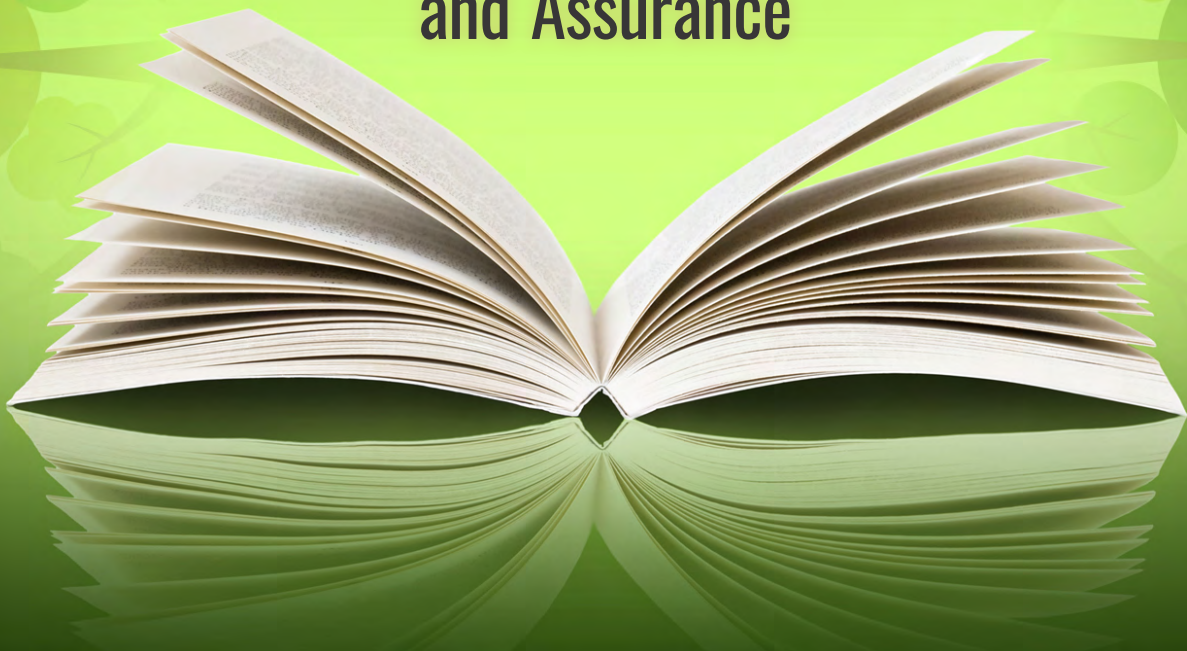


# EDUCATING ACCOUNTANTS FOR A SUSTAINABLE FUTURE



## A Literature Review of Competencies, Educational Strategies, and Challenges for Sustainability Reporting and Assurance



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International  
Federation  
of Accountants

# ABSTRACT



Recent years have witnessed a significant shift in stakeholder demands for relevant and reliable sustainability-related disclosure, reporting and assurance. In response, the accountancy profession has worked to prepare its professionals to address stakeholder demands and meet the intrinsic needs of society with regard to the disclosure, reporting, and assurance of this information. Implicit in this expanded scope of a professional accountant's role is the expectation that aspiring and professional accountants will receive adequate learning and development; however, little structure exists around what exactly this training should entail. Further, sustainability reporting is an issue with global consequence but with presently limited alignment globally as to mandatory disclosure and assurance requirements. Efforts by the International Sustainability Standards Board (ISSB), the International Auditing and Assurance Standards Board (IAASB), and others are underway to provide a pathway towards globally-aligned sustainability standards.



This paper reviews recent literature from three stakeholder groups—academics, professional accounting organizations (PAOs), and public accounting/audit firms—and seeks to provide insight on the expectations of the accountancy profession to provide sustainability-related reporting and assurance services. Specifically, this review identifies recurrent themes as to the new and existing competencies required of professional accountants to provide these types of services and the education strategies and pursuing challenges in developing these competencies in aspiring and professional accountants. Competencies most frequently identified in the literature reviewed include systems-thinking, interpersonal skills (e.g., communication, interdisciplinary work), critical thinking and problem-solving, adaptability and flexibility (e.g., the ability to take existing skills and apply them to new types of data), and technological capability. Effective educational strategies offered for developing these competencies in aspiring and professional accountants include those that are the most hands-on or immerse students most fully in real-life scenarios. These include strategies like project-based learning, case-based learning, and experiential learning. Strategies for continuing professional development refer to the importance of a skills-focused education and rapid training programs to upskill the workforce through programs offering digital badges, micro-credentials, and stackable credentials. Finally, the most frequently cited challenges associated with developing these competencies in aspiring and professional accountants include resource constraints, an already-full core curriculum subject to accreditation standards, and a lack of consensus and wide uncertainty on the scope, definition, and implementation of sustainability reporting.

# SUSTAINABILITY & EDUCATION LITERATURE REVIEW KEY FINDINGS



## MOST RELEVANT COMPETENCIES FOR SUSTAINABILITY REPORTING & ASSURANCE

<p><b>SYSTEMS-THINKING</b> (Deloitte 2022; JICPA 2022; Lozano et al. 2017; Redman and Wiek 2021)</p>	<p>Ability to apply knowledge of topic interconnectivity to (a) understand the various financial statement impacts of sustainability metrics and (b) propose innovative solutions to associated risks.</p>
<p><b>INTERPERSONAL SKILLS</b> (Carvalho and Almeida 2022; JICPA 2022; Lozano et al. 2017; Redman and Wiek 2021)</p>	<p>Ability to communicate across groups and disciplines to gain an understanding of inputs to sustainability metrics.</p>
<p><b>CRITICAL THINKING AND PROBLEM SOLVING</b> (Lozano et al. 2017; Rieckmann 2018; Sharma and Stewart 2022; Tran and Kerzig 2023)</p>	<p>Ability to quantify and translate non-financial data and associated risks into financial statement data.</p>
<p><b>ADAPTABILITY AND FLEXIBILITY</b> (Gil-Doménech 2021; ISCA 2022; Redman and Wiek 2021)</p>	<p>Ability to apply foundational accounting knowledge to new types of data reporting and new reporting requirements</p>
<p><b>TECHNOLOGICAL CAPABILITY</b> (AICPA 2022; Carvalho and Almeida 2022; Deloitte 2022)</p>	<p>Ability to analyze non-financial data and large datasets.</p>



## STRATEGIES TO DEVELOP SUSTAINABILITY REPORTING & ASSURANCE COMPETENCE

**Integrative sustainability education indicates its integral nature rather than as an 'add-on'.**

- Weaving it into courses versus isolating it (Sharma and Stewart 2022)

**Project-based, case-based, and experimental learning.**

- Technical memorization versus critical thinking through solutions (Evans 2019; Lee and Perdana 2023; Train and Kerzig 2023)

**A combination of formal, non-formal, and informal learning produces holistic learning (Caldana et al. 2023).**

- Formal = Curricular
- Non-formal = Extracurricular
- Informal = External via work/practical experience or internship



## CHALLENGES TO DEVELOPING SUSTAINABILITY REPORTING AND ASSURANCE COMPETENCE

### Resources constraints.

- Lack of qualified instructors, lack of textbooks, curriculum capacity (Al-Hazaima et al. 2021)

### Curriculum constraints, subject to accreditation and/or credentialing standards.

- Wong et al. (2021) cites a 'vocational orientation of students' who dismiss non-technical education as irrelevant

### Lack of consensus on what should be taught and how.

- Uncertainty as to what role should accounting play in sustainability (Gray 2019)
- Dissonance between training technical accountants and independent thinkers (Gray 2019)

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# I.

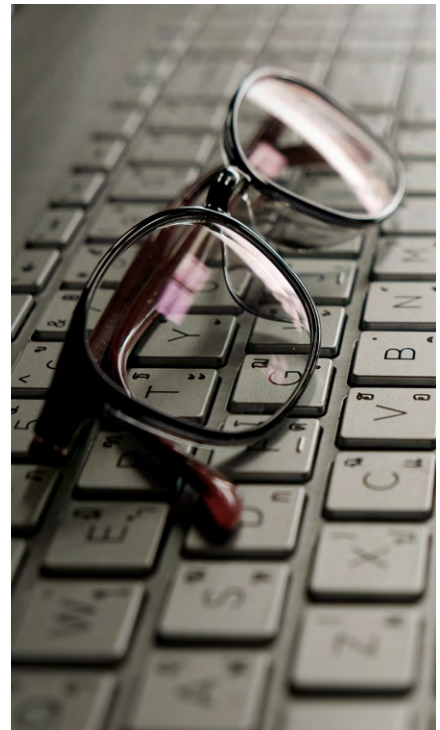
## INTRODUCTION



There has been a significant shift in stakeholders' expectations of corporate reporting, specifically as it relates to corporate sustainability. As a profession historically responsible for preparing and providing assurance on financial reporting the accounting profession has broadened its role to address the expanded scope of the information expected within a corporate report. Necessarily, the accounting profession expects, and stakeholders rely on professionals' competence to provide high quality sustainability-related reporting and assurance services. This requires an identification of the competencies required to provide these services, as well as an investigation into existing educational standards to compare their adequacy in developing these new competencies.

The goal of this study is to provide a baseline grounded in the literature against which the ability of the International Education Standards (IESs) in preparing aspiring and professional accountants for sustainability-related reporting and assurance can be evaluated. To accomplish this goal, the study includes a broad review of the academic, professional accounting organization (PAO), and public accounting firm literature to respond to three key questions.

- (a) What new and existing competencies of aspiring and professional accountants are most relevant to sustainability-related reporting and assurance?
- (b) What educational strategies are most effective in the development of sustainability-related reporting and assurance competencies for both aspiring and professional accountants?
- (c) What are the biggest challenges for aspiring and professional accountants to obtain the competencies needed to perform quality sustainability-related reporting and assurance services?



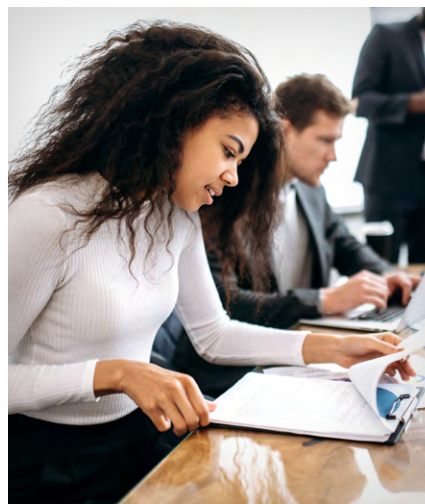
This literature review summarizes existent literature that provides insight to one or more of these questions. This summary of the literature provides a benchmark from which an analysis of the adequacy of the current state of the IESs can then be assessed.

This evidence was gathered via a literature review of academic, PAO, and public accounting firm publications, with an emphasis on recent literature (i.e., published during the last five years since 2019) and representative of a global perspective. This review identifies the academic literature and several non-academic publications addressing the competencies required of accountants performing sustainability-related work.

The most commonly referred to competencies include systems-thinking, interpersonal skills (e.g., communication, interdisciplinary work), critical thinking and problem-solving, adaptability and flexibility (e.g., the ability to take existing skills and apply them to new types of data), and technological capability (e.g., Carvalho and Almeida 2022, ISCA 2022, Redman and Wiek 2021).



Both public accounting firm and academic publications speak to the strategies and challenges associated with educating accounting professionals adequately to perform sustainability-related services. Generally speaking, the educational strategies demonstrated to most effectively develop sustainability competencies include those that are the most hands-on or immersed students most fully in real-life scenarios (Evans 2019). These include strategies like project-based learning, case-based learning, and experiential learning (Evans 2019; Lee and Perdana 2023; Tran and Herzig 2023). Outside of the classroom, practitioners stress the importance of a skills-focused education and rapid training programs to upskill their workforce through continuing professional development programs which offer digital badges, micro-credentials, and stackable credentials (Deloitte 2022; PwC 2021). The most frequently cited challenges associated with developing these competencies include resource constraints, an already-full core curriculum subject to accreditation standards, and perhaps most difficult, lack of consensus and wide uncertainty on the scope, definition, and implementation of sustainability reporting (Al-Hazaima et al. 2021; Eugénio et al. 2022; Gray 2019; Wong et al. 2021).



An analysis of the literature reviewed should inform a variety of different stakeholder groups. Firstly, this analysis is intended to provide a baseline from which the International Federation of Accountants (IFAC) and the International Panel on Accountancy Education (IPAE) can provide feedback, and recommend revisions if necessary, on the current adequacy of IESs in preparing aspiring and professional accountants for sustainability-related reporting and assurance services. Secondly, this analysis could be used more broadly by PAOs as a comparison point as they offer recommendations via competency frameworks for their own jurisdictional accounting education standards. While countries generally vary on their legislated

sustainability reporting requirements, the rise in sustainability reporting and accountants' responsibility in the field is a global trend. Thirdly, this analysis could be of use to public accounting/auditing firms that are both currently and prospectively assigning accountants to conduct sustainability-related work. As public accounting firms seek to upskill their employees to accommodate this work, the findings herein may inform the path forward. Finally, this analysis provides a comprehensive review of the literature and recommendations for academic research. In highlighting areas where substantial academic research has been conducted, this analysis also identifies gaps where future empirical research could provide further insights. In addition, the field of sustainability and the pursuant demands on the accountancy profession change quickly and research should continue to analyze the current climate.

Section II provides the background for the study. Section III describes the systemic process for conducting a review of the literature. An analysis of findings from the literature review is presented in Section IV, and the paper concludes in Section V with a discussion and summary of findings developed in the literature review.

## II.

## BACKGROUND



### IFAC and the IESs

IFAC is responsible for the maintenance of the IESs in the public interest. The IESs establish requirements for entry to professional accounting education programs, initial professional development (IPD) of aspiring professional accountants, and continuing professional development (CPD) of professional accountants.<sup>1</sup> The IESs are published for use by the IFAC member organizations and other stakeholders, including education providers, employers, regulators, and the public sector. Furthermore, the IFAC member organizations are required to identify and undertake actions to have the IESs adopted and implemented in their jurisdictions (IFAC 2022). The IESs are maintained by the IFAC staff and the IPAE. Because the IESs are authoritative standards (containing requirements for IFAC member organizations), any revisions to the standards are subject to due process. This literature review is one component of evidence-gathering in support of such due process, related to the IPAE's Sustainability Reporting Project (SRP).

### The Role of Accountants in Providing Sustainability-Related Services

In response to a call from stakeholders and legislators to expand the scope of corporate reporting to include sustainability information, a variety of sustainability reporting frameworks have been developed and adopted to meet these needs. The accountancy profession responded to the ever-growing number of competing sustainability reporting models by supporting the establishment of the International Sustainability Standards Board (ISSB) in 2022 to develop a



global baseline for investor-focused sustainability disclosures. The ISSB finalized its first two standards, IFRS S1 and S2, in June 2023 (IFRS 2023), which the International Organization of Securities Commissions (IOSCO) subsequently endorsed in July 2023 (IOSCO 2023). The IPAE initiated the SRP, with the aim of establishing the

competencies and ethics necessary for professional accountants to perform sustainability-related services, in both preparer and auditor/assurance capacities. The SRP responds to a significant shift in stakeholder demands for relevant, reliable, and decision-useful sustainability-related reporting and assurance services. The SRP represents three objectives, two relating directly to the adequacy of IESs in recommending necessary competencies in preparing accountants to provide sustainability-related services. The SRP calls for a critical assessment of whether the IESs in their present form support aspiring and professional accountants in adequately developing the required competencies for sustainability-related work, and further, if any revisions are necessary based on the evidence documented.

To remain true to the goal of properly educating and preparing aspiring accountants, the standards that underlie accounting education must be regularly assessed for adequacy and completeness. Therefore, this review of the literature seeks to provide a benchmark, composed of recent global literature published by a variety of stakeholders (e.g., academics, PAOs, public accounting/auditing firms).

<sup>1</sup> IPD and CPD are defined within the IESs as follows. IPD is "learning and development through which aspiring professional accountants first develop professional competence leading to perform a role as a professional accountant" (International Education Standard 5). CPD is "learning and development that takes place after Initial Professional Development (IPD), and that develops and maintains professional competence to enable professional accountants to continue to perform their roles competently" (International Education Standard 7).

# III.

## METHOD



### Planning the literature review

The first step of developing the literature review is identifying the research questions to direct the selection of papers. The goal of this review is to formulate a baseline for analysis of the adequacy of the current IESs relative to sustainability-related reporting and assurance. Five research questions are utilized to direct this review:

- (1) What existing knowledge, skills, and behaviors of aspiring and professional accountants are most relevant to sustainability-related reporting and assurance?
- (2) What new knowledge, skills, and behaviors need to be developed, or have more emphasis placed on, in order to enable aspiring and professional accountants to deliver quality sustainability-related reporting and assurance services?
- (3) How do the competencies required to perform quality sustainability-related reporting and assurance services differ between aspiring and professional accountants?
- (4) What educational strategies are most effective in the development of sustainability-related reporting and assurance competencies? How do these strategies differ for IPD (pre-qualification) and CPD (post-qualification)?
- (5) What are the biggest challenges for aspiring and professional accountants to obtain the competencies needed to perform quality sustainability-related reporting and assurance services?

### Conducting the literature review

The five aforementioned goals informed the conduct of the literature review, necessitating the development of a search strategy and set of search terms. The search strategy included identifying the breadth and specificity of the literature search. Given the wide range of stakeholders related to the research questions, the breadth of the literature search included both a search of library databases (e.g., Academic Source Complete, Business Source Complete, EBSCO) for academic research and of general databases for research published by PAOs and public accounting/audit firms.

Next, the dates of publication were specified to ensure that the analysis reflects the current expectations of the competencies required by the accountancy profession. Therefore, the literature search focused primarily on the last three years (published between 2021 and 2023), while also expanding where necessary to incorporate relevant background literature. Finally, an initial set of search terms was developed, e.g., "sustainability," "education," "competencies," "accounting," "students," "preparedness," "higher education institutes (HEIs)," "training," "strategies," "challenges," and "ESG." This set of search terms served as the initial basis for conducting the literature review and was broadened as the search progressed.





# IV.

## ANALYSIS



After concluding the literature search, relevant articles and publications were organized based on content and evidence in support of the research questions specified above. To distill the content of this literature search into a useable baseline for analysis of the IESs, the research questions are grouped into three categories: competencies, education strategies, and education challenges. Research questions #1 through #3 address the new and existing competencies required of aspiring and professional accountants for their work in sustainability-related reporting and assurance, and further, address any differences in required competencies between aspiring and professional accountants. Research questions #4 and #5 address the strategies and challenges, respectively, of educating both aspiring and professional accountants.

### Competencies relevant to sustainability-related reporting and assurance services

Given the expediency with which the move toward mandatory sustainability-related reporting and assurance has progressed, the demand for professional accountants to conduct these services has been equally urgent. Accordingly, there has been no shortage of research from different stakeholder groups offering suggested paths forward to adequately prepare professionals in the sustainability discipline. This analysis first outlines frequently cited sustainability competency frameworks in recent academic literature. Next, it identifies publications outside of the academic literature (specifically, those published by PAOs and public accounting/auditing firms) citing sustainability competencies for aspiring and professional accountants. Finally, it identifies any

publications differentiating necessary competencies and/or training based on the preparation of either aspiring or professional accountants.

#### *Sustainability competency frameworks identified in the academic literature*

Much of the research developing sustainability competency frameworks rests on seminal early works by Wiek and colleagues. Therefore, this review begins first with the framework proposed by Wiek, Withycombe, and Redman (2011) which identifies relevant academic literature on key competencies in sustainability and synthesizes them into a framework. This framework applies broadly to the education of professionals working in sustainability and is not specific to the accounting profession. Wiek et al. (2011) identify a framework of five competencies including systems-



thinking competence, anticipatory competence, normative competence, strategic competence, and interpersonal competence, of which definitions are provided below.<sup>2</sup> At the forefront of their review, the authors note one comprehensive key competency which is the sustainability research and problem-solving competence, which recognizes the fast-changing nature of the sustainability field and acknowledges that the most valuable competency will include professionals who can act as reactive change-agents in the face of evolving needs as it relates to sustainability-related work.

<sup>2</sup> Through a systematic review of the literature, Wiek et al. (2011) identify five competencies, including (1) systems-thinking competency, which refers to the ability to analyze complex systems across different domains (e.g., society, environment, etc.) and across different units of measurement, (2) anticipatory competence, which refers to the ability to analyze current information to envision the future of sustainability issues, (3) normative competence, which refers to the ability to assess the current state relative to sustainability targets, (4) strategic competence, which refers to the ability to design and implement interventions, transitions, and strategies toward sustainability, and (5) interpersonal competence, which refers to the ability to motivate, enable, and facilitate collaboration in achieving sustainability goals.

Lozano, Merrill, Sammalisto, Ceulemans, and Lozano (2017) expand this framework via use of a grounded theory and hermeneutics-based approach.<sup>3</sup> Their framework includes 12 competencies referred to as 'Education for Sustainable Development (ESD) Competencies,' including (1) systems thinking, (2) interdisciplinary work, (3) anticipatory thinking, (4) justice, responsibility, and ethics, (5) critical thinking and analysis, (6) interpersonal relations and collaboration, (7) empathy and change of perspective, (8) communication and use of media, (9) strategic action, (10) personal involvement, (11) assessment and evaluation, and (12) tolerance for ambiguity and uncertainty.

As a component of the United Nations Education, Scientific, and Cultural Organization (UNESCO) Education 2030 project,<sup>4</sup> Rieckmann (2018) draws upon previous literature and offers a framework of key competencies in Education for Sustainable Development. These competencies include (1) systems thinking competency, (2) anticipatory competency, (3) normative competency, (4) strategic competency, (5) collaboration competency, (6) critical thinking competency, (7) self-awareness competency, and (8) problem-solving competency.

Evans (2019) uses grounded theory and hermeneutics-based analysis to develop a set of five competencies for the sustainability field. This analysis, like those aforementioned, builds upon the previous literature and makes revisions based on the insights developed from textual analysis and



further research. Evans (2019) identifies five core competencies required by the sustainability field and further specifies the definition of each competency, the knowledge required by the competency, and the skills to practice the competency. These five competencies include (1) systems competence, (2) critical and normative competence, (3) interpersonal and communication competence, (4) creative and strategic competence, and (5) transdisciplinary competence.

The final sustainability competency framework discussed in this review is that of Redman and Wiek (2021) which broadens the five sustainability competencies established in Wiek et al. (2011) (and previously described) to include three emerging competencies. The three emerging competencies include (1) intrapersonal competence, which specifies the professional competence related to the self (i.e., self-regulation and resilience), (2) implementation competence, which specifies action-orientedness, and (3) integration competence, which refers to the ability to flexibly integrate all other competencies as the requirements of the field evolve. Redman and Wiek (2021) specify that this competency

framework is applicable across disciplines and can guide faculty, students, and practitioners to advance sustainability efforts.

The aforementioned sustainability competency frameworks represent a mature stream of academic literature and provide a comprehensive framework outlining the desired competencies of educating professionals in the sustainability field. These frameworks are broad and evolve from a breadth of various disciplines. Given the breadth of sustainability work in general, an inter-disciplinary framework is advantageous for gathering a complete perspective of the competencies required of a sustainability professional.

The business and accounting disciplines themselves have also attended to this research question and identified their own iterations of competency frameworks. Perhaps given the relative recency of this literature, less consensus exists as to a specific framework; however, several commonalities evolve from the literature. Studies by Gil-Doménech, Magomedova, Sánchez-Alcázar, Lafuente-Lechuga (2021) and Carvalho and Almeida (2022) both

<sup>3</sup> Grounded Theory (GT) is a research methodology which emphasizes developing and building theory from data and observations (as compared to research which develops an a priori assumption of the data based on pre-existing theory). Hermeneutics is a method of textual analysis achieved via an iterative process of interpreting the individual elements of the text and the whole of the text to develop a holistic interpretation of the text (Lozano et al. 2017).

<sup>4</sup> The UNESCO Education 2030 project is a component of the movement to eradicate global poverty through the sustainable development goals (SDGs) by 2030. Specifically, SDG 4 seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (Leicht, Heiss, and Byun 2018).

use interviews with interested stakeholders to develop a set of specific learning objectives and transversal skills, respectively, required to prepare accountants for their role in sustainability-related reporting and assurance. Gil-Doménech et al. (2021) identify 53 learning objectives (accessible [here](#)). Carvalho and Almeida (2022) note that the most important emergent skills required of accountants based on their interview data are transversal skills like communication, proactivity, teamwork, and the ability to adapt to new contexts. They note that while traditional accounting curricula focus on technical skills, the rise in responsibility for sustainability-related data will require enhanced education in interdisciplinary work and communication skills.

Olalla and Merino (2019) perform a content analysis<sup>5</sup> of a sample of undergraduate business course syllabi in Spanish universities and identify competencies for sustainability organized by the five pillars of education throughout life (Delors 1998; UNESCO 2008), which include learning to know, learning to do, learning to live together, learning to be, and learning to transform oneself and society. Given the methodology of this study that analyzes the current state of education related to sustainability competencies, the goal is to identify, rather than prescribe, these competencies as presented in current undergraduate business education. This study identifies competencies related to knowledge acquisition and problem solving as the most frequent competencies addressed in the syllabi analyzed.



#### *Sustainability competencies identified outside the academic literature*

Other relevant stakeholders, like PAOs and public accounting firms, have also issued publications outlining the required competencies of sustainability-prepared accountants. Recognizing that the majority of such literature stakes a claim in the sustainability space for accountants and is economically unmotivated to acknowledge gaps in accountants' knowledge related to sustainability-related reporting and assurance services, this review presents three articles that summarize the broader skillset expected of tomorrow's accountants.

A 2022 report co-published by Singapore's Institute of Chartered Accountants (ISCA), Ernst & Young, Singapore Management University, and the Singapore Accountancy Commission titled "Sustainability: Jobs and Skills for the Accountancy Profession" provides a well-rounded summary of both accountants' proficiencies and gaps in preparedness for sustainability-related services. The report states at the



outset that "accountants are poised to lead, but need additional skills;" namely, additional skills in the areas of new reporting standards, green finance,<sup>6</sup> and carbon pricing (ISCA 2022, 5). The report summarizes some of the key existing competencies that make accountants' natural leaders in this space, e.g., estimating and quantifying the effects of business events on the financial statements, communicating performance to the public via disclosure, internal audit procedures to safeguard data collection, and providing third-party assurance services. The report concludes with a summary of new skills and skill applications that will be required of accountants to participate in this field, e.g., knowledge and awareness of current sustainability reporting requirements and the flexibility to evolve this knowledge as requirements change, the ability to extend pre-existing skills to new areas of non-financial data, the ability to communicate with other areas of business to better understand various sustainability metrics, the ability to translate sustainability metrics into financial metrics (particularly when evaluating materiality), and the ability to identify and quantify risks associated with sustainability strategies (ISCA 2022).

<sup>5</sup> Content analysis is a form of textual analysis that uses a predetermined set of data to code the text, providing a quantitative basis for analysis and conclusions from a set of texts. Content analysis is sometimes, as in this case, aided by computer software to ensure text exploration is systematic (Olalla and Merino 2019).

<sup>6</sup> 'Green finance' refers to the issuance of loans or investments that support environmentally-friendly activities, like building environmentally-friendly infrastructure (ISCA 2022, 6).



Likewise, a working group of the Japanese Institute of Certified Public Accountants (JICPA) has developed and issued various publications in order to address measures for implementing “capacity-building initiatives for professional accountants in sustainability” related to skill and sustainability competencies<sup>7</sup> required of members of the JICPA (JICPA 2023). Specifically, these publications highlight knowledge, communication, and quantification related to sustainability information in conjunction with financial reporting, via the development of five competencies (JICPA 2022). The competencies identified reflect themes identified in the academic literature detailed above. Table 1 provides a mapping comparing the JICPA’s developed competencies to Redman and Wiek (2021)’s sustainability competencies for illustrative purposes.

A report by Deloitte (2022) identifies the critical financial skills and competencies required for accountants’ emerging role in sustainable finance, as well as strategies for upskilling the current workforce. Deloitte’s report focuses primarily on the importance of integrating sustainability and systems thinking into relevant curricula in order to promote the interconnectivity of topics. In addition, the report promotes a focus on innovation, problem-solving, and a deeper understanding of the role of technology in helping organizations achieve their sustainability objectives and create user-friendly information related to those objectives (Deloitte 2022)

Finally, the Association of International Certified Professional Accountants (AICPA) updated the AICPA Foundational Competencies Framework for Aspiring CPAs in 2022. The Framework defines the set of skills-based competencies needed for students entering the accounting profession (AICPA 2022). In this framework, competencies are organized under three pillars: technical competencies, organizational competencies, and leadership competencies. The 2022 update includes a distinct subsection of ‘environment, social, and governance management’ within the organizational competencies. These competencies focus on explanatory, evaluative, and technological skills to manage sustainability reporting within the organization. The framework is available through the AICPA.<sup>8</sup>

### *Differentiating competencies for preparing professional and aspiring accountants for sustainability-related reporting and assurance*

The sections above describe academic and professional literature identifying competencies required for accountants’ participation in sustainability-related services. Research question three inquires as to any differentiation in the competencies required of aspiring versus professional accountants. Limited literature speaks specifically to this question, and differentiation of these two groups is typically made with regard to education strategies (i.e., the role of the university in preparing aspiring accountants as compared to the role of the firm in upskilling current professionals<sup>9</sup>), which is discussed in the subsequent section of this review. However, one study analyzed in this review provides a breakout of content knowledge for different types of accounting professionals in sustainability-related roles: namely, preparers, assurance providers, tax professionals, and ESG specialists (ISCA 2022). However, this breakout does not specify different skillsets, but rather different content areas whereby a broader skillset might be applied. Therefore, the research does not seem to parse aspiring and current professionals when providing an assessment of competencies for sustainability-related services.

<sup>7</sup> Prior to issuance of the JICPA (2023) report for capacity-building initiatives, the institute issued a working paper in June 2022 outlining five key competencies for professional accountants’ knowledge and understanding of sustainability. These include: (1) See the big picture of various sustainability issues and their social and economic impacts based on an integrated knowledge base, (2) Understand the basic framework of the relationship between sustainability and corporate management as well as corporate value, (3) Engage in intensive and constructive dialogue with management, directors, and investors regarding key sustainability trends and their impact on the industries and companies, (4) Have the necessary knowledge and understanding of requirements for sustainability-related disclosure (e.g., regulations and standards), and (5) Understand the purpose and basic framework of assurance engagements (JICPA 2022).

<sup>8</sup> See Framework is available via the following link [foundational-competencies-framework-pdf.pdf \(thiswaytocpa.com\)](https://www.aicpa.org/~/media/Files/2022/04/foundational-competencies-framework-pdf.pdf).

<sup>9</sup> At this point, the literature reflects a largely reactive approach to the inclusion of sustainability topics in accounting education. The inclusion of such topics in university education is predominantly driven by the current state of legislation in a given jurisdiction, while professional education is the domain of accounting firms as a means to upskill their workforce in response to staffing needs on client engagements. Sustainability accounting education provided by continuing professional development programs or external badging programs appears to be attained primarily on an ad hoc basis.

## Education Strategies for Developing Sustainability-Related Reporting and Assurance Competencies

This section reviews the literature from academic and professional studies that provide evidence regarding education strategies utilized for developing sustainability-related competencies. These include strategies to upskill current accounting professionals and integrate sustainability into accounting education curricula in higher education institutions (HEI). Primarily, the academic studies focus on providing empirical evidence through survey data, student interviews, and experimental analysis as to the most effective pedagogical approaches for teaching sustainability within HEI. Likewise, the professional studies focus primarily on rapid training programs that promote the development of skills to educate the existing accounting workforce to develop these competencies.



### *Education strategies identified within the academic literature*

First, this review addresses recent, relevant academic literature that evidences the effectiveness of different pedagogical approaches to teaching sustainability. Evans (2019) conducts a literature review addressing effective sustainability pedagogies and presents a useful summary on facilitate understanding more recent literature. In her review, Evans categorizes 172 papers into 16 distinct pedagogical approaches, then sorts those approaches into high-, medium-, and low-priority approaches for teaching sustainability based on the number of studies identifying the benefits of each approach. Evans (2019) identifies high-priority approaches, e.g., project/problem-based learning (in an organization/community), active learning (in class), collaborative learning, experiential learning, project/problem-based learning (in class) and integrative learning (inter- and transdisciplinary). Evans' ranking of pedagogical approaches is accessible [here](#). Her list generally reflects the most hands-on learning as the highest priority in introducing the topic.



More recent literature examines specific implementation of sustainability education and provides evidence of its effectiveness. Lee and Perdana (2023) conduct a quasi-experimental analysis<sup>10</sup> of 103 undergraduate accounting students at a large U.S. public university who are given either lecture intervention or lecture intervention plus experiential service-learning intervention. They find that, in comparison with the lecture-only students, students participating in the experiential service learning improve their community engagement perception, sustainability awareness, and data analytics competency (i.e., Tableau and Power BI). Tran and Herzig (2023) provide evidence on the learning outcomes, including both content knowledge and professional skills (e.g., critical thinking, teamwork, and communication skills), developed by postgraduate accounting students at a German university from a blended case-based learning approach toward sustainable development. The authors test a blended-case study concerning material flow cost accounting (MFCA). Their approach combines the three elements of a teaching case study (i.e., a significant business issue(s), sufficient information on which to base conclusions, and no stated conclusions (Ellet 2007)) with blended learning, defined as “the thoughtful integration of classroom face-to-face learning experiences with online learning experiences” (Garrison and Kanuka 2004, 96). Tran and Herzig (2023) employ a specific iteration of a blended case-based learning approach that utilizes self-learning activities like animated and slide videos, assigned book and article pages with associated quizzes and journal assignments, and synchronous discussions, presentations, and games.

<sup>10</sup>Quasi-experimental research design is similar to an experimental design in that it aims to establish cause-and-effect through comparison of a treatment and control group, but unlike an experiment, quasi-experimental research does not randomly assign participants into either the treatment or control groups (Lee and Perdana 2023).



Other recent literature examines the inclusion of sustainability education in business school curricula more broadly to determine the most effective skills, rather than examining a specific educational tool. Sharma and Stewart (2022) conduct 41 interviews with faculty and students at a university in New Zealand to collect data on their perception of the inclusion and efficacy of sustainability education embedded in the accounting curriculum. The interview data offers insights as to considerations for stand-alone versus integrated sustainability education, strong versus weak sustainability focus, and specific skills taught to grasp sustainability topics. The authors conclude that integrating, rather than separating, sustainability education provides a lens that sustainability is integral to accounting rather than an “add-on” (Sharma and Stewart 2022, 17) and that education strategies enforcing critical thinking and critical analysis of sustainability literature are considered to be the most effective. Specific education strategies which enforced critical thinking included assignments like essays related to ethical issues and sustainability, literature critiques covering environmental accounting and societal issues, analyses of corporations’ responses to public pressure, and the development of original solutions to current problems (Sharma 2013; Sharma and Stewart 2022).

Caldana, Eustachio, Sampaio, Gianotto, Talarico, and Batalhão (2023) test whether formal, non-formal, or informal learning experiences contribute most effectively to developing sustainable development competencies (SDCs) among students at a Brazilian university by collecting survey data from 274 undergraduate business students. Following prior literature, Caldana et al. (2023) identify formal learning as classroom learning and business school curricula, non-formal learning as extracurricular learning through engagement in student organizations, and informal learning as learning outside of the business school through an internship or work experience. These learning types are empirically evaluated to ascertain their effect on specific sustainability competencies (e.g., systems thinking competence, interpersonal competence, etc.). From this evidence, the authors conclude that different competencies are significantly improved from the experience of different learning experiences. For example, formal learning improves scores in diversity, foresighted thinking, systems thinking, and normative competencies. Non-formal learning improves scores in diversity, systems thinking, strategic management competencies, and knowledge about the UN’s Sustainable Development Goals (SDGs). Informal learning associates with nearly all of the developed competencies except knowledge-centric competencies. The authors conclude universities might encourage a combination of

formal, non-formal, and informal learning strategies as a way to foster holistic development of sustainable competencies (Caldana et al. 2023).

#### *Education strategies identified within the professional literature*

Moreover, as higher education institutions prepare to update their curricula to educate students on sustainability, professional services firms seeking to participate in sustainability-related work are looking to upskill their workforce. Therefore, some accounting firms have issued publications on the importance of, and addressing their investment in, upskilling their workforce in an aim to prepare the accountant of the future (PwC US 2021). Collectively, an analysis of this literature indicates that most accounting professionals (i.e., those who are not dedicated ESG specialists) pursue upskilling primarily via online learning or continuing professional development programs as a component of professional development. For example, Deloitte Canada (2022) suggests that professional education and continuous professional development courses, including baseline technical courses on specific ESG issues (e.g., climate change), regulatory and framework-specific course, and implementation and application of ESG, could address the systems-thinking skills that many professional accountants currently lack. Further, Deloitte specifies an “urgent” need for micro-credentialling for mid-career professionals looking to develop an ESG expertise (Deloitte 2022, 22).

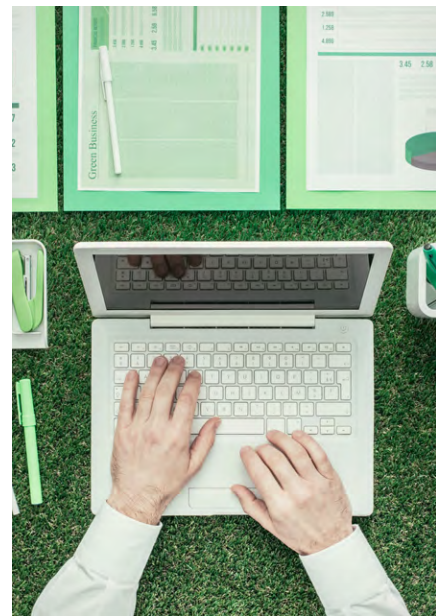
Similarly, PwC US (2021) reiterates the importance of accounting professionals maintaining a “skills-focus,” rather than a “degree-focus,” that reflects the flexibility the profession expects of its professionals (19). To fill this “skills-focus,” PwC offers a host of educational strategies to prepare professionals, including digital badge programs, digital credential programs, stackable credentialing, and micro-credentialing. To motivate employees to seek upskilling, PwC encourages “recognizing and rewarding employees who acquire new skills,” “providing clear pathways for advancement, allowing education during the workday, covering costs, creating transparent, transferable credentials, and showcasing learning” (PwC 2021, 19). Another important education tool PwC references is collaboration between the private sector, the public sector, and higher education institutes. Some collaborative examples cited are Miami Dade College and NextEra Energy, PwC and Northeastern University’s While You Work program, and Washington University in St. Louis and Boeing’s Join Engineering Leadership Development Program (PwC 2021).

### Education Challenges in Developing Sustainability-Related Reporting and Assurance

This analysis concludes with a description of the challenges identified in the literature associated with developing sustainability competencies amongst accountants; namely, uncertainty around the integration of sustainability and accounting, the scope of core curriculum subject to accreditation and licensing standards, and resource constraints, particularly in developing and newly industrialized countries (NICs).

Perhaps the most pervasive challenge related to integrating sustainability in accounting education is the breadth of unknowns. For a discipline with a historical resistance to novelty (Lee 1990; Robb 1989), that novelty is exacerbated when there exists a lack of consensus in general about what role accounting should play in sustainability (Gray 2019). Further, there is difficulty in establishing a starting point.

“ This conundrum is reflected at its most basic in the contrasting questions: do we take accounting, management and corporations and ask, “how can they contribute to sustainability”? Or do we take society and ecology as our starting point and ask, “what must be done to approach sustainability?” The first takes corporations and accounting as essential to our discussion; the second allows for the possibility that accounting and corporations may be the problem and any answer may decide that we need no accounting or corporations—at least as we currently know them (Milne et al. 2009; Russell et al. 2017).” (Gray 2019, 44).



A lack of consensus on a definition of sustainability accounting has resulted in a “weak” sustainability accounting education focused on surface learning and definitions, which is a natural consequence of shoe-horning a dynamic and evolving subject into a technical subject which teaches students to identify the “correct” accounting methodology (Tran and Herzig 2023). This creates a dissonance between the traditional accounting curriculum that trains students to become technical accountants and one that trains students to be independent thinkers (Gray 2019). Gray (2019) notes that, while the challenges of integrating sustainability into accounting education is its inherent newness and uncertainty, it is the duty of education to specifically address that uncertainty, and further, that if educators and students do not believe they are “fundamentally challenged,” the education is likely lacking (33).



Gray (2019) also notes challenges of time and space in accounting education to allot for the type of problem-solving and critical thinking skills often cited as sustainability competencies. Wong, George, and Tanima (2021) also note this challenge, particularly in the face of pressures from PAOs and their accreditation requirements and credentialing standards to spend substantial amounts of time on core aspects of the traditional accounting curriculum. A traditional focus on accreditation and credentialing affects students' interest in straying from core accounting curriculum as well; Wong et al. (2021) cite a "vocational orientation of students as many 'dismissed non-technical education as irrelevant and a waste of time'" (Hazelton and Haigh 2010, 173).

An additional challenge relates to various resource constraints on higher education institutions, and particularly those in developing NICs. The role of higher education is perhaps more prominent in these areas, but the diversity of the sector makes broad adoption of significant changes to the accounting curriculum more challenging (Eugénio, Carreira, Miettinen, and Lourenço 2022). Al-Hazaima, Low, and Sharma (2021) identify a similar resource constraint on universities in Jordan related to a lack of sustainability textbooks, lack of qualified educators, curriculum capacity, and sustainability's relevance to industry.

Taken together, the message from this literature relays significant challenges in updating the accounting curricula to incorporate sustainability in a meaningful way. However, the literature also notes that "it can and needs to be done—if climate change and environmental degradation issues are to be addressed in any meaningful way" (Al-Hazaima, Low, and Sharma 2021).



## V.

## DISCUSSION



This literature review provides evidence, developed in recent, relevant, global literature, responding to five key research questions:

- (1) What existing knowledge, skills, and behaviors of aspiring and professional accountants are most relevant to sustainability-related reporting and assurance?
- (2) What new knowledge, skills, and behaviors need to be developed, or have more emphasis placed on, in order to enable aspiring and professional accountants to deliver quality sustainability-related reporting and assurance services?
- (3) How do the competencies required to perform quality sustainability-related reporting and assurance services differ between aspiring and professional accountants?
- (4) What educational strategies are most effective in the development of sustainability-related reporting and assurance competencies? How do these strategies differ for IPD (pre-qualification) and CPD (post-qualification)?
- (5) What are the biggest challenges for aspiring and professional accountants to obtain the competencies needed to perform quality sustainability-related reporting and assurance services?

Evidence is provided via a literature review of academic, PAO, and accounting/auditing firm publications, with an emphasis on recent literature (i.e., published during the last five years) and representative of a global perspective. The literature review uncovers a well-developed academic literature and several non-academic publications reviewing the competencies required of accountants performing sustainability-related work. The most commonly referred to competencies include systems-thinking, interpersonal skills (e.g., communication, interdisciplinary work), critical thinking and problem-solving, adaptability and flexibility (e.g., the ability to take existing skills and apply them to new types of data), and technological capability (e.g., Carvalho and Almeida 2022, ISCA 2022, Redman and Wiek 2021).

Both public accounting firms and academic publications address the strategies and challenges associated with educating accounting professionals adequately to perform sustainability-related services. In general, the educational strategies demonstrated to most effectively develop sustainability competencies include those that are the most hands-on or that immerse students in real-life scenarios (Evans 2019). These included strategies like project-based learning, case-based learning, and experiential learning (Evans 2019; Lee and Perdana 2023; Tran and Herzig 2023). Outside of the classroom, accounting practitioners stressed the importance of a skills-focused education and rapid training programs to upskill their workforce through continuing professional development programs offering digital badges, micro-credentials, and stackable credentials (Deloitte 2022; PwC 2021). The most frequently cited challenges associated with developing these competencies include resource constraints, an already-full core curriculum subject to accreditation standards, and perhaps most difficult, lack of consensus and wide uncertainty on the scope, definition, and implementation of sustainability accounting (Al-Hazaima et al. 2021; Eugénio et al. 2022; Gray 2019; Wong et al. 2021).



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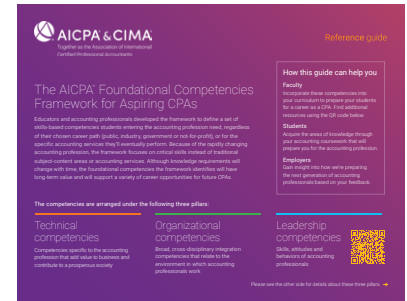
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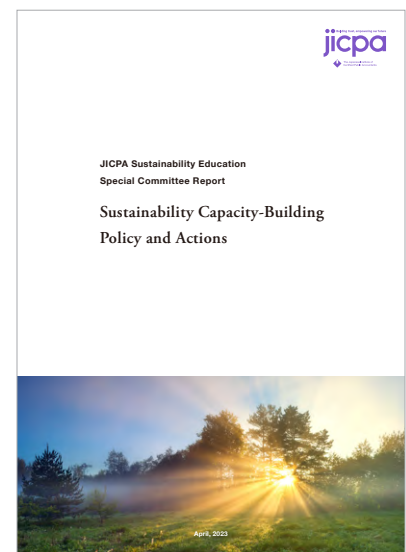
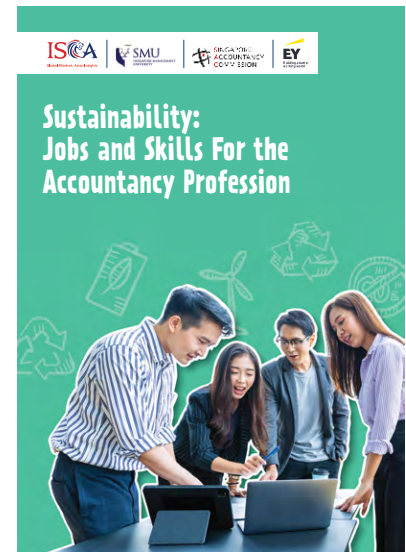
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# TABLES

## Mapping the JICPA’s Sustainability Competencies (JICPA 2022) to Redman and Wiek (2021)

**TABLE 1**

Proposed Sustainability Competencies (JICPA 2022)	Mapped to Redman and Wiek’s (2021) Key Competencies Framework	Competency Definition (Redman and Wiek 2021)
(1) See the big picture of various sustainability issues and their social and economic impacts based on an integrated knowledge base.	Systems-Thinking Competence	Ability to apply modeling and complex analytical approaches: (1) to analyze complex systems and sustainability problems across different domains (environmental, social, and economic) and across different scales (local to global), including cascading effects, inertia, feedback loops, and other system dynamics; (2) to analyze the impacts of sustainability action plans (strategies) and interventions (how they change systems and problems).
(2) Understand the basic framework of the relationship between sustainability and corporate management as well as corporate value.	Strategies-Thinking Competence	Ability to construct and test viable strategies (action plans) intervention, transition, and transformations toward sustainability.
(3) Engage in intensive and constructive dialogue with management, directors, and investors regarding key sustainability trends and their impact on the industries and companies.	Inter-personal Competence	Ability (1) to collaborate successfully in inter-disciplinary and -professional teams; and (2) to involve diverse stakeholders, in meaningful and effective ways, in advancing sustainability transformations.
(4) Have the necessary knowledge and understanding of requirements for sustainability-related disclosure (e.g., regulations and standards).	Implementation Competence	Ability to put sustainability strategies (action plans) into action, including implementation, adaptation, transfer and scaling, in effective and efficient ways.
(5) Understand the purpose and basic framework of assurance engagements.	Implementation Competence	Ability to put sustainability strategies (action plans) into action, including implementation, adaptation, transfer and scaling, in effective and efficient ways.

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