty are not familiar with sustainability content, it takes time and effort to integrate these topics into conventional or stand-alone courses. Our research discusses a resource that will be made available to anyone who wishes to use it as self-contained online modules with audio or a set of downloadable PowerPoint presentations. They can be used for student preparation prior to a formal class through a stand-alone segment with more in-depth discussion in a classroom setting, or introduced by the instructor through PowerPoint presentations during class time. Often, instructors feel that they do not have sufficient time to cover all the required content. This resource provides an opportunity for students to learn basic knowledge of sustainability topics through self-study, allowing the instructor to relate the material to conventional topics or have more in-depth discussions during class.

Since the COVID-19 pandemic, Hakkarainen et al. (2024) found that online sustainability education is becoming more prominent at post-secondary institutions. However, there is a lack of research supporting its effectiveness. Our research provides evidence that online sustainability education can be engaging and effectively increase knowledge levels and opinions about evolving business models and the reporting of business performance. However, the online approach is best if the content is further developed through classroom discussions. The content can also be introduced and discussed in the classroom alone if time permits. The resource has been used in both formats by the authors.

Universities must support organizations and the professions in their need for qualified employees in this transition to a new form of corporate reporting. To fill this gap, the authors developed two modules to help students understand this transition to a reporting framework that is relevant to all stakeholders, not just capital providers (shareholders and creditors). Both modules use topic-related subject matter, quotations by subject matter experts, illustrations, examples of progressive businesses, short videos, and reflective questions to illustrate how leading companies are successfully addressing the environmental and social dimensions as a complement to the economic/financial dimension of sustainability and credibly reporting on all three dimensions.

Companies are recognizing that business models need a more contemporary form that fits today's societal needs regarding environmental and social concerns. The Business Roundtable, whose membership consists of the Chief Executive Officers of the largest companies in the United States, has proclaimed that a business mission should include more than profit; it should also be about purpose (Business Roundtable, 2019). Therefore, the first module is entitled *Re-thinking the Role of Business*. Complementary to the change in business mission, shareholders no longer hold primacy. Consequently, many companies are transitioning from classical, competitive capitalism to new forms of capitalism that emphasize cooperation to solve societal problems, such as capitalisms with titles similar to "stakeholder," "creative," "conscious," "inclusive," and "sustainable" (Freeman et al., 2007; Hemphill, 2010; Conscious Capitalism, 2024; Coalition for Inclusive Capitalism, 2023; Gore & Blood, 2012). The second module, titled *Re-thinking the Role of Corporate Reporting*, and the focus of this research, illustrates how corporate reporting must also transition to "fit" the change in business models. To help with this transition, a number of standard-setting organizations have formed to provide guidance for credible reporting, such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the Task Force on Climate-Related Financial Disclosures (TCFD), the Value Reporting Foundation (VRF), and the European Financial Reporting Advisory Group (EFRAG) which issued the Corporate Sustainability Reporting Directive (CSRD), to name a few. Recently, many of these standard-setters are working together under the International Sustainability Standards Board (ISSB), which is part of the International Financial Reporting Standards (IFRS).

One characteristic of credible reporting is reporting on topics of importance (material topics) to stakeholders and the company. The materiality of many environmental and social topics changes depending on the industry and location of the business. Therefore, the first step in the transition, supported by the standard-setters, is to decide which topics are important or material to an organization's stakeholders, including the financial community as well as other significant stakeholders. Material topics are those that can harm the business or create risk to society or both. In contrast, if action is taken, material topics can also provide opportunities beneficial to business and society.

To conduct the research, student reviewers were chosen from several different disciplines, with approximately half majoring in business. The student reviewers were asked to complete a pre-survey, then to view the two learning segments on the topic of materiality, and thereafter to complete a post-survey. We analyzed the students' anonymous responses regarding the student reviewers' level of knowledge and their perceptions of companies' responsibilities to report material items and to whom. We also analyzed the effects of demographic variables on students' responses regarding business responsibility for reporting sustainability topics (financial, environmental, and social).

This study evaluates a modular instructional resource designed to support students' understanding of materiality and the changing role of corporate reporting. Using the pre- and post-module surveys together with qualitative responses to open-ended questions, we examined changes in knowledge, perceptions, and student reflections regarding sustainability reporting and the responsibilities of business. The findings show that the student reviewers had little exposure to the concept of materiality before viewing the module segments. The consensus of the student reviewers was that environmental and social aspects of sustainability were part of business reporting responsibilities. This study contributes to the literature on sustainability education by providing empirical evidence of the effectiveness of modular, scalable teaching interventions in developing materiality-related competencies.

LITERATURE REVIEW

The Concept of Materiality

Although financial reporting has a long history, it is continually evolving to include relevant topics as the context in which business operates changes. For example, the balance sheet and income statements are standard, but even these statements sometimes appear with more contemporary names, such as statement of financial position and statement of operations. Internationally, the cash flow statement was added to the required statements by the International Accounting Standards Board in 2001 (IFRS Foundation, IAS 7, n.d.). Even though revisions only come with considerable input from stakeholders, especially members of the financial community as to what and how financial information should be reported for it to be useful, the statement was revised from the first 1977 statement and revised again in 2016.

Therefore, now that sustainability reporting or specifically environmental and social reporting are being added to required reporting, it makes sense that organizations engage with stakeholders to determine what is relevant and useful to them. When the Global Reporting Initiative (GRI), the first globally recognized sustainability reporting standard setter, released its first set of guidance, it required organizations to engage with their stakeholders to identify which environmental and social topics they felt were material. Materiality was determined by two conditions: What is important to the stakeholders? What has the greatest impact on the organization? (GRI, 2013; KPMG International, 2013). In the most recent standard on materiality, GRI Standard #3, the organization is to determine the severity of the material topics by addressing the scale, irremediable character, and the scope, as well as the likelihood that they will materialize (GRI, 2021). The revised GRI definition of materiality makes it similar to the definition of risk as it relates to the organization and to society.

Subsequently, with the availability of other reporting standards, such as the Sustainability Accounting Standards Board (SASB), materiality has become an even more important topic. However, in contrast to the GRI Standard, which requires the organization to engage with stakeholders to determine materiality, the SASB has pre-determined which topics are important to an organization based on its industry. With the release of IFRS Standard 1 by the International Sustainability Standards Board (ISSB), the ISSB still requires a determination of material topics by the organization. The ISSB has merged its standards with the SASB and suggests that an organization should begin to define its material topics by reviewing those topics suggested by the SASB for its industry. However, if the organization finds the SASB topics inappropriate, ISSB suggests using other approaches and materials to determine materiality (IFRS S1, 2023). One approach might be to engage with stakeholders.

Initially, materiality was narrowly defined to include only impacts to the organization that significantly affect financial performance. More recently, double materiality has come to the surface, which covers not only significant impacts to the organization but also any significant impacts that the organization has on the planet and society. Climate-related impacts are an example of double materiality, as they can affect an organization's financial performance but also have detrimental effects on the planet and society. Standard setters in the European Union recognize and require reporting under double materiality based on the standards under the European Financial Reporting Advisory Group (Dumitru et al., 2023).

To prepare the two segments on materiality for the module titled *Re-thinking the Role of Corporate Reporting*, we found it impossible to cover all material topics for every industry in every location; therefore, we selected a few topics that we felt would be important to most organizations. In addition to the general concept of engagement with stakeholders, the topics chosen were greenhouse gas emissions reduction, conflict minerals, modern-day slavery, and CEO-to-average-worker pay ratio. We explain each of these topics briefly and why they were chosen.

Climate Change and Greenhouse Gas Emissions (GHG Emissions)

The topic of greenhouse gas (GHG) emissions relates to at least two Sustainable Development Goals (SDG): SDG#7 Affordable and Clean Energy; and SDG#13 Climate Action. Although there are still disbelievers in climate change, the evidence is mounting that GHG emissions are at least a partial cause of climate change. The Pew Institute, using data from the National Oceanic and Atmospheric Administration

(NOAA), reported a significant increase in the frequency and the impact (cost) of disasters when comparing two 20-year periods (2003 to 2022 compared with 1983 to 2002) (Sanders, Pew Institute, 2023). This parallels an increase in GHG emissions released into the atmosphere. "Frequency" multiplied by "impact" is the calculation used to determine the degree of risk. Therefore, if the frequency and impact (or severity defined as the dollar amount of impact) of disasters is increasing, the probability of climate change affecting business operations is also increasing. Furthermore, the International Sustainability Standards Board (ISSB) defined risk as an important disclosure component of IFRS S2: Climate-related Disclosures. (IFRS S2, June 2023).

Considering the increasing number of mandatory requirements and voluntary standards for climate-related disclosures, we chose GHG emissions as a material topic to discuss in the online module, as it is fast becoming a reporting requirement for many organizations. MSCI (May 2023) reported an increasing number of companies disclosing not only Scope 1 (direct emissions) and Scope 2 (indirect emissions) but also Scope 3 (supply-chain emissions). Many global indices also require reporting of GHG emissions reduction efforts. Furthermore, many standard setters not only suggest several indicators to use in reporting, but they also request disclosure of a detailed transition plan. To name a few of those standards, IFRS S2, the European Sustainability Reporting Standards (ESRS) under the Corporate Sustainability Reporting Directive (CSRD), and the United Kingdom's Disclosure Framework under the UK Financial Conduct Authority (FCA) (CDP, 2024) all require reporting of transition plans.

Knowing progress in emissions reduction is important for organizations as it supports understanding of the organization's resiliency and the resiliency of our planet. In addition, the organization and society can experience financial risks related to decreases in revenues or additional costs to address the effects of climate-related disasters on property, plants, and equipment. In contrast, the organization can potentially experience cost savings from decreased emissions by avoiding fees or penalties for failing to meet required emissions reductions, as well as conserving raw materials, since emissions represent raw materials lost to the atmosphere. In addition, GHG reduction efforts could reduce the risk of future regulation of fossil fuel use.

Conflict Minerals

Conflict minerals reporting addresses three SDGs: SDG#8 Decent Work and Economic Growth; SDG#10 Reduced Inequalities, and SDG#16 Peace, Justice, and Strong Institutions. Conflict minerals are common and rare minerals that are used in manufacturing processes and are mined in areas that experience some sort of conflict, such as civil war (OECD, 2016). "Conflict-affected and high-risk areas are identified by the presence of armed conflict, widespread violence, or other risks of harm to people. Armed conflict may take a variety of forms, such as a conflict of international or non-international character, which may involve two or more states, or may consist of wars of liberation, or insurgencies, civil wars, etc." (OECD, 2016, p. 13) The concern is that revenues from these minerals may be used to support conflict or the wealth of a few politicians rather than improving the quality of life for much of the population in these countries. The Democratic Republic of the Congo is an area of conflict where considerable mining is done; however, it is not the only area of conflict. The Global Conflict Tracker shows conflicts in many countries in Africa and the Middle East, as well as some in Central America and the East (Council on Foreign Relations, n.d.).

Initially, an organization or consumer might think they have no connection to conflict minerals; however, many organizations that manufacture our electronic products could source minerals from conflict areas. Therefore, companies must audit their supply chains to determine if any of their supplies come from conflict zones, even if they buy the minerals indirectly through a chain of suppliers and not directly from the conflict zone. Several countries, including the European Union, the United States, and Canada, to name a few, require reporting on conflict minerals. The OECD also provides guidelines on conflict minerals (OECD, 2016).

Silva & Schaltegger (2019) conducted a systematic review of the literature on social assessment and management approaches for investigating the use of conflict minerals in supply chains. However, they found that the effectiveness of various approaches has yet to be studied. According to Silva & Schaltegger (2019), assessing and reporting conflict minerals in supply chains is an important attempt to hold companies

responsible for social and human rights in their supply chains; therefore, we chose conflict minerals as a material topic worthy of discussion.

Modern-Day Slavery

We chose modern-day slavery (also referred to as forced labor) as another material topic for many businesses, especially those in resource-extractive industries and textile industries, which may unknowingly engage in modern-day slavery. This materiality topic is aligned with SDG#8 Decent Work and Economic Growth and SDG#10 Reduced Inequalities. As well, modern-day slavery can be associated with conflict minerals. Furthermore, modern-day slavery is a global issue, and some forms of it exist in almost every country. According to Mende (2019), there is no consensus on the definition of modern-day slavery; however, any form has three dimensions: 1) control of a person by another; 2) an unwanted or involuntary component; and 3) exploitation of a person. Examples of different forms of modern-day slavery are child labour, debt bondage (working to pay off a form of debt), forced labour, and human trafficked labour (Mende, 2019), but the list is not comprehensive.

There are laws to prevent modern-day slavery in many countries, and the number is growing that require organizations to report they are not supporting modern-day slavery through their operations, either directly or indirectly in their supply chains. The UK was the first country to step forward to address this issue through legislation. Other countries or jurisdictions have already passed laws or are working to get them passed, such as Canada, the United States, Australia, and several European countries like France, the Netherlands, and Norway. Companies within these areas must publish their anti-slavery supply chain audit and verification information.

Ratio of CEO Pay to Average Worker Pay

Several countries require reporting the ratio of CEO to average or median worker pay. According to Arnot (27 November 2024), the United States, the United Kingdom, France, the Netherlands, Finland, and Denmark require the reporting of some form of this ratio. This ratio is primarily in line with SDG#10 Reduced Inequalities. A large pay ratio between the top earners and the average earners can decrease morale in the organization and potentially make employees less productive and less caring about their work. It also creates inequalities within the country, potentially leading to poverty, protests, and revolutions. The Council for Inclusive Capitalism (2025) reports that over the past 40 years, although worker productivity has increased approximately 70 percent, hourly wages have only increased approximately 12 percent. In a report for the Economic Policy Institute, Mishel and Wolfe (2019) found that in the United States, "CEO compensation has grown 940% since 1978, while typical worker compensation has risen only 12% during that time" (p. 1). Considering concerns about distributive justice, many stakeholders who see the benefits of equality believe this is a material topic for reporting (Cheng & Zhang September 6, 2023). Furthermore, Cheng & Zhang (2023) found that stakeholders can influence companies with high CEO-to-average-worker pay ratios to reduce the gap.

The legislative bodies in each country provide guidance for calculating the ratio; however, the Global Reporting Initiative (GRI), an important standard setter for sustainability reporting, also provides guidance on how to calculate this ratio for reporting organizations that are not under legislation to report.

There are some pros and cons to reporting this ratio. Those in favor argue that knowing the ratio helps policymakers to address the inequality in society. Boyer (2021) found that in the United States inequality in both income and wealth decreased between 1920 and 1980 but increased thereafter. Transparency is important for shareholders to make better decisions about their investments. However, Bank and Georgiev (2019) criticize the Securities and Exchange Commission's reporting of pay ratio in the United States. Although they support reporting the ratio, they argue that its information quality could be improved if more context were provided around the numbers to make it more comparable among companies. Companies' operations and pay strategies can be quite different, and too much flexibility is allowed in the calculations.

Transformative Learning

As organizations are changing their business models to operate more sustainably, post-secondary institutions have a responsibility to prepare students for positions that require knowledge of sustainability performance and reporting. Based on the United Nations Global Compact for business, many post-secondary institutions have signed to adhere to the United Nations Principles for Responsible Management Education (PRME) (UN PRME, 2023). By signing PRME, academics pledge to create learning opportunities for post-secondary students to develop competencies to support responsible management. Academic faculty pledge to conduct research on the topic and provide leadership for the next generation of business leaders to operate in a sustainable manner. Just revamped in 2024, PRME has seven principles. Briefly, the principles support the following actions: 1) Purpose: develop capabilities to generate sustainable value; 2) Values: instill the need for global social responsibility; 3) Teach: integrate responsible management concepts and practices; 4) Research: inspire responsible management and educational practice; 5) Partner: engage with all organizations to advance responsible and accountable management; 6) Practice: adopt responsible and accountable management principles in governance and operations; 7) Share: share successes and failures to enable collective learning, common values, and purposes.

In our study, the PRME principles of Teach and Share are emphasized. By creating these modules, we support the teaching of responsible management concepts and practices. Because this research focuses on materiality in sustainability reporting, we also support sharing successes and failures to enable learning and improve performance. We also encourage transparency to stakeholders by sharing progress on the organization's commitment to improve topics of significance to stakeholders and of impact to the organization. In addition, the world-recognized Association to Advance Collegiate Schools of Business (AACSB), an accrediting organization for business schools, has introduced Standard 9: Engagement and Societal Impact to motivate business schools to integrate societal impact into their curriculum and related activities (Conklin and Houston, 2024).

Transformation is perceived as a dramatic or meaningful change. However, we prepared these modules with the expectation that even a minor change in our approach to corporate reporting would be important, as the concept of reporting only financial results as the only information that is important to stakeholders has long been engrained in our business systems. In their systematic literature review covering 1999 through 2019, Rodríguez Aboytes & Barth (2020), reported that transformative learning regarding sustainability is immature but could play a strong role in our efforts toward a more sustainable planet.

Mezirow's work (1997) builds on the work of other researchers but has been a major influence on the development of the theory of transformative learning for adults. According to Calleja (2014), other early influencers were Freire (1974), Habermas (1971, 1984, 1987), and Kuhn (1962). Mezirow (1997) explained that we acquire "frames of reference" which are "structures of assumptions through which we understand our experiences" (p. 5). As transformative learning applies to corporate sustainability reporting, it would motivate students to reflect on conventional beliefs about the corporate reporting system, limited to financial reporting, and consider a contemporary system that includes environmental and social topics that can affect financial performance. Often, we disregard concepts that do not appear to fit within our conventional frame of reference or "habits of mind" that become part of our "point of view" (Mezirow, 1997, p.5). Rodríguez Aboytes & Barth (2020) suggested that for transformative learning to occur, students need to be presented with "disorienting dilemmas" that allow them to question their conventions.

Because the world has changed from a large middle class to a few people controlling most of the wealth (for example, see Amladi, January 20, 2025), social topics such as modern-day slavery, CEO-to-average-worker pay ratios, diversity, equity, and inclusion have become important topics to stakeholders. Furthermore, due to the growth in population on our planet, more resources are needed to satisfy needs and wants. Scarce minerals needed to transition to renewable energies are often mined in conflict regions. Not only might the revenues from mineral production support the conflict, but also workers may be paid low wages or forced to work in mines, creating what is referred to as modern-day slavery. Often, these topics are of interest to stakeholders of an organization, as they do not want to buy products that support unethical or illegal practices.

Thus, the material in the module on *Re-thinking the Role of Corporate Reporting* presents balanced, yet disorienting dilemmas, which create opportunities for critical evaluation and reflection on how reporting must change to accommodate the needs of a changing business context. This research reports on the effectiveness of the modules in supporting students' readiness to support reporting appropriate for a revised business model.

MODULE DESIGN

To introduce the change in corporate reporting to post-secondary students, we created two modules with separate but interrelated segments. The first module is on the topic of *Re-thinking the Role of Business.* The titles of the four segments follow: 1) The Evolution of Capitalism; 2) Practicing Contemporary Capitalism; 3) Most Prevalent Alternative Forms of Capitalism; and 4) Other Alternative Forms of Capitalism. To complement the first module, the second module is on the topic of *Re-thinking the Role of Corporate Reporting.* This second module consists of seven segments on the following topics. 1) Sustainability Fundamentals; 2) Implementing Sustainability at the Organization Level; 3) Materiality (General and GHG Emissions); 4) Materiality (Modern-day Slavery, Conflict Minerals, and Pay Ratio); 5) Evolution of Sustainability Reporting; 6) Credibility of Sustainability Reporting; and 7) Value Creation Reporting. Only the results of the two segments (Segments 3 and 4) on materiality are discussed here.

Each segment has specific objectives. The segments on materiality have the following objectives:

Segment 3

1) Comprehend how organizations define sustainability through material topics.
2) Apply the materiality concept to certain topics that many organizations address, such as climate change.
3) Identify key accounting standard setters that make disclosure more useful and relevant.
4) Characterize key reporting guidelines outside the financial accounting realm that are used to report on sustainability.

Segment 4

1) Review the concept of materiality (As we designed the segments to stand alone, this segment has a brief introduction to the concept of materiality as well).
2) Apply the materiality concept to global issues such as modern-day slavery, conflict minerals, and pay ratio.
3) Identify key organizations and their purposes that work with accounting standard setters to make disclosure more useful and relevant.
4) Characterize key reporting guidelines outside the financial accounting realm that are used by reporting companies.

The authors prepared the segments using facts, videos, illustrations, quotations from subject matter experts, organization examples, questions of a reflective nature, and summaries. The segment preparation was also guided by Bloom's (1956) taxonomy to ensure students were acquiring several levels of learning. These levels are defined as follows:

- Recall facts, definitions, and concepts.
- Comprehension of the subject matter.
- Application of the ideas, concepts to an example: company organization, government, or its agencies, or a situation.
- Analysis of the various parts of a challenge or situation.
- Synthesis of major findings in the analysis.
- Evaluation or judgement or decision based on the above steps.

METHODS

To ensure both professional relevance and student effectiveness, the modules underwent a multi-stage review process. Before student review, the modules were sent to a number of business people and professionals working in the field of sustainability performance and reporting. After their reviews, we incorporated their feedback for improvement of the modules prior to student reviews. Once the segments were designed and ready for student review, an invitation was sent to potential student reviewers with the intent to determine the knowledge acquired and to provide an avenue for student reviewers to give feedback to improve the segment. Students who completed both the pre- and post-surveys received a university bookstore certificate for needed books and supplies. The research plan was reviewed and approved by the University of Calgary's Conjoint Faculty Ethics Board (REB20-1426).

The institutional setting for this study, the University of Calgary, was a large publicly funded university offering undergraduate, graduate, and professional programs. Because sustainability reporting is often linked to accounting and finance curricula, business students were the primary target audience for reviews; however, given that responsibility for sustainability reporting is shared by multidisciplinary teams, we sought student reviewers from diverse disciplines across campus. Consequently, student reviewers from a variety of majors answered the surveys. Recruiting participants from different majors and programs offered data to test whether prior experience with sustainability or year of study influenced learning outcomes. The authors instructed the student reviewers to complete the pre-survey, view the interactive segment, and then complete the post-survey.

The pre-surveys for both segments included the extent of knowledge about each materiality topic (Likert scale) and demographic variables (major, gender, year of study; related previous courses). Along with the same questions in the pre-survey, the post-survey included these additional questions:

- Extent of agreement with statements regarding the responsibility of businesses for reporting certain materiality topics (Likert scale);
- Content-specific questions about material topics and their meaning;
- Questions about various standard-setters and their purpose;
- Feedback on the effectiveness of the segment, along with suggestions for improvement.

The number of respondents for the materiality segments was 20. T-tests and frequencies were used to compare pre- and post-survey responses. Student responses to post-survey questions asking for their impressions of the segment and suggestions for improvement, as well as responses to knowledge assessment questions were analyzed using an inductive thematic approach. Responses were first read in their entirety on a segment basis, reflecting the distinct learning objectives of each segment. Responses were then reviewed iteratively to identify recurring ideas, patterns, and common perspectives across participants. Similar responses were grouped into broader themes that reflected shared aspects of the student learning experience, including perceptions of module effectiveness, engagement with the content, and evidence of conceptual understanding. Illustrative quotes are provided in the analysis section below.

ANALYSIS AND DISCUSSION

Descriptive Statistics

The descriptive statistics (See Table 1) show that the sample held a nice balance between male and female respondents on both the pre- and post-surveys, ranging between 57-60 percent males and 40-43 percent females, depending on whether the survey was the pre- or post-survey. As well, many of the respondents, 50-55 percent, were majoring in business and between 45-50 percent were non-business majors. As most organizational sustainability teams are multi-functional, it is important that the transition in corporate reporting is an essential topic for diverse post-secondary majors. This mix in our sample gave us an opportunity to compare responses between business and non-business majors, as well as other demographic variables. Most respondents were undergraduate students, ranging from 75-76 percent; however, the sample did have a few graduate students, 19-20 percent, and one post-graduate student.

TABLE 1
DESCRIPTIVES: DEMOGRAPHICS AND NUMBER OF RESPONDENTS

Category		Segment 3: Materiality		Segment 4: Material Social Topics	
		Pre-survey	**Post-survey**	**Pre-survey**	**Post-survey**
Gender	Male	12(57%)	12(60%)	12(60%)	12(57%)
	Female	9(43%)	8(40%)	8(40%)	9(43%)
Majors	Business-related	11(52%)	10(50%)	11(55%)	11(52%)
	Non-business-related	10(48%)	10(50%)	9(45%)	10(48%)
Year of study	Undergraduate (1, 2, 3 and 4)	16(76%)	15(75%)	15(75%)	16(76%)
	Graduate	4(19%)	4(20%)	4(20%)	4(19%)
	Post-Graduate	1(5%)	1(5%)	1(5%)	1(5%)
Total number of participants		21	20	20	21

Using t-tests (See Table 2), next we compared the responses to determine to what extent the students could fulfill the objectives for the two segments. Responses were provided on a Likert scale (0-4) with the following anchors: strongly agree = 4; somewhat agree = 3; somewhat disagree = 2; strongly disagree = 1; unsure = 0. Unsure answers were not included in the t-test analysis but reported separately. The overall mean value on the pre-survey for Segment 3 (stakeholder engagement, general materiality, standard-setters, and GHG emissions) was 1.90, showing a low level of overall understanding. The most common response was "somewhat disagree" or "strongly disagree" that they could fulfill the objectives. The percentage of "unsure" answers ranged from 0-15 percent, depending on the objective. In contrast, after viewing the segments of the module, the overall mean on the post-survey was 3.42, indicating a "somewhat agree" or "strongly agree" response ($p < .01$). Even though there were a few "unsure" responses on the post-survey, the "unsure" responses were reduced considerably.

The results from the analysis of the objectives for Segment 4 (review, modern-day slavery, conflict minerals, and pay ratio) were similar to those of Segment 3, except for the first objective, which was a review of what was covered in Segment 3 on materiality (See Table 3). Recall that Segment 3 included a discussion of one material topic, that of GHG emissions. The review of materiality was necessary for the segments to be able to stand alone. All responses on the objectives had an overall mean of 2.31 on the pre-survey and an overall mean of 3.52 on the post-survey. Except for the review objective, all other objectives showed a strongly significant improvement in learning ($p < .01$). The first objective also showed a significant improvement ($p < .05$), as only one material topic was covered in the earlier segment. The "unsure" responses decreased from 0-15 percent on the pre-survey to a 5 percent level of "unsure" for just two objectives on the post-survey, which is equal to one respondent.

TABLE 2
SEGMENT 3 COMPARISON OF PRE- AND POST-SURVEY RESPONSES ON OBJECTIVES (COMPETENCIES) (4=STRONGLY AGREE)

Objective	Pre-survey Means	Post-survey Means	t-statistic	p-value	Percentage of Unsure: Pre-Survey	Percentage of Unsure: Post-Survey
1. I comprehend the concept of double materiality as it pertains to financial reporting, and environmental and social reporting.	1.55	3.40	9.45	0.00***	0.00%	0.00%
2. I can identify some material sustainability topics that are significant for many industries.	2.15	3.60	6.18	0.00***	0.00%	0.00%
3. I can identify some material sustainability topics that are significant for investors.	2.00	3.37	5.60	0.00***	0.00%	0.00%
4. I can describe the process that organizations use to identify material topics for sustainability performance and reporting.	1.89	3.39	5.30	0.00***	10.00%	0.00%
5. I can distinguish between Scope 1, 2 and 3 emissions.	1.60	3.33	5.77	0.00***	15.00%	10.00%
6. I comprehend why reporting both absolute and intensity of emissions should be reported.	2.69	3.69	4.14	0.00***	10.00%	10.00%
7. I can recognize key standard setters for sustainability reporting disclosures.	1.50	3.44	8.80	0.00***	10.00%	0.00%
8. I can distinguish between key standard setters for sustainability reporting	1.58	3.26	8.29	0.00***	5.00%	0.00%
9. I can name financial documents that would contain disclosures about climate change.	2.11	3.32	4.65	0.00***	0%	5.00%
Mean value	1.90	3.42	6.47	0.00***	5.56%	2.78%

***p<.01; **p<.05; *p<.10

TABLE 3
SEGMENT 4 COMPARISON OF PRE-AND POST-SURVEY RESPONSES ON OBJECTIVES (COMPETENCIES) (4=Strongly agree)

Objective	Pre-survey Means	Post-survey Means	t-statistic	p-value	Percentage of Unsure: Pre-Survey	Percentage of Unsure: Post-Survey
1. I can identify topics that are material for many industries.	2.75	3.30	2.46	0.02**	0.00%	0.00%
2. I can define modern-day slavery.	2.53	3.74	5.75	0.00***	5.00%	0.00%
3. I can explain the corporate reporting requirements for modern-day slavery.	1.89	3.28	6.93	0.00***	10.00%	0.00%
4. I can name some products that might be associated with modern-day slavery.	2.26	3.79	5.27	0.00***	5.00%	0.00%
5. I comprehend why companies need to report their use of potential conflict minerals.	2.63	3.63	3.77	0.00***	5.00%	0.00%
6. I can identify where pay ratio is found in the company's documents.	1.94	3.61	5.32	0.00***	5.00%	5.00%
7. I can explain the pay ratio.	2.18	3.47	4.40	0.00***	15.00%	0.00%
8. I can argue whether the pay ratio is an important indicator for investors for their decisions.	2.29	3.35	4.01	0.00***	10.00%	5.00%
Mean value	2.31	3.52	4.74	0.00***	6.88%	1.25%

***p<.01; **p<.05; *p<.10

Knowledge Assessment, Participant Impressions, and Course Evaluation

This section discusses findings related to respondents' post-course knowledge assessment, impressions of their learning experience, and evaluation of the course materials.

Segment 3

One knowledge assessment question asked respondents to explain double materiality. Many of the responses were correct and complete, such as:

> *Double materiality is when an important issue to stakeholders affects both the financial aspect of the organization, as well as the social and environmental surroundings of the business.*

This response correctly recognizes that the financial impacts on the company are just one aspect of materiality, while double materiality also includes the company's impact on society and the environment. A few responses focused on the company's external impacts but neglected to include financially material information in the definition. This is important because students demonstrated knowledge of impact materiality, a concept that is often missing in the financial accounting curriculum, as it is more common in sustainability reporting than traditional financial reporting. These responses suggest the module expanded participants' understanding of what constitutes reportable information, broadening their concept of corporate reporting beyond that codified in traditional financial reporting standards to include organizational impacts on society and the environment. In the post-course survey, respondents showed a solid understanding of these concepts.

Respondents were asked to share their impressions on videos contained in the module segment. A common theme was an appreciation for their short length and informativeness. Some respondents perceived videos, such as those related to climate change, to be already understood, while others found the background information relevant and helpful. These findings suggest students may perceive the topics differently, and to onboard all learners, some might be exposed to material with which they are already confident. One student noted:

> *I thought that all these videos were the perfect length, and even though the last one was 6 minutes, it was engaging and interesting to listen to.*

Another student wrote:

> *The Climate Basics Video felt a bit outdated, and so I was less engaged in that one. I appreciated the length of the videos; they were easy to consume.*

Student perceptions of the level of difficulty of the module varied. More than half of respondents selected "somewhat difficult" while the next most common response was "somewhat easy." Only one participant found the module to be "extremely easy," and no respondents chose "extremely difficult." Variation in perceived difficulty suggests the module was accessible to all students while still providing sufficient challenge to promote engagement, regardless of background or prior experience with the topics. In providing an opinion on how the course could be improved, one student noted:

> *The more one listens and studies on the topic the easier it becomes, so make them accessible to the wide public and share with other organizations.*

This response suggests the student perceived the segment as having value beyond the classroom, with the potential to contribute to broader knowledge and practice. Other respondents highlighted the engaging quality of the materials. Common improvements suggested reducing the amount of text, changing font size,

and improving the understandability and simplicity of graphs and charts. The module's segments were revised to incorporate this feedback.

Segment 4

After reviewing the segment, many participants were able to give correct examples of conflict minerals, as well as name regions and industries that are susceptible to modern-day slavery. Students were also, with only a few exceptions, able to differentiate SASB standards from GRI standards, the first being primarily of interest to the financial community, and the second being of interest to all stakeholders. Performance was slightly weaker on stakeholder engagement in determining material topics for reporting purposes, although many students were still able to answer the related questions correctly.

Participants were asked to share their impressions of the module segment. One participant related the segment topics to their own life. This response suggests an emerging transfer of learning, as the participant applied concepts introduced in the module to a familiar personal context and reflected on their own consumer behaviour. They noted:

> *I liked that this module could be related to myself too, because I know brands that use modern-day slavery, so it's interesting to me to think a bit more critically about things in my life.*

Participants frequently identified modern-day slavery, CEO-worker pay ratios, and the distinctions among reporting standards as the most memorable aspects of the module. The comments were enthusiastic, and many showed a willingness to change the way business is done to address the two latter issues. Comments such as these suggest that authentic case examples encouraged participants to critically reflect on contemporary business practices and the societal implications of corporate reporting. For example, one participant said:

> *Modern slavery video was fantastic because we've all heard about modern-day slavery but to watch this video and have all this information laid out right in front of us is enraging and motivating to do something.*

Like segment 3, participant perceptions of the module's level of difficulty varied. Nearly half of respondents selected "somewhat easy" while the next most common response was "somewhat difficult." When asked how the course might be improved, the feedback was positive, with words like "amazing," "well done," "engaging," "informative," "attention grabbing," and "perfect." One participant noted aspects of the videos were "a little dry" but this sentiment was not repeated by others. Some participants suggested the differences between reporting standards be visually presented as a table or diagram to be more easily understood. These suggestions were considered when revising the final versions of the videos.

Demographic Variables

An analysis of responses on the pre- and post-surveys by comparing demographic variables of gender, major, experience (with previously related courses) and year of study shows only minor differences. All categories increased their knowledge, showing significant differences from the pre-survey to the post-survey. For Segment 3 engagement and climate change, all except two p-values were under .01, one was under .05, and the other was under .10. The changes in experience and year of study result primarily from the number of students in these categories, as all except two students had taken previous courses that were designed to gain knowledge related to sustainability. There was only one respondent that fell into the category of graduate/post-graduate (See Table 4). Comparable results occur in Segment 4 (conflict minerals, modern-day slavery, and pay ratio (See Table 5). All categories show a significant increase in knowledge when comparing pre- and post-survey responses. Four categories show improvement at less than .01, while the other categories show improvement at less than .05.

TABLE 4
SEGMENT 3 COMPARISON OF PRE- AND POST-SURVEY RESPONSES ON OBJECTIVES BASED ON DEMOGRAPHIC CHARACTERISTICS

Category		Pre-Survey Means	Post-Survey Means	t-statistic	p-value
Gender	Male	2.13	3.41	5.59	0.00***
	Female	1.54	3.42	7.30	0.00***
Major	Business-related	2.10	3.36	5.40	0.00***
	Non-business-related	1.69	3.47	6.87	0.00***
Experience	Previously taken relevant courses	1.98	3.38	7.19	0.00***
	Previously not taken relevant courses	1.19	3.61	9.97	0.06*
Year of study	Year 1 and Year 2	1.38	3.48	20.00	0.00***
	Year 3 and Year 4	2.11	3.25	6.05	0.00***
	Graduate and post-graduate	1.67	3.76	5.19	0.01**

***p<.01; **p<.05; *p<.10

TABLE 5
SEGMENT 4 COMPARISON OF PRE- AND POST-SURVEY RESPONSES ON OBJECTIVES BASED ON DEMOGRAPHIC CHARACTERISTICS

Category		Pre-Survey Means	Post-Survey Means	t-statistic	p-value
Gender	Male	2.01	3.52	5.87	0.00***
	Female	2.34	3.47	3.37	0.01**
Major	Business-related	2.22	3.40	5.39	0.00***
	Non-business-related	2.06	3.63	4.28	0.00***
Experience	Previously taken relevant courses	2.26	3.47	5.60	0.00***
	Previously not taken relevant courses	1.25	3.75	20.00	0.03**
Year of study	Year 1 and Year 2	1.72	3.50	6.04	0.01**
	Year 3 and Year 4	2.43	3.35	3.61	0.01**
	Graduate and post-graduate	1.94	3.88	5.28	0.01**

***p<.01; **p<.05; *p<.10

Opinions

Several statements were provided only in the post-survey to determine the opinions of the student reviewers about their agreement or disagreement with the material presented. As the level of knowledge about materiality topics was low on the pre-survey, we did not think it would be useful to ask these questions prior to reviewing the segments. Regarding Segment 3 (See Table 6) that covered stakeholder engagement in general and GHG emissions reporting, after reviewing the segment 95 percent of respondents "somewhat agreed" or "strongly agreed" that companies should engage with their stakeholders to determine material topics. Furthermore, 100 percent of respondents "somewhat agreed" or "strongly agreed" that companies should follow through and develop performance initiatives on the topics that were identified as material by their stakeholders. Finally, 70 percent of respondents "somewhat disagree" or "strongly disagree" that the cost of sustainability reporting exceeds the benefits. The responses to this statement are consistent with their thinking about climate change disclosure. When asked if climate change is important to investors, 100

percent responded with “somewhat agree” or “strongly agree.” Furthermore, 80 percent of respondents felt that climate change is the responsibility of companies, not governments. However, a few respondents were unsure of a few questions: 25 percent (5 respondents) were unsure about who reported their GHG emissions information to the CDP, and only 55 percent understood that companies are not the only reporters to the CDP.

Regarding Segment 4 (See Table 7), covering conflict minerals, modern-day slavery, and pay ratio), 100 percent of respondents felt that companies were responsible for tracing their minerals to areas of conflict; however, they also recognized that this was not always an easy task, as 72 percent “somewhat agree” or “strongly agree” that it can be difficult. Respondents, 81 percent, understood that modern-day slavery does not just occur in developing countries, and they disagreed, 91 percent, that companies should not be held responsible. Respondents also “somewhat agree” or “strongly agree” that pay ratio disclosure is useful (96 percent) and that pay ratio is reported in the proxy statement (91 percent). Finally, 81% of respondents could name a pay ratio that is unreasonable.

TABLE 6
SEGMENT 3 POST-SURVEY RESPONSES ON RESPONSIBILITIES OF BUSINESS
(4=Strongly agree)

Question/Statement	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Unsure
1. Companies should engage with other stakeholders than just shareholders to determine material topics.	14(70%)	5(25%)	1(5%)	0(0%)	0(0%)
2. Climate change disclosures are important for shareholders to make proper investment decisions.	15(75%)	5(25%)	0(0%)	0(0%)	0(0%)
3. Climate change is the responsibility of governments, not companies.	4(20%)	0(0%)	4(20%)	12(60%)	0(0%)
4. Companies should create performance initiatives on the topics identified as important by its stakeholders.	11(55%)	9(45%)	0(0%)	0(0%)	0(0%)
5. The cost of sustainability reporting exceeds the benefits.	3(15%)	0(0%)	8(40%)	6(30%)	3(15%)
6. Only companies report to the CDP.	2(10%)	2(10%)	5(25%)	6(30%)	5(25%)

TABLE 7
SEGMENT 4 POST-SURVEY RESPONSES ON THE RESPONSIBILITIES OF BUSINESS
(4=Strongly agree)

Question/Statement	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Unsure
1. Companies should be responsible for tracing its minerals to any areas of conflict.	15(71%)	6(29%)	0(0%)	0(0%)	0(0%)
2. Pay ratios provide useful information to investors.	10(48%)	10(48%)	0(0%)	0(0%)	1(5%) *
3. Modern day slavery occurs only in developing countries.	2(10%)	2(10%)	6(29%)	11(52%)	0(0%) *
4. Companies should not be held responsible for their contractors that engage in forced or child labor or other forms of modern-day slavery.	2(10%)	0(0%)	4(19%)	15(71%)	0(0%)
5. Pay ratios are found in the proxy statement.	13(62%)	6(29%)	1(5%)	0(0%)	1(5%) *
6. A reasonable pay ratio between CEO and average worker is 800:1.	1(5%)	2(10%)	2(10%)	15(71%)	1(5%) *
7. Tracing their use of conflict minerals can be difficult for companies.	6(29%)	9(43%)	2(10%)	1(5%)	3(14%) *

*Some rows sum to more than 100% due to rounding.

CONCLUSIONS AND LIMITATIONS

We set out to find an answer to the following research question:

> *To what extent do modular instructional resources improve students' understanding of the transition in corporate reporting, particularly materiality, and shape their perceptions of corporate reporting responsibilities?*

The results of this study suggest that students can reconsider assumptions of sustainability reporting and the role of business when presented with modular instructional resources, particularly on materiality. These findings are consistent with transformative learning theory, as participants' reflections suggest they reconsidered their views regarding the responsibilities of business and what constitutes material information for corporate reporting. Our findings further suggest that many students engaged deeply with the material, often connecting sustainability reporting concepts to their own experiences and future professional responsibilities. Modules such as these are well positioned to add to the curriculum in post-secondary institutions, as they can be assigned as pre- or post-class work, freeing up time for coverage of an already crowded curriculum while also orienting students to the changing role of corporate reporting in light of recent developments in sustainability reporting.

The findings provide evidence that the modules enhanced students' understanding regarding stakeholder engagement and the materiality topics of climate change and GHG emissions, conflict minerals,

modern-day slavery, and pay ratio. Learning gains were observed across all demographic groups, including gender, major, prior experience, and year of study. Student reviewers also felt that improved performance as well as disclosure of progress on these material environmental and social topics is important and the responsibility of business.

The sample size is relatively small; however, we wanted reviewers to take sufficient time to review the segments and provide serious feedback. While the study relies on self-reported measures, these are appropriate given the exploratory educational context and the focus on perceived learning outcomes. Therefore, the sample size was limited by the budget we had to offer stipends to student reviewers for the time spent completing the task. As the study was completed at only one post-secondary institution, we are unable to generalize the findings to other post-secondary institutions. However, the literature on sustainability education, especially in business schools, clearly shows that they are not changing curriculum to keep up with evolving business models.

The segments can be used as stand-alone without further discussion in a classroom setting. However, best practice would have students review the segments before class, with a fuller discussion of the topics, especially the reflective questions, within a classroom setting.

We encourage all post-secondary business schools, as well as other majors, to prepare students to acquire the knowledge and competencies that business firms and professions need in their future employees. Consequently, students will graduate with the ability to help solve today's societal problems and to support companies in their journeys to operate more sustainably.

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