Sustainability:
Learning and Teaching in the Business Education Context

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ABSTRACT

Business schools worldwide are integrating sustainability into their curricula, yet a gap persists in understanding students' perspectives on these courses' effectiveness in preparing for sustainability challenges. This study investigates undergraduate students' perceptions of essential sustainability skills and knowledge they learn in a business school. Through three focus group interviews with 15 undergraduates, four themes emerged: mindsets, skills, learning approaches, and global perspectives. Students expect sustainability education to enhance comprehension, workforce readiness, and life skills, emphasising technical and global competencies. They advocate for more engaging, integrated online and face-to-face learning approaches to better prepare for sustainability careers.

KEYWORDS

Business Schools, Learning Spaces, Sustainability Learning and Teaching

INTRODUCTION

As sustainability continues to become a key focus area, many higher educational institutions (HEIs) are introducing dedicated sustainability programs and courses. Consequently, it is imperative to address the gap between expectations and actual outcomes. Universities must progress beyond merely providing sustainability courses and undertake a thorough exploration of student motivations and educational objectives. Customizing curriculum and teaching methodologies to meet the needs of students is crucial for effectively preparing future generations to confront the multifaceted challenges of sustainability.

Agyeman et al. (2009) revealed a diversity of student motivations for enrolling in sustainability courses, ranging from personal environmental concerns to career skills development in this growing field. Understanding this spectrum of motivations is crucial because a mismatch between student expectations and course content can lead to decreased engagement and learning outcomes. The persistent disconnect between student expectations and the reality of sustainability courses presents a critical challenge for higher education. Universities must move beyond merely offering courses

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and embark on a deeper understanding of student motivations and learning goals. By catering to this diverse audience through tailored curriculum and pedagogical approaches, future generations can be empowered to effectively tackle the intricate challenges of sustainability.

While the recent rise in sustainability initiatives within higher education appears positive, it is crucial to examine the underlying motivations behind this shift. To start, the COVID-19 pandemic and worsening climate change have undoubtedly served as major wake-up calls, prompting societies to reassess their relationships with one another, the environment, and their own vulnerabilities. These factors represent global risks that transcend individual experiences and national borders. According to Beck (n.d.), this situation generates a sense of reflexive modernization, forcing societies to critically reflect on their impact on the world and seek systemic solutions. HEIs, as both knowledge producers and societal influencers, are responding to this call for reflection and change.

In response to the interconnected global crises, there is a growing imperative to promote sustainable mindsets and lifestyles across society. Hence, HEIs play a pivotal role in this endeavor (Fisher & McAdams, 2015). At a global level, HEIs have been increasingly integrating sustainability concepts and knowledge into their core activities, including teaching, research, and community services efforts. Institutional initiatives and sustainable campus operations are identified as key actions taken by HEIs to advance sustainability goals (Biancardi et al., 2023).

While there is a shared understanding that sustainability education can be integrated across different levels of education, from primary to higher education, the development and design of appropriate curriculum for such education remains uncertain (Novy et al., 2021). Highlighting the value of key competencies in sustainability, Evans (2012) identified system thinking competence, anticipatory competence, normative competence, strategic competence, and interpersonal competence as crucial skills that empower individuals to address complex problems and capitalize on opportunities for sustainability.

Acquiring knowledge in a specific discipline, as well as other fundamental or interrelated competencies, is essential, often acquired through dedicated courses in higher education. UNESCO (2020) underscored the importance of instilling a sustainable mindset among younger generations, suggesting that education at all levels should equip students with the knowledge, skills, values, and agency to address interconnected global challenges like climate change, loss of biodiversity, unsustainable use of resources, and global inequality.

Indeed, further investigation is needed to understand how HEIs can effectively adopt sustainability education to contribute to the achievement of sustainable development goals (SDGs) across various institutions. Alvarez and Rogers (2006) outlined three focal points within higher education sustainable development (HESD) curriculum: (1) elucidating definitions, historical contexts, and interpretations; (2) integrating sustainable concepts into practice; and (3) fostering discourse surrounding sustainability. While these delineations offer a foundational framework for exploring teaching and learning approaches in HESD, they do not encompass the entirety of sustainability curricula within HESD (Wiggins & McTighe, 2005).

In modern sustainable education at universities, there is a growing recognition of the need to expand beyond these traditional emphases. A contemporary approach acknowledges the importance of interdisciplinary collaboration and the integration of sustainability principles across various academic disciplines. This approach aims to address the complexity of sustainability challenges by fostering a holistic understanding among students. Moreover, the current curriculum emphasizes the pressing need for climate education and the incorporation of environmental, social, and governance (ESG) frameworks. These additions reflect the evolving nature of sustainability education, aligning it with contemporary global concerns and priorities (Ramirez, 2020).

Despite these advancements, challenges persist, particularly regarding the clarity and coherence of sustainability concepts across different disciplines. The adoption of sustainability principles by diverse academic fields may result in confusion among educators and students alike. Therefore,

ongoing dialogue and collaboration are crucial to ensure a unified understanding of sustainability across all academic domains.

This underexplored area is important to investigate because it directly addresses the disconnect between current sustainability education offerings and the skills needed for future careers. By filling this gap, universities can better align their sustainability curricula with the demands of the job market, ensuring that graduates are equipped with the necessary skills to effectively address sustainability challenges.

Business Schools and Sustainability

Business schools play a pivotal role in shaping the future of sustainability within business education. With the increasing awareness surrounding the environmental, social, and economic impacts of business rise, it is imperative for business schools to incorporate sustainability into their curriculum and practices.

Beyond curriculum development, business schools are also fostering research and thought leadership in sustainability. Faculty members are conducting research on a range of topics like sustainable supply chain management, corporate social responsibility, renewable energy, and ethical decision-making (Pimpa, 2023). More importantly, business schools are implementing sustainable practices on campus, such as energy conservation, waste reduction, and green building initiatives.

When exploring the common nature of sustainability curriculum in business and management institutions, it seems clear that an authentically interdisciplinary approach, transformative experiential learning, instruction on the relationship between ecological health, society, policy, and ethics, collaborative learning experiences focusing on enhanced community relationships, and action research paired with teaching and learning for local and global communities are common key characteristics of sustainability education in business schools (Nichols & Shorb, 2007). Responsible business activities can have positive impacts on society and the environment, including reduced pollution levels, economic growth, narrowed income disparities, and enhanced overall quality of life (Brzezicki & Jasiolek, 2021). Skills required to manage sustainable businesses must be tailored to diverse business contexts and industries (Pimpa, 2023).

Business education for a sustainable future is complex, with perpetual arguments regarding the feasibility of sustainable business practices. Education researchers agree that experiential learning can help business students understand the interplay between natural ecological systems and complex social and economic systems (Louv, 2008; Ritchie, 2013). Studies by Gamage et al. (2022) and Suh and Han (2019) agree that business schools should equip students of all backgrounds to act on complex global issues like climate change, biodiversity loss, resource depletion, and global inequality. Seatter and Ceulemans (2017) also confirmed that a well-designed business curriculum for education in sustainable development will simplify complex issues, giving students from various backgrounds the tools they need to become active members of society and protectors of the environment through their individual and collective efforts.

When addressing curriculum design, Ritchie (2013) advocates for sustainable business education curricula that promote engagement with local communities, helping students learn key sustainability issues and simplifying their complex nature. Ritchie (2013) and Pimpa (2023) also confirmed that allowing extended time in the communities being studied allowed students to integrate sustainability ideas from various disciplines. This approach allows students to build rapport with local communities and step into their day-to-day lives, fostering a deeper understanding of sustainability. In other words, sustainability education can take various forms, including face-to-face classes, distance learning, online education, or experiential learning within communities. Business schools must use leading-edge sustainability educational techniques to equip business students with the skills needed to make the world more sustainable through research and creative problem-solving.

This study aims to gain a deeper insight into the learning experiences, skills, and knowledge of students dealing with sustainability-related topics. The main research questions in this study include:

- What are the structure and fundamental characteristics of sustainable education in Thai higher education institutions?
- What are the expectations of business students who enroll in sustainability courses?

LITERATURE REVIEW

Business schools have faced increasing criticism for their failure to instill graduates with a strong sense of responsibility and for inadequately preparing them to tackle the sustainability challenges prevalent in today's business environment. This critique stems from various stakeholders, including students, corporations, and social responsibility organizations (Matten & Moon, 2004; PRME, 2017a; Rasche et al., 2013). In response to this scrutiny, a growing number of schools are proactively establishing academic centers dedicated to promoting sustainability education (ABIS & EFMD, 2013).

The integration of sustainability concepts or cases into core curriculum courses tends to be one of the most popular initiatives among business academics. It is imperative to incorporate sustainability into core business courses, such as finance, marketing, operations, and strategy. This ensures that all business students receive foundational knowledge about sustainability and its relevance to various business functions (Hopwood et al., 2005). Further exploration of this issue reveals common points among research studies. For instance, Goekler (2003) showed that for effective learning about sustainability, business students must cultivate creative thinking skills and actively interact with alternative perspectives. Similarly, Chiang and Chen (2022) and Tabucanon et al. (2021) addressed gaps in the integration of education for sustainable development within the higher education system. Both studies raise a similar concern regarding the lack of practical experience among university professors in delivering the concept of sustainability to students. It is critical for higher education institutions to concentrate on the proper delivery and design of knowledge and skills relevant to current and future sustainable development professions.

Modern business education is increasingly recognizing the need to equip students with a holistic, systems-based approach to sustainability. Leading organizations like AACSB (2022) and Branden (2015) are advocating for educational programs that challenge students to think beyond isolated solutions and engage in a continuous pursuit for innovative approaches to sustainability challenges.

More importantly, contemporary trends in sustainability education focus on the integration of ESG. This shift reflects the growing complexity of business operations, where ESG factors are intrinsically linked and require integrated consideration. By embracing these trends, business schools can prepare future leaders with the skills to navigate complex sustainability challenges and drive positive change throughout their careers.

Skills and Sustainability Education

The growing importance of sustainability has led international agencies like UNESCO (2005, 2017), UNECE (2009), and accreditation bodies like ABET (2017) and the Engineering Council (2013) to emphasize the need for developing key sustainability competencies in business education. This shift reflects the understanding that businesses are no longer operating in a vacuum but are increasingly tied to their environmental and social impact. To operate business sustainably, studies in this area (ABET, 2017; Cote, 2021; Pimpa, 2023; Sibbe, 2019) have identified three common themes within the business school curriculums.

1. **Systems Thinking and Strategic Integration:**
   a. Understanding the interconnectedness of social, environmental, and economic factors within business and ecosystems
   b. Developing holistic perspectives to design and implementing effective sustainable strategies
   c. Emphasizing systemic approaches to address complex sustainability challenges

2. **Environmental Analysis and Sustainable Practices:**
   a. Conducting life cycle assessments to evaluate the environmental impact of products and services
   b. Utilizing data analysis skills to track sustainability performance and identify improvement opportunities
   c. Integrating sustainable practices into business operations to minimize environmental footprints
3. **Financial Literacy and Sustainable Investment:**
   a. Grasping green finance solutions and principles of impact investing
   b. Analyzing ESG factors in investment decisions
   c. Managing climate-related financial risks and promoting sustainable finance initiatives

Table 1 provides a starting point, showcasing how business schools are proactively nurturing these crucial sustainability skills. These examples demonstrate the commitment of educational institutions to equip future leaders with the skills to navigate the complex and evolving landscape of responsible business practices.

To foster graduates as effective change agents in both their workplaces and personal lives, it is vital to build sustainability literacy within the framework of business education systems (Sipos et al., 2008; Stibbe, 2009). In fact, there have been attempts to identify required sustainability skills and competencies required by students across disciplines (Cotr, 2021; Lozano et al., 2017; UNIDO, 2022). For instance, Rieckmann (2012) conducted a Delphi study involving experts from Europe and Latin America to define key sustainability key competencies. Systemic thinking, anticipatory skills, and critical thinking emerged as the most relevant competencies for those working in sustainability-related fields.

Several researchers underscore the value of introducing sustainability-based education early on and including diverse actors and fields into a common curriculum. However, it remains unclear how to develop different sets of skills (e.g., cognitive and behavioral domains) and competencies. While prior literature emphasizes career and work-related skills, they often overlook other life skills. Regarding teaching and learn approaches for sustainability, scholars like Alcaraz et al. (2011) and Caldana et al. (2023) agree that increasing students' sustainability literacy, professional skills, and fostering their understanding of SDGs requires a multi-modal approach to education that incorporates formal, nonformal, and informal settings.

METHODS

Stage One: Research Process and Sources

This study utilized a mixed-methods approach, leveraging a combination of primary and secondary data sources. Initially, secondary data collection focused on acquiring information into the objectives, structure, evaluation methods, and curriculum of undergraduate business programs that incorporate sustainability elements. This data was drawn from three selected business schools in Thailand. The selection criteria for these institutions prioritized their relevance to the study's focus on sustainability education and student perspectives. The overarching aim was to establish foundational frameworks for sustainability education programs within Thailand.

A rigorous screening process was applied to the collected secondary data to ensure quality and relevance to the research topics. This involved the elimination of irrelevant data and rectification of inconsistencies or errors to maintain data integrity. Subsequently, the collected data underwent a coding process to categorize it based on predefined themes or variables. This coding facilitated the organization and analysis of the data by identifying pertinent patterns, trends, and relationships that aligned with the research objectives.

Table 1. Key points from the literature in sustainability education and skills

Authors/Sources	Skills and Competencies	Remarks
Cote, C. (2021) https://online.hbs.edu/blog/post/sustainability-skills	Foundation knowledge (environment, energy, innovation, waste management) + Leadership Data and Analysis Strategic Thinking Forward Thinking Creativity Communication	Factors like employees' happiness, rights, representation, quality of life, waste produced annually, and carbon emission levels are becoming important.
UNIDO. (2022) https://www.unido.org/stories/what-are-green-skills	**Engineering and Technical Skills:** Hard skills encompassing competences involved with the design, construction, and assessment of technology usually mastered by engineers and technicians. **Science Skills:** Competences stemming from bodies of knowledge broad in scope and essential to innovation activities, including physics and biology. These skills are in high demand in each stage of value chains and in the utility sector, which provides basic amenities like water, sewage services, and electricity. **Operation Management Skills:** Knowledge related to change in organizational structure required to support green activities and an integrated view of the firm through life-cycle management, lean production, and cooperation with external actors like customers. Such skills are important, for example, for sales engineers, climate change analysts, sustainability specialists, chief sustainability officers, and transportation planners. **Monitoring Skills:** Technical and legal aspects of business activities that are fundamentally different from the remit of engineering or science. They refer to skills required to assess the observance of technical criteria and legal standards.	Systemic changes, such as those necessitated by the shift to a low-carbon, resource-efficient economy, will bring about new products, services, and required skills.
Bianchi (2020)	Strategic Thinking Value Thinking Competency Systems Thinking Future Analysis Knowledges on Challenges Facing Society, *- Interpersonal Competency Ethics/Values Practical Skills	Managerial skills for new business models.
Lozano et al. (2017)	Systems thinking; interdisciplinary work; anticipatory thinking; justice responsibility and ethics; critical thinking and analysis; interpersonal relations and collaboration; empathy and change of perspective; communication and use of media; strategic action; personal involvement; assessment and evaluation; and tolerance for ambiguity and uncertainty.	
The United Nations Educational Scientific and Cultural Organization (2018)	There are eight key ESD competencies: (1) systems thinking; (2) anticipatory; (3) normative; (4) strategic; (5) collaborative; (6) critical thinking; (7) self-awareness; and (8) integrated problem-solving.	

Thematic analysis was employed to uncover recurring themes and patterns within the dataset, shedding light on key insights relevant to sustainability education. Additionally, comparative analysis techniques were utilized to explore variations or similarities in student perspectives across different data sources, enriching the study's findings with nuanced insights.

Stage Two: Data Collection Procedures

During this phase, the researcher conducted two focus group interviews involving 15 students with each group comprising five participants. All students had undergone a sustainable development training program in July 2021 and had integrated SDGs into their ongoing projects as part of their final-year coursework.

The data collection instruments were meticulously designed by the researcher in conjunction with research assistants from Mahidol University's College of Management (see Table 2). Furthermore, two professors specializing in sustainable development provided expert evaluation to ensure the instruments' clarity and precision.

Ethics Statement

The self-administered survey, which is nonexperimental in nature, was conducted under complete anonymity to ensure participant privacy. No personal or sensitive information that could be used to identify the respondents was collected. Besides, the consent of the respondents to partake in this study was obtained before the data collection process.

Sustainability Education for Business

A comprehensive training program for students in this study was meticulously crafted and administered by the academic team at the College of Management at Mahidol University (CMMU). Grounded in training theory, the program was structured to achieve three primary objectives:

- **Foundational Understanding:** Utilizing principles of cognitive learning theory, the program aimed to instill a basic comprehension of SDGs and their practical application within real-world business scenarios. Through active engagement and experiential learning techniques, students were equipped with the fundamental knowledge necessary to navigate the complexities of sustainable development within business contexts.
- **Ethical Awareness:** Drawing upon principles of ethical training, the program sought to foster a heightened awareness of responsible business practices and ethical considerations. By employing case studies, role-playing exercises, and ethical decision-making frameworks, students were encouraged to critically examine ethical dilemmas commonly encountered in business environments, thus cultivating a sense of moral responsibility and integrity.
- **Skills Integration:** Informed by principles of skill-based training, the program aimed to empower students with the practical skills required to integrate sustainable concepts into their future professional endeavors. Through hands-on workshops, interactive simulations, and collaborative projects, students were provided with opportunities to develop and refine their abilities in areas like sustainability strategy formulation, stakeholder engagement, and impact assessment.

FINDINGS

Programs Structure and Pedagogies

The initial phase of this study leveraged secondary data sourced from three public universities, encompassing program descriptions, course syllabi, and subject-specific details. This stage was pivotal in elucidating the interconnectedness of these components with regards to sustainability learning and development.

The selection encompassed three categories of undergraduate degrees in sustainability, comprising two in the natural sciences and one in the social sciences. Across all programs examined, a common thread emerged: a comprehensive provision of environmental knowledge and social studies, including demography and area studies. Key components like economics, environmental studies, business acumen, and soft skills were identified as foundational across the curricula.

Typically, first-year students embark on an exploration of the broader contextual landscape encompassing economics, engineering, and environmental studies. As students progress, they encounter specialized scientific and engineering courses, along with modules delving into sustainable economics.

Crucially, sustainability is not treated as an addendum but is intricately woven into the fabric of each program's curriculum. This intentional integration serves to foster a profound understanding of the inherent interconnectedness among ecological, social, and economic systems. However, the pivotal question persists: how do students engage with and absorb sustainability concepts within these programs? Previous studies offer valuable insights, highlighting key methodologies that warrant consideration:

1. **Multidisciplinary Projects:** Students tackle real-world problems through collaborative projects that span disciplines like economics, social justice, environmental science, and engineering. This hands-on approach breaks down silos and helps students see the interconnectedness of sustainability challenges.
2. **Case Studies and Simulations:** By analyzing real-world case studies and participating in simulations, students learn how businesses, communities, and governments navigate complex sustainability issues. This experiential learning allows them to apply theory to practice and develop problem-solving skills.
3. **Fieldwork and Service Learning:** Immersing themselves in community-based projects allows students to understand the local impacts of sustainability challenges and actively contribute to solutions. This provides valuable context and fosters a sense of agency.
4. **Guest Speakers and Expert Panels:** Hearing from diverse professionals working in sustainability fields exposes students to different perspectives and career paths. This can spark ideas, ignite passion, and guide future career choices.
5. **Interdisciplinary Discussions and Debates:** Facilitated discussions and debates encourage students to critically analyze different viewpoints on sustainability issues. This develops their communication skills, strengthens their arguments, and prepares them for real-world dialogue.

By weaving sustainability throughout the curriculum and employing varied learning methods, these programs not only equip students with knowledge but also empower students with the skills and critical thinking necessary to address the complex challenges of our time.

The importance of sustainability as a central theme throughout the entire curriculum is emphasized. This means not only covering sustainability in dedicated courses but also integrating it into the curricula of every related field. This method ensures that sustainability ideas and principles are integrated into the curriculum from start to finish.

Students in sustainable studies programs develop the ability to contextualize environmental issues within broader socio-political and economic systems. Across all programs examined, students are equipped to analyze these systems and devise comprehensive solutions to diverse environmental and social challenges.

Experiential learning, including fieldwork, internships, and service-learning initiatives, is a cornerstone of sustainable degree programs in Thailand. These hands-on experiences enable students to apply classroom learning into tangible solutions for real-world sustainability issues, equipping them with invaluable skills for their future careers.

Furthermore, social and community service learning is a prominent feature of sustainable degree programs in Thailand. Through engagement with local communities, students gain insights into the social impacts of their work, fostering a sense of social responsibility and promoting community well-being.

Additionally, one of the programs offers two leadership tracks aimed at nurturing socially conscious leaders adept at driving social innovation. This approach prioritizes the reformation of societal institutions to enhance both economic and social efficacy.

When it comes to pedagogical issues, lecture-based education and classroom instruction emerge as common practices. However, some programs augment traditional methods by offering students hands-on experience with sustainability challenges. This is facilitated through service learning, field trips, and internships with local, national, and international nonprofit organizations. All programs also address the incorporation of technology in environmental applications and social media platforms as key elements for enhancing students' learning experiences.

"I also observe students' deep connection to SDGs in their daily lives and career paths."

Sustainability extends beyond the environment, encompassing equality, equity, and social justice. Sustainable education programs should bridge the gap between theory and practice by equipping students with real-world skills for their personal and professional journeys.

Students' Expectations

Sustainable Readiness

Students participating in this study anticipate that sustainable education programs will equip them with practical skills and knowledge applicable to both their daily lives and future careers. They acknowledge that sustainability concepts profoundly influence their everyday activities, prompting reflection on the environmental implications of their actions. For instance, education on sustainability encourages students to reconsider their purchasing, dietary, and commuting habits, fostering a shift toward more environmentally friendly lifestyles. This heightened awareness and mindful approach to daily routines contribute to the cultivation of a sustainable mindset among students.

"I can discuss environmental issues when I have the knowledge to make sustainable decisions on daily activities like food, fashion, or fuel."
"I am a new person because I now see that we may help the environment by lowering energy usage, plan our food and energy, recycle more, and not waste materials."

Education on sustainability prompts students in this study to reflect on and evaluate their daily behaviors, fostering changes aimed at achieving a more sustainable future. This educational approach not only promotes a sense of community and interconnectedness but also encourages individuals to harmonize their lives with the natural world. Moreover, literature suggests that education plays a crucial role in shaping sustainable behavior by enhancing awareness, fostering critical thinking, and promoting pro-environmental attitudes (Wals, 2014). Overall, participants perceive sustainability mindsets as the capacity to grasp the broader picture, offer nonjudgmental perspectives, and seek integrated solutions, recognizing the interconnectedness of various facets of sustainability (Sterling, 2001).

Preparation for future careers emerges as a prevalent concern among the students in this study. They anticipate that sustainability education will be instrumental in equipping them with skills relevant to their professional trajectories and fostering an understanding of the intricate interplay between environmental, social, and economic dimensions. Particularly, students with backgrounds in business education emphasize the importance of cultivating a collaborative mindset. This mindset proves essential in navigating the sustainability and business value chains effectively. Addressing sustainability challenges and capitalizing on opportunities necessitates robust collaboration with stakeholders spanning the supply chain, including suppliers, customers, and local communities. Such

a collaborative mindset is underpinned by specific skill sets that are indispensable for navigating the complexities of sustainability in a business context.

Technical Sustainable Skills

Professional skills for green jobs or sustainability-related work are mentioned frequently by participants when discussing their motivation to enroll in sustainable development courses. Although most participants are in specific and specialized undergraduate programs like medicine, nursing, and music, they feel the urge to develop the new set of skills for future jobs.

Future skills refer to skills they will adapt into their profession and the knowledge on innovation and technologies that support sustainability in all organizations. Participants tend to focus on the ability to keep up with technology to improve environmental conditions, as well as access to support for all. Issues on new technologies and techniques to reduce human influence on the environment are seen as important future skills for all.

Most participants expect that graduates from universities will possess skills in sustainability in the same way as the ability to operate computers or speak foreign languages. They also expect that skills in new areas of environmental and social technology, such as renewable energy and waste management, will be in great demand.

When discussing soft skills in sustainability, all participants referred to communication and analytical skills. They understand the global challenges we are facing, such as inequality, climate change, loss of natural resources, and poverty. Graduates with cross-cultural communication and collaboration abilities will be crucial to the development and implementation of sustainable solutions in all industries.

Students from business schools discuss the ability to design corporate strategy through their sustainable business activities. Sustainable business skills are what commonly stated by the students in this study as the ability to plan business activities without compromising with environmental, resources, and social issues.

The adoption of sustainable practices, such as cutting back on energy and water consumption, minimizing plastic use, recycling old products, and a fair system in the supply chain, can often lead to financial savings for organizations. In this circumstance, graduates with such skills can help organizations achieve their financial goals while doing less damage to the environment. Table 2 illustrates points on expectations among students who participated in this program.

Table 2. Students' expectations on sustainable education training

Technical Skills	Soft Skills	Generic Education & Training
- Knowledge of renewable energy technologies and their applications. - Understanding of water conservation and management techniques. - Proficiency in sustainable agriculture and food production methods. - Ability to design and implement sustainable buildings and infrastructure. - Familiarity with circular economy principles and practices.	- Effective communication and collaboration skills to work with stakeholders from diverse backgrounds and perspectives. - Critical thinking and problem-solving abilities to develop sustainable solutions to complex challenges. - Leadership and management skills to inspire and motivate others to act on sustainability issues. - Flexibility and adaptability to navigate the changing landscape of sustainability.	- Understanding of the environmental, social, and economic impacts of unsustainable practices. - Knowledge of the principles and practices of sustainable development. - Familiarity with the United Nations Sustainable Development Goals (SDGs) and their relevance to sustainability education. - Understanding of the intersectionality of sustainability issues, such as climate change, social justice, and economic development.

Relevance to Daily Activities

All participants anticipate the direct applicability of program learnings to their future careers. They believe that the acquisition of pertinent ESG knowledge, industry practices, and collaboration skills will bolster their confidence to embrace new technologies for sustainable work practices. Moreover, they underscore the transformative potential of impactful sustainability education, which resonates with their personal experiences and empowers them to engage critically, assert agency, and address issues of personal significance.

Furthermore, participants underscore the transdisciplinary nature of sustainable education, which integrates relevant theory and practical applications across diverse fields and future career paths. Notably, the program challenges traditional disciplinary boundaries, advocating for collaboration and innovative problem-solving approaches to address real-world challenges.

"It is practical. I can relate what's in the course to my work and study."

The fact that sustainable education encourages students to think about "the big picture" is evident. When participants were asked to define the relevance of sustainability to knowledge and skills, they agreed on the interconnectedness among various facets like general knowledge, understanding about specific issues, global and local awareness, staying aware of current affairs, and the ability to identify local and global trends.

"I expected to be able to connect local and global issues when I enrolled in this course. This course has to be practical to be sustainable."
"Communicating environment issues in Thailand to the tourists or non-Thai visitors is relevant to my daily life as a student in environmental studies because we are more global in this era."

An interdisciplinary approach to sustainability education might involve bringing together teachers and experts from fields like science, social studies, and language arts to design a unit on renewable energy. Within this framework, students would learn about the science of renewable energy sources, understanding how technologies like solar panels and wind turbines work. They might also explore the economic and social factors that influence the adoption of renewable energy technologies, such as government policies, market forces, and cultural attitudes.

The relevance of SDGs in students' lives is clear. Participants define that SDGs emphasize the simple nature of sustainability, highlighting its role in improving all aspects of life and society beyond the natural environment. The SDGs place particular emphasis on equality, equity, and social justice, making sustainability relevant to both professional and personal domains. A word cloud generated from the data under the theme of relevance is presented in Figure 1.

This multi-disciplinary aspect also offers benefits to sustainability education programs. It allows students to see how sustainability is relevant to many different aspects of their lives, fostering a comprehensive understanding of the issue. It also encourages critical thinking, problem-solving, and collaboration as students work together to integrate different perspectives and approaches.

Sustainable Digital Skills

Sustainable digital skills are indispensable for navigating an increasingly digitized landscape and addressing environmental, social, and economic impacts. Proficiency in digital technology not only facilitates personal and professional endeavors but also fosters employability, social cohesion, and quality of life. Moreover, digital literacy empowers individuals with a deeper understanding of historical, current, and future societal trends. As technology continues to evolve, digital competencies become imperative for fostering long-term sustainability and enabling adaptability to emerging

Figure 1.

challenges. By equipping individuals and communities with digital skills, we pave the way to building a more sustainable and resilient future.

Participants' acknowledgment of the importance of information literacy underscores their recognition of its pivotal role in navigating the vast sea of information available today. Information literacy, as defined by Bruce (1999), encompasses the ability to identify the need for information, locate relevant sources, and effectively utilize them. This skill is crucial in maintaining integrity while processing information, ensuring that decisions and actions are grounded in reliable data.

Moreover, participants highlight the interconnectedness between information literacy and digital skills. Digital skills encompass not only the ability to access information but also to analyze and interpret it effectively. In the context of sustainability, this translates to the ability to analyze ESG data critically. Additionally, participants note the importance of integrating skill-based initiatives into ESG reporting, demonstrating how digital skills facilitate the incorporation of sustainability practices into organizational frameworks.

When discussing examples of the relationship between sustainability and digital skills, participants cite various digital solutions aimed at reducing environmental impact and enhancing efficiency. For instance, they mention the use of digital technology to optimize energy consumption, streamline supply chain processes, and implement technologies that enable resource conservation and product repairability. These examples illustrate how digital skills serve as enablers of sustainable practices, driving innovation and progress toward a more environmentally conscious future.

"Business schools should include digital literacy to ensure the long-term viability of society."
"I believe the more we know about technology, the more we can create efficiencies that help the environment stay healthy."

Nearly half of the participants noted that traditional business activities often involve heavy resource consumption, highlighting examples like the use of paper and ink or frequent personal travel as irresponsible activities. Participants suggested that businesses can reduce resource consumption by

allowing staff to manage their resources more efficiently and provide digital technology alternatives. Engaging in discussions about these issues in the classroom can also help students consider their consumption behaviors and prepare them to adopt more sustainable habits from an early age.

One participant noted that online information, e-commerce, and instantaneous communication via mobile technology are examples of digital technologies that contribute to sustainability, aligning with their expectations prior to enrollment.

"CO2 emissions can be cut with the help of digital technologies. By moving resources like software and operating systems to the cloud, we can save energy and cut down on pollution."
"Recently, the demand for digital skills in the so-called green jobs has grown increasingly obvious as the COVID-19 pandemic has compelled many firms to become digital in order to survive."

THEORETICAL IMPLICATIONS

This study addresses the importance of students' needs to learn and improve their competencies in sustainability for various reasons, emphasizing the value of preparing students for future sustainability challenges from the perspective of higher education. Hence, adopting critical pedagogy approaches in today's sustainability education is essential. Critical pedagogy encourages students to critically analyze and challenge existing power structures, social norms, and economic systems that contribute to sustainability issues, empowering them to become agents of change in addressing complex sustainability challenges.

Recognizing the crucial role of digital skills in effective learning about sustainability implies the importance of integrating technology into sustainability education. Universities should draw upon technology integration theory to effectively incorporate digital tools, resources, and platforms into sustainability courses, thereby enhancing students' digital literacy and their ability to engage with sustainability challenges in a digitalized world.

By considering these theoretical implications, universities can enhance the effectiveness and relevance of their sustainability education programs, preparing students to address current and future sustainability challenges in their careers and communities.

PRACTICAL IMPLICATIONS

Universities play a critical role in advancing sustainable development by promoting understanding and engagement with sustainability through their education programs, courses, and research opportunities. This study underscores the importance of universities designing academic activities that focus on sustainability, including environmental studies, renewable energy, sustainable business practices, and other topics addressing global challenges.

The study highlights the multi-disciplinary nature of sustainable education is multi-disciplinary, emphasizing that universities should integrate diverse perspectives and disciplines into their sustainability curricula. This helps students develop a holistic understanding of sustainability issues, see the true value of sustainability, and better prepares them for interdisciplinary work in their future careers.

In the modern era of education, sustainability concepts can be taught through various digital learning platforms, thereby enhancing students' digital skills in sustainability. Recognizing the importance of digital skills for effective learning about sustainability implies that universities should incorporate technology and digital literacy into their sustainability courses. This ensures that students are equipped with the necessary tools to engage with sustainability challenges in a digitalized world.

Furthermore, the anticipation by participants in this study that learning about sustainability will enhance their understanding of future careers implies that universities should emphasize the

development of transferable skills such as environmental analysis, sustainable finance and investment, global politics, and social impact assessment. This ensures that students are well-prepared for diverse career paths in sustainability-related fields.

Overall, these implications suggest that universities should adopt a proactive approach to sustainability education, continuously updating their curricula to meet the evolving needs of students and the demands of the workforce in a rapidly changing world.

CONCLUSION

The SDGs, established by the United Nations, are regarded as the cornerstone of contemporary sustainable education. These goals address three fundamental components of sustainability: (1) fostering economic growth; (2) promoting social inclusion; and (3) ensuring environmental protection. All of these components work together to ensure the well-being of individuals and communities.

The importance of sustainability initiatives within tertiary institutions has grown as a result of the awareness HEIs give to students about environmental and social difficulties, the technical support and skill development opportunities to enhance students' understanding of sustainability, and the proactive roles that HEIs play in sustainability. Therefore, HEIs must fully understand students' expectations and aspirations regarding sustainable education and training.

The key findings of the research study revolve around three areas: (1) identifying sustainable skills needed by undergraduate students; (2) recognizing their motivations for enrolling in sustainability courses; and (3) discerning their expectations regarding future career prospects. These findings hold considerable relevance to existing theoretical frameworks and models in education, sustainability, and career development.

The findings align with constructivist learning theory, which emphasizes active learning and the real-world application of knowledge. Students' emphasis on acquiring practical skills like environmental analysis and sustainable finance suggests that sustainability education should focus on hands-on learning experiences and problem-solving activities.

This study challenges traditional curriculum development models by highlighting the need for universities to continuously adapt their sustainability courses to meet evolving skill requirements and employment trends. It suggests a departure from rigid, content-driven curriculum models toward more flexible, outcome-based approaches that prioritize the acquisition of future-oriented skills.

Also, the study underscores the role of critical pedagogy in sustainable education at the higher education level. It highlights how sustainability education enhances students' understanding of global politics and social impact assessment, supporting the principles of critical pedagogy. By encouraging students to critically analyze socio-economic systems and power structures, sustainability education can empower students to become agents of change in addressing systemic sustainability challenges.

The recognition of digital skills as crucial for effective sustainability learning aligns with technology integration theory. Universities should incorporate digital tools and platforms into sustainability education to enhance students' digital literacy and ability to engage with sustainability challenges in a digitalized world.

This study identifies key common characteristics of courses in sustainability for business students in Thailand. Thailand's business schools need to adopt pedagogy and knowledge in the fields of environmental science, social issues, management, and digital technology to teach students how to incorporate sustainability concepts and skills into their daily work and lives, thereby influencing their behavior.

The analysis of sustainability courses shows thar sustainable courses in Thailand place an emphasis on experiential learning strategies like fieldwork, internships, and service-learning projects. Students gain sustainability skills from the experiential learning activities because HEIs and their partners can bring relevance and real-life situations where students can apply what they have learned in the classroom to the community.

Industry associations can help identify needed skills and co-design training initiatives within HEIs. Instead of independently developing sustainability training programs, industrial partners should collaborate with HEIs to create modern and industry-relevant sustainability training programs grounded in academic knowledge.

Participants in this study emphasized the importance of equipping students from all disciplines with skills for the present and future sustainable path. Among them, digital skills, data literacy, and environmental knowledge are essential for future graduates. Collaborative efforts between industry and HEIs are needed to define roadmaps for climate neutrality, offer training courses or programs on carbon and greenhouse gas emissions, and develop digital leadership programs to drive sustainable efficiencies.

Basic sustainable skills in business, such as energy and water conservation, plastic reduction, waste recycling, effective communication of sustainable issues, and implementation of a fair system in the supply chain, should be integrated into general education training for all students in Thai tertiary education. Graduates with these abilities can aid businesses in meeting their financial objectives while protecting the environment.

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