Students' learning sustainability – implicit, explicit or non-existent: a case study approach on students' key competencies addressing the SDGs in HEI program

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Abstract

Purpose – This study aims to understand better the student awareness and knowledge on how the Sustainable Development Goals (SDGs) are used in higher education institutions (HEIs) to motivate students' learning on sustainability. It is essential to consider students' understanding of sustainability at the end of their studies to assess whether they feel prepared to apply sustainability in their daily work life.

Design/methodology/approach – The study has a quantitative case study design, and the specific method used is an online survey with masters' students using the university student platform EvaSys. The study assesses approaching how students perceive the overall education integrating sustainability into programs and curricula.

Findings – The results showed that work-integrated learning (WIL) projects learning and real-life experiences as part of their studies enhanced the students' understanding of sustainability. Moreover, the study showed that integrating an understanding of the SDGs in teaching offers universities a way to frame students' key competencies in ways that allow them to develop their interpersonal competencies as ambassadors for sustainability in their future work life.

Practical implications – This study supports the argument that WIL and real-life university experiences enhance students' key competencies critical for sustainability.

Originality/value – The pedagogical approach advanced in this paper addresses how WIL and real-life experiences might develop students' key competencies on sustainability. This approach indicates that working with SDGs in teaching encourages students to promote their interpersonal competencies for sustainability.

Keywords University social responsibility (USR), Sustainable Development Goals (SDGs), Higher education institutions (HEIs), Work-integrated Learning (WIL)

Paper type Research paper

Introduction
Sustainability is an increasingly important topic worldwide, with awareness of this topic growing since the 2016 Agenda 2030 publication by the United Nations (Boyon, 2019). Universities have shown an increased interest in the idea of integrating sustainability into programs and course core curriculum. The Sustainable Development Solutions Network (SDSN, 2020) has highlighted universities' essential role in delivering SDGs, arguing that none will be fully achieved without university contributions in education, research, innovation, and leadership. Universities can facilitate progress, bridging research efforts and community needs to develop a more sustainably oriented society. In addition to students' education and preparation, sustainability in higher education institutions (HEIs) also focuses on the sustainable operation of university facilities and communities. This effort toward the sustainable management of university facilities serves a dual function, as universities may act as living labs or institutional role models for students (Lozano *et al.*, 2011). The private sector will benefit if university graduates carry sustainability awareness, skills and values into their professions. Relatedly, the private sector sees increasing importance in alignment with the SDGs of Agenda 2030 (Scheyvens *et al.*, 2016). Not surprisingly, there is a growing awareness of sustainability's importance, specifically, Agenda 2030 within HEIs (Filho *et al.*, 2019; GUNi, 2020; Shiell *et al.*, 2020). University programs and sustainability researchers are increasingly investigating how best to prepare students to integrate sustainability into future professional efforts (Junghanns and Beery, 2020) and considering how program outcomes in HEIs align with the actual learning processes (Redman *et al.*, 2021).

Lozano *et al.* (2017) argue that integrating sustainable development (SD) into the programs and curricula will also create meaningful SD learning outcomes. Hence, the development of students' system-thinking demands new pedagogical ideas and transdisciplinary approaches promoting students learning by addressing experimental, interactive, and real-life cases (Lozano *et al.*, 2017). In HEIs, the integration of the SDGs and Agenda 2030 draws attention from the wider society. Ultimately, the implementation of sustainability issues in HEIs has become significant because it creates awareness of environmental challenges, supports knowledge about sustainability and raises critical thinking among students. Rapid urbanization, climate change and loss of biodiversity across different scales and continents increase the critical task of HEIs to empower future generations on SD (Caniglia *et al.*, 2018).

Given the potential role of HEIs in the transition to a more sustainable society, the purpose of this research is to understand better the student awareness and knowledge on how the SDGs are employed in HEIs. Further, it is interesting to understand how the SDGs may enhance students' key competencies on sustainability. The sub-purpose is to ascertain the level of awareness and understanding about sustainability that students have by the completion of their studies at one Swedish University (Kristianstad University, hereafter HKR). To further help us understand students' knowledge on SDGs, the following research questions were posed: How do work integrated learning (WIL) , known as "*verksamhets-förlagd utbildning*" VFU in Swedish) and real-life experiences used as teaching methods

support graduates' abilities to apply their knowledge of the SDGs and sustainability to their future work-life? Moreover, What is the level of master students' key competencies for sustainability throughout the four faculties of HKR?

These research questions may help us identify the best practices for sustainability pedagogy in each program. Such an analysis might be helpful for universities and faculties that can learn from each other and potentially improve the sustainability contents of their programs and curricula. A literature review and conceptual framework on sustainability outcomes were used to explore the research questions and provide a foundation for a survey. The survey investigated students' understanding and application of the SDGs. The survey provided researchers with valuable data, which was then analyzed by using descriptive and correlative analysis to reveal information and insights about the sustainability knowledge of HKR students.

Literature review

Ávila *et al*. (2019) elaborate on how universities must move forward to overcome barriers to implementing the Agenda 2030 in HEIs. According to their research, HEIs play a vital role in transforming SD in society and stress that the main barriers to implementing sustainability in HEIs' systems are a lack of continuity of actions and resistance to changes (Ávila *et al*., 2019). HEIs' systems should have all the resources needed to develop innovative sustainable solutions: science, technology, highly educated researchers, teaching staff and motivated students (Ávila *et al*., 2019). Sonetti *et al*. (2019) claim that universities always must take the role of significant contributors addressing SD and implementing SDGs in HEIs. In this way, integrating SD in HEIs goes beyond developing course curricula, educating new generations of leaders for future change and practices of SD in teaching to grasp behavioral change. A basic example of this opportunity can be found in the sustainable waste-water treatment education proposals explored in Junghanns and Beery (2020). Their study focuses on how innovative HEIs' programming may serve achievement targets of SDG 6 Clean Water and Sanitation. Another example, Brundiers *et al*. (2010) emphasize HEIs' sustainability and addresses the associated complex problems. Their study at Arizona State University (ASU) argued that real-world learning opportunities could be used to help develop a problem-solving mindset. This effort by universities to develop innovative ways to grow students' capabilities for SD has also resulted in university-to-university collaborations. For example, the AGERA project (GVM, 2020) was funded by the Swedish Government agency Vinnova which administers state funding for research and development. The effort is a collaboration of seven universities across Sweden to create a framework for integration and alignment of the Agenda 2030 SDGs in university operations and programming.

University social responsibility

Another aspect of moving forward toward implementation of the Agenda 2030 in HEIs is University Social Responsibility (USR), as emphasized by Bokhari (2017), "sustainable development cannot be achieved in isolation from the close relationship between higher education and its institutions-namely universities-and society" (p. 1). Sánchez *et al*. (2013) define USR as "the capacity of the university to disseminate and implement a body of principles and general and specific values, by means of four key processes—management, teaching, research, and community engagement to respond to the needs of the university community, and in this framing, their "country" as a whole" (p. 710). Looking at USR from a citizenship perspective, USR is defined by Vasilescu *et al*. (2010), as "the need to strengthen civic commitment and active citizenship; it is about volunteering, about an ethical approach, developing a sense of civil citizenship by encouraging the students, the academic staff to provide social services to their local community or to promote ecological, environmental

commitment for local and global sustainable development" (p. 4178). Furthermore, USR is also explained by Lo *et al.* (2017, p. 40) as "a policy of ethical quality of the performance of the university community (students, faculty and administrative employees) via the responsible management of the educational, cognitive, labor and environmental impacts produced by the University, in an interactive dialogue with society to promote a sustainable human development." Based on these definitions, it can be noticed that USR encourages universities to incorporate ethical, environmental, social values and principles into their primary functions, and this can only be achieved by adopting a stakeholder's perspective (i.e. satisfying the expectations and needs of the stakeholders) (Jorge and Pena, 2017). Hence, training, research, management and community engagement must be implemented (Table 1).

Conceptual framework
Wiek *et al.* (2011) argue that universities could facilitate internal change for a transition toward sustainability through increased student awareness and note that this requires a specific set of competencies and skills. Redman *et al.* (2021) argue that to enable students and to build their understanding of sustainability, teachers and instructors need both the right tools and methods, as well as the right framework to ground their teachings on. This approach is supported by Rieckmann (2012), who states that developing proficiency in key competencies enables people to participate actively and responsibly in modern society. The literature review emphasizes the role of students as problem solvers, change agents and transition managers (Lozano *et al.*, 2017; Caniglia *et al.*, 2018; Jorge and Pena, 2017; Bokhari, 2017; Ávila *et al.*, 2019). Building upon the strength of the students' role, Wiek *et al.* (2011) provide such a framework for understanding students' key competencies. This framework uses the context of sustainability as "a functionally linked complex of knowledge, skills, and attitudes that enable successful task performance and problem-solving" (p. 204). As can be seen in Figure 1, their model is based on students' five key sustainability competencies: systems-thinking competence, anticipatory competence, normative competence, strategic competence and interpersonal competence.

The selection of these five competencies is further strengthened by Rieckmann (2012), who defines systemic thinking, anticipatory competence and critical thinking as the most important abilities. Pálsdóttir and Jóhannsdóttir (2021) highlighted the importance of the five competencies in their investigation of the extent to which the five key sustainability competencies are integrated into the University of Iceland curriculum. The Icelandic study showed differential integration across competencies and university faculties and assessed the University's world ranking and a sense of the pressing sustainability problems humanity faces. Furthermore, Brundiers *et al.* (2020) highlighted the importance of the five key competencies in

University Function	Description
Training	Incorporating environmental, social, and ethical issues in the curricula, to address the demands stated by Responsible Management Education or the United Nations Decade of Education for Sustainable Development.
Research	Transferring expertise and knowledge to the society.
Management	Implementing accountability and good governance practices, in association with developing codes of reporting practices on environmental and social affairs and good governance.
Community Engagement	Promoting civic values, corporate citizenship and contributing to the socio-economic environment

Source: Jorge and Pena (2017)

Table 1.
Key elements in the adoption of a stakeholder perspective

today's research and further refined and complimented them to show a hierarchy within them and broaden their scope. Combining the five competencies makes it possible to create methods for developing programs and course curriculums to structure them as efficiently as possible regarding the needed learning outcomes of sustainability-related classes.

The first competence, system-thinking, involves analyzing complex systems across different domains (society, environment, economy) within a local and global context. It also includes skills such as comprehending, empirically verifying and articulating their structure, cause–effect relations, perceptions, motives, decisions and regulations. Thus, students should be able to cope with cascading effects, feedback loops related to sustainability issues and problem-solving. According to Rieckmann (2012), increasing complexity, risks and uncertainties in today's globalized world are the main challenges, highlighting the importance of system-thinking competence.

The second competence, the anticipatory competence, is "the ability to collectively analyze, evaluate, and craft rich pictures related to sustainability issues and sustainability problem-solving frameworks" (Wiek *et al.*, 2011, pp. 207–209). It assumes the ability to consider qualitative and quantitative information and then evaluate, articulate and break down their structure into critical components. Additionally, this competence also prepares students to cope with unintended harmful consequences and integrational equity. Further, anticipatory competence describes "the ability to craft integrates creative and constructive skills" (Wiek *et al.*, 2011, pp. 207–209).

The third competence is normative competence and includes the student's ability to "collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets" (Wiek *et al.*, p. 209). However, this competence goes beyond these skills and encompasses the overall goal of developing a critical view and scrutinizing the sustainability of current and future states of social-ecological systems.

The fourth is strategic competence, which involves students' ability "to collectively design and implement interventions, transitions, and transformative governance strategies toward sustainability" (Wiek *et al.*, 2011, p. 210). Thus, it can be described as the skill to get things done efficiently and systematically. It also includes buzzwords such as feasibility and effectiveness in what is done. Therefore, students need to identify barriers and carriers and form alliances to challenge current positions and solve logistical problems. Thus, a robust understanding of the real world.

Figure 1.
A layered set of competencies in academic sustainability education, linking basic competencies and key competencies in sustainability, as well as recognizing interpersonal competence as cross-cutting key competence in sustainability
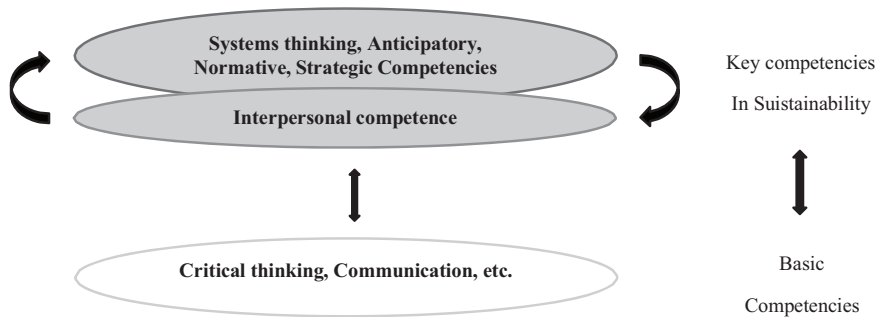
Source: Wiek *et al.* (2011)

The fifth and final competence is interpersonal competence. Wiek *et al.* (2011) define interpersonal competence as one that completes the framework. Interpersonal competence involves the student's ability "to motivate, enable, and facilitate collaborative and participatory sustainability research and problem-solving" (p. 211). It requires a high degree of communication, collaboration and negotiation. The student must develop an ability for outreach and collaboration with stakeholders. Additionally, it is about thinking and acting across cultural boundaries, thus strengthening trans-cultural thinking, facilitating diversity across cultures and valuing individuals and communities. Also, leadership (self and others) is a skill that might be relevant for this. These skills are also a necessity for the other four competencies. Reaching this final competence is complicated as it involves all the other competencies, challenging the pedagogical setting.

The five competencies form a set of fundamental competencies. However, Wiek *et al.* (2011) emphasize that students could not be expected to acquire all competencies on an equally high level but rather find the right balance according to the students' assets. Therefore, it is suggested that they expect students to develop in-depth expertise in one or two key competencies and a solid understanding of the others. For instance, while students of a technical faculty need more robust competencies in contesting, anticipating and developing multidimensional approaches to problems, students of managerial faculties might have more focus on a critical perception of the world (Mazur *et al.*, 2021). Both sides, however, need competencies in cooperation.

Furthermore, the sufficiency of knowledge also depends on the level of the academic program; a master's student might be expected to acquire a more profound understanding and expertise of these critical competencies than undergraduates (Wiek *et al.*, 2011). Wiek *et al.* (2011) problematize the importance of understanding students' awareness about sustainability at the end of their studies and preparedness to implement their knowledge in their daily work life. HEIs can offer the curricula and the teaching and learning environment to generate and transfer sustainability awareness to future generations. Thus, a part of sustainability education involves incorporating SD into teaching and curricula and taking on the challenge of raising student awareness and agency. The learning environment may support and enable the interpersonal growth of students' key competencies on sustainability.

Integrating pedagogical approaches with sustainable development competencies
Lozano *et al.* (2017) note an urgent need to move from researching and developing SD integration objectives/aims to actual SD integration into university curricula; they note that while there has been significant growth in the literature regarding competencies for SD, the attempts to link pedagogical approaches and competencies have been limited. Filho *et al.* (2019) recently noted systematic efforts to increase SD objectives/aims integration into university curriculum as one way to address this limitation. An example of recent action to address this need can be seen through a course for university faculty at the University Jaume I of Castellon (Spain) (Expósito and Sánchez, 2020). This training course for higher education faculty provides education for SD (ESD) skills and competencies and is designed to help academics reorient their curricula to align with the SD goals of the United Nations' Agenda 2030. A useful framework to support academics attempting to adjust their curricula is the three pedagogical categories linked with appropriate pedagogical approaches found in Lozano *et al.* (2017) (Table 2).

Lozano *et al.* (2017) argued that two of the three pedagogical categories, universal and environmental education pedagogies, provide good coverage of the system thinking competency. The anticipatory thinking competency requires a mix of the three pedagogy

categories to provide the best possible coverage; the suggested pedagogies approaches were case studies, lecturing, problem-based learning, participatory action research, traditional ecological knowledge, eco-justice and supply chain analysis. The other two mentioned competencies were strategic competence and interpersonal competence. Strategic competence also requires a mix of the three pedagogical categories and suggested specific case studies, lecturing and problem-based learning approaches. Furthermore, as in the universal category, all the approaches were deemed useful in the community and social justice category. Finally, place-based environmental education and supply chain analysis is needed to provide the best competence coverage in the environmental education category.

Lozano *et al.* (2017) argue that a diversity of approaches could help develop a range of competencies, enhancing student capacities to think and learn. "These pedagogical approaches are non-exclusive, with some overlap in techniques among them and a clear potential to use two or more of these educational strategies synergistically" (p.6). Different methods could and must be used in various settings and teaching methods adapted to the conditions where it takes place, highlighting the diversity in approach as crucial for students to take an active part. Relatedly, Lozano *et al.* (2017) argue that working with real-life case studies has proven to be one of the methods that could enhance students' active learning for SD. Real-life case studies conducted for a company or an organization may foster students' analytical reflection that promotes critical thinking for SD. Similarly, SDSN (2020) emphasized the development of courses directed to real-world collaborative projects. Caniglia *et al.* (2018) enlarge the real-life idea to a global scale and argue that future generations must be prepared to address (un)sustainability across different scales and contexts. They raise the question of what kind of curricula and teaching-learning environments should be used in transnational collaborations to prepare students in an increasingly globalized and interconnected world.

Real-world learning opportunities

Dealing with actual sustainability problems takes students beyond theoretical understanding, helping them develop practical competencies (Brundiers and Wiek, 2010). Brundiers and Wiek (2010) label these "wicked" problems and emphasize how educators must help students generate workable solutions to create a better society. They argue that one way is working together with different stakeholders. They suggest that students then learn different forms of understanding to learn how to cope with conflicting perceptions. Brundiers and Wiek (2010) address SD challenges by defining the problem jointly with stakeholders toward a robust and relevant outcome in students learning processes.

Pedagogical categories	Description
Universal	Pedagogies that are utilized in most contexts and disciplines (lecturing, case studies, concept and mind maps, interdisciplinary team teaching and problem based learning)
Community and social justice	Pedagogies that are used specifically in addressing community building and social justice (Interlinked teams, community service learning and participatory action research)
Environmental Education	Pedagogies from environmental education practices and environmental sciences (place-based environmental education, traditional ecological knowledge, ecojustice and supply chain analysis)
Source: Lozano *et al.* (2017)	

Table 2.
Pedagogical categories

According to Brundiers *et al*. (2010), "literature on education for sustainable development call for pedagogical innovations that provide interactive, experiential, transformative and real-world learning" (p. 309). This focus on practical learning also requires a reorientation and development in course curriculums to meet this goal. Brundiers *et al*. (2010) argue that students must be exposed to real-world settings in communities, businesses and governments put three dominant models to real-world learning formats: project-based learning, service learning and internships. Project-based learning includes students collaborating with partners to develop a solution approach supervised by the faculty and stakeholders. Service-learning is about students learning while giving, e.g. in a community, to support social innovation and change. Internships develop a student's professional working experiences (students gain) while assisting or supporting professional progress (students give).

As an essential societal institution, universities play a significant role in advancing the SDGs in teaching and course curricula (Bokhari, 2017). In light of the challenges thriving towards a progressive society, universities are increasingly required to not only rely on being strong-willed but universities also need to involve with real society and provide students with incentives to participate linking students to practical field application, for USR to take place (Bokhari, 2017). These real-world learning opportunities are designed to help students increase their understanding of sustainability problems and complement their competencies in applying problem-solving approaches while collaborating with non-academic experts and other stakeholders (Brundiers *et al.*, 2010). This "real world" approach fosters the role of HEIs as a change agent, integrating transdisciplinary case studies on regional, urban and sustainable organizational transitions into research and the curriculum. According to Bokhari (2017), alongside student engagement, the faculty, other stakeholders and community participants will also learn and benefit.

Design/methodology
Specifically, this research intended in this study to use the conceptual framework by Wiek *et al*. (2011), which examined how integrating sustainability in HEIs' teaching could facilitate students' key competencies for internal change to support a transition toward SD. The following section present the methods employed in this study, which align with the research's purpose.

Case study approach
The motivation for focusing on HKR is the faculty's growing interest in aligning curriculum with the SDGs and the 2030 Agenda. For example, HKR has participated in the AGERA project. AGERA is a joint project between Swedish Universities to develop new ways of evaluating and following up the effects of collaboration regarding SD on campus and in university programs (AGERA, 2020). HKR is also a member of the UN Global Compact. This SD emphasis is in line with the SD issues on global and at local levels. UN Global Compact and the SDGs have an important and central role as a fundament for further concepts and actions in achieving Agenda 2030 at HKR. Furthermore, HKR works actively within UN-based initiative PRME (The Principles for Responsible Management Education) and has signed up as PRME Champions for the second time 2020/2021. HKR has also recently joined the Sustainable Development Solutions Network (SDSN).

HKR works with the Kristianstad model for work placement, an internship program labeled WIL in line with the engagements. WIL is organized in close cooperation with the private and public sectors, and students are affiliated with an organization within business and industry or public administration during their studies. The work involves case studies

through real-life learning by collaborating with the WIL organization, and students use literature to understand, interpret and analyze the real-life setting. The combination of relevant literature and the student's learning experience enables a straightforward collaboration between research, education and work-life, following Brundiers *et al.* (2010) real-life practices in teaching. The study focused on student learning outcomes regarding sustainability after their HKR university studies and whether students feel prepared to implement their knowledge in their daily work life. A case study approach has been used with a quantitative methodology to obtain basic descriptive statistics to obtain a generalizable sample across a sizable population of university students. The focus on one university integrating WIL (authentic context) into teaching and students' active learning attempted to generate an in-depth understanding of sustainability outcomes at HKR (Crowe *et al.*, 2011). For most study programs, the HKR offers WIL projects to enable the students to further their knowledge about sustainability by immediately applying it in a real-life setting, cooperating with different companies and organizations. Thus, a case study approach is appropriate in this situation, based mainly on uncertainty regarding the phenomenon (sustainability education outcomes across many campus programs) and the context, HKR and WIL (Yin, 2009).

Within the case study approach, a survey to obtain descriptive statistics was deemed the most efficient way to gain insight into the phenomena of interest. The method choice is also based on the hope that results and analysis may illuminate important trends and patterns in HKR student experiences and learning outcomes (Amos, 2016). It is hoped that such information may then have value beyond the specific context of HKR.

Participant's selection
This study investigates the master's students' sustainability knowledge and awareness upon completing their studies at HKR. HKR is a small Swedish university offering 50 educational programs. In the year 2019, HKR had 14.829 undergraduate students, 71% women and 29% men. The university awarded 1443 diplomas to its students. The survey was aimed at master's students at HKR based on the assumption that they could be expected to have a more profound understanding of sustainability and the five competencies framework than undergraduate students (Wiek *et al.*, 2011). The participant sample of master's students consisted of all second cycle students (graduate students) at the university in the 2019 fall semester; these faculties are the Faculty of Business, Faculty of Health and Science, Faculty of Education and Faculty Natural Science. In total, the survey was sent out to 742 students across all faculties at the HKR. The researchers only collected the empirical data relevant to the study's specific purpose, and the data was collected following the General Data Protection Regulations (GDPR), which aims to protect the rights of the participant's data (GDPR, 2020). [AQ2]

Online survey
The online survey was conducted through EvaSys (Appendix 1), an online survey design and delivery tool. The survey consisted of 13 questions. It was divided into parts: Part A, Demographics and Control Questions; Part B, General Knowledge on Sustainability; and Part C, Competencies. Part C, Competencies, was then divided accordingly to the five sustainability competencies described by Wiek *et al.* (2011) including:

- System-thinking competence
- Anticipatory competence
- Normative competence

- Strategic competence
- Interpersonal competence
- Part A: Demographics and control questions were measured using four single-choice format questions. For example, these included students' study level, department and program and students' place of study (distance or campus) (Appendix 2).
- Part B: General knowledge on sustainability, survey questions included one closed yes/no question, two single-choice questions and one question using a five-point Likert scale (1 = "I completely disagree" to 5 = "I fully agree").
- Part C and the five competencies were measured as followed:

  - System-thinking was measured with four items and a bipolar scale ranging from 1 to 5 (Johnson and Christensen, 2008).
  - Anticipatory competency was measured with four items using a five-point Likert scale was used ranging from 1 = "I completely disagree" to 5 = "I fully agree."
  - Normative competency was measured using four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I fully agree."
  - Strategic competency was measured with four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I fully agree."
  - Interpersonal competence with four items using a five-point Likert as well-scale ranging from 1 = "I completely disagree" to 5 = "I fully agree."

All items were formulated based on the framework of Wiek *et al.* (2011). The research team conducted an iterative process of drafting the items, discussing and reviewing. While not a pilot test *per se*, draft items were presented to a group of HKR graduate students to test their understanding and comfort with the questions. Data was collected online using the EvaSys survey management tool, and the tool automatically consolidated all data in an Excel spreadsheet. The first step in the analysis was to evaluate each question's results in relative frequencies. Correlations between survey items were also considered.

Results

Demographics

The survey was sent to 742 students, and 30 responses were returned, resulting in a response rate of 4%. In part A, the survey participants were described based on the percentage of the study. The sample group ($n = 30$) was described as full-time or part-time studying participants based on 70% of this group indicating that they study at a rate of 100% (full-time studies), whereas one quarter (26.7%) were studying part-time and about 3% had a study rate of 15%. Three-quarters (76.7%) of the participants studied on campus, whereas 23.3% studied remotely.

Participants' general knowledge of sustainability

In part B, participants were asked five general questions about their general knowledge of sustainability (Appendix 3).

- *Q2.1:* Here, the participants were asked about their familiarity with the SDGs. 93.3% were familiar with the SDGs, whereas 6.7% were not familiar with the SDGs.

- *Q2.2:* This question concerned the participant's engagement in sustainability issues (e.g. in a job, volunteer activities, university or household), 30% were deeply involved, whereas 30% reported engaging regularly and 13.3% did not engage at all while the rest 26.7% only occasionally participates in such events and activities.
- *Q2.3:* This question concerned SDGs frequencies in classes. 33.3% stated it to be part of more than four classes during their education. Another 33.3% stated that they experienced SDGs in three-quarters of their classes, 23.3% stated they identified SDGs in one-third of their classes and 10% of the participants answered that the SDGs were not an identifiable part of their classes, and finally, these results indicate and support a broad distribution of the SDGs in various classes and could be described as a fair result.
- *Q2.4:* This question focused on the learning environment on campus: "Aside from course experiences and research on campus, how would you describe your university's performance in terms of sustainable practices? (e.g., green campus initiatives, energy consumption, ethics, labor conditions of employees)." 22.2% stated the performance as high, 59.3% evaluated the performance as satisfactory, and 18.5% rated the university's performance as insufficient, and 0% none of the participants rated this as non-existent. [AQ3]
- *Q2.5:* In this question, participants were asked about their perception and rating regarding the statement: "Do you believe sustainability is important for your future work career?" Using the Likert scale 1-5 (1 = completely disagree and 5 = fully agree), the participants' average score was 4.6. These results indicate an awareness of the importance of sustainability in their future work life.

Participants' scores on five key competencies in sustainability
In this part of the survey, the questions focused on the five key competencies: system-thinking, anticipatory, normative, strategic and interpersonal competence. Each of these competencies was evaluated using the Likert scale, and each competence was tested through four different survey questions. The *system-thinking* competence measures the participants' ability to analyze systems affected by local and global contexts (Appendix 4). The results showed that participants agree that sustainability must be viewed globally and that both the organizations and the government have sustainability responsibilities. In total, one-third of the participants think that sustainability is affected by every individual and that sustainability is not only a topic for those responsible for significant emissions.

The *anticipatory* competence aims to measure "the ability to analyze, evaluate collectively, and craft rich 'pictures' related to sustainability" (Wiek *et al.*, 2011, pp. 207–209). The results showed that participants anticipate a strong role for sustainability with an average 4.7/5 score. Participants see a responsibility to act sustainably, 4.7/5 average score. There was also a 4.7/5 score on the question of the importance of educating students for sustainable futures. A slightly lower average score of 4.3/5 regarding their expectations future innovation and new technologies to play a crucial role in reaching SD (Appendix 4).

The *normative* competence aims to unveil the participants' ability to "collectively map, specify, apply, reconcile and negotiate sustainability values, principles, goals, and targets" (Wiek *et al.*, 2011, p. 209). Looking at the overview of the results in this competence, it becomes clear that the participants rate themselves high in the normative competence, especially regarding statements such as the importance of the ecological aspect of sustainability (Appendix 4). The participants scored an average of 4.3/5 on the question of

whether Sweden is working towards sustainability. A score of 4/5 was the result of the question of how encouraged participants feel about introducing and implementing new sustainable ideas and concepts in their future workplace. The question of whether the ecological aspect of sustainability is the most important for the future received a 3.9/5 score. The highest score in the normative competence (4.4/5) was in response to the idea of people acting as sustainably as possible in their private life.

The *strategic* competence describes and analyses the participants' skills to identify barriers and carriers of sustainability and business to solve strategic and logistical problems (Appendix 4). While participants scored 3.4/5 in the question of whether sustainability affects all industries equally, a much higher 4.6/5 was scored in response to the question of organizations working together to fulfill future sustainability goals. Scores of 4.2 and 4.3/5 were recorded regarding government and organizations' perceived role in achieving SD goals.

Interpersonal competence is the final competence and builds on the other four competencies students have developed (Appendix 4). It describes the participants' ability to actively think across cultural borders and incorporate different views into their own opinion. Participants scored 4.2, 4.3 and 4.4/5 on the self-perception questions of sustainable leadership abilities, the ability to discuss sustainability and the ability to work in diverse groups, respectively. A slightly lower 4/5 was the average score for the question of the capability of participants to make use of their education in sustainability to solve problems.

Discussion

This study shows that master students rely on their self-respect to understand sustainability. The participants in this study scored high, especially regarding confidence concerning taking responsibility in their future work career. This confidence was especially noted in the student's *normative competence*. Based on the analysis, it was determined that master students have good self-confidence regarding sustainability. The argument is strengthened as master students at HKR scored high for the *strategic competence*: the normative competence and strategic competence rating might indicate that students have relatively high self-confidence in making strategic actions decisions. In support of the idea of sustainability as multifaced, the analysis showed that students' competencies in *system thinking* involving the local versus global context scored high. As many as 84.6% of the students showed awareness about how sustainability concerned development globally. Students' future thinking involving students' *anticipatory competence*, thinking ahead scored high 71.1%. The scores on students' *anticipatory competence* indicate unity in opinions and awareness of sustainability topics worldwide. The results emphasize that sustainability will be a long-term issue that affects one generation after another and must be carefully considered by each generation. The analysis showed that the master students seemed to trust their achieved skills, which made them confident in sustainability judgment-related issues. One explanation for this could be connecting all competencies, which gave students skills by a more professional and comprehensive look. In that way, the students' *interpersonal competencies* could, as argued by Wiek *et al.* (2011), be developed as suggested by Brundiers *et al.* (2010) through WIL-projects real-world learning practices advancing SDGs practice, which could bring forward a combination of skills for students' competencies to be developed. Hence, the pedagogical methods used indicated that students' competencies were explored and developed through WIL. Therefore, it is argued that addressing teaching methods used for developing programs and course curriculum will pave the way for the needed learning outcomes of sustainability-related classes.

Working with WIL supports the idea of Caniglia *et al.* (2018) that educating students in sustainability remained important as our findings showed that WIL and real-life experiences could contribute to empowering future generations on SD. Hence, it appears that master students at HKR may feel well prepared using their competencies interchangeably for sustainability problem-solving. Despite the low response rate, this study could guide further research on methods employed for integrating SDGs in HEIs.

Conclusions

This research aimed to understand better student awareness and knowledge on how the SDGs are used in HEIs to motivate students' learning on sustainability. Just as Pálsdóttir and Jóhannsdóttir (2021) highlighted the importance of the five competencies in their investigation into University of Iceland curriculum, the five competencies are deemed to support a transition toward sustainability. It is essential to consider students' understanding of sustainability at the end of their studies to understand whether they feel prepared to apply sustainability in their daily work life. The findings of this study do not, however, as suggested, approve of students' competencies on SD being non-existent. Concordant with the findings, it is argued that students learning managed to explore and develop skills for SD. Moreover, based on the analysis, it is further argued that using the key competencies and specific questioning of students' awareness of sustainability seems to indicate that implicit and explicit learning regarding sustainability is happening on campus. Just as Pálsdóttir and Jóhannsdóttir (2021) highlighted the importance of the five competencies in their investigation into University of Iceland curriculum, the five competencies are deemed to support a transition toward sustainability. Unfortunately, it was not justifiable to compare the different levels of knowledge throughout the four university faculties to identify possible best practices at different faculties due to the low response rate. Perhaps, such a mix is valuable given the highly dynamic quality of sustainability, with problem-solving identified as an important skill. This research indicates a strong possibility that most HKR master students seem self-confident and prepared to practice SD and the implementation of the SGDs in their future work life. Nonetheless, the study supports the previously made assumptions of a basic understanding of sustainability among final-year master students to develop their *interpersonal competence* (Wiek *et al.*, 2011). The study has also shown that WIL enhanced real-world learning opportunities following Brundiers *et al.'s* (2010) argument engages students in the learning process. Therefore, it is assumed that the WIL project and its real-life experience environment at HKR foster and enhance the master students' understanding of sustainability and enhance students' competencies for sustainability identified by Wiek *et al.* (2011). As students prepare to enter the world of work, their employers increasingly require a mindset attuned to sustainability and familiarity with the SDGs and how they can be integrated into core business models.

The findings showed that real-life experiences enhanced the master students' understanding of sustainability as part of their studies. Moreover, the study showed that integrating an understating for the SDGs in teaching offers universities a way to frame students' key competencies to allow students to develop their interpersonal competencies to serve as ambassadors for SD in their future work life. This study strengthens the argument that WIL practices at universities enhance students' reflective and crucial competencies for SD. The master students showed profound understanding and expertise in the five competencies; this study thereby supports Wiek *et al.*'s (2011) argument, in which they conclude that master students are expected to acquire a more profound understanding and expertise of these crucial competencies than undergraduates who are only expected to

develop in-depth expertise in one or two key competencies and understanding of the others. Notwithstanding, this study only involves master students at the graduate level as the participants; their argument can be deemed valid to provide examples as the master students in this study have shown a profound understanding of the five key competencies for SD. Overall, this analysis will contribute to enhanced performance in combining students' different competencies and developing their interpersonal competencies on sustainability (Wiek *et al.*, 2011). Based on the analysis, this study provides a sound basis and first insights for understanding how WIL practices in HEIs support students for approaching sustainability and advancing their knowledge on SDGs in their future work life. Finally, it is suggested that this study provides a base for future research. A next step could be to roll out this study on a broader scope within the university and use more effective response rate techniques to engage more students.

Practical implications
This paper argues that master students, through WIL practices experience, are educated to rely on their self-confidence for understanding sustainability. Students' real-life experiences in education might contribute to students' confidence concerning taking responsibility for sustainability in their future work careers. The results showed that the master students seemed to trust their achieved SDG skills, which made them confident in sustainability judgment-related issues. By engaging in WIL-projects and real-life experiences, students are educated to develop their interpersonal competencies interchangeably for sustainability problem-solving.

Limitations of the study
This study's main limitation is the low response rate. The low number of responses compromises the study's representativeness, as the target group might not necessarily reflect the likely overall results of a more significant response pool. Nonetheless, the results provide a small case study snapshot and argue that they help us focus on the interest in sustainability at HKR. Further, the low response rate contributed to an understanding of improvements of future student survey methodologies. For example, Saleh and Bista (2017) identified participants' interest, survey structure, communication methods and assurance of privacy and confidentiality as leading indicators for response rate; they also noted that male participants are more likely to respond when receiving a reminder. A problem contributing to the study's low response rate has been explained by Saleh and Bista (2017), who found that most people only open emails from people they know. Additionally, even then, they do not open every email they receive. Therefore, future studies may consider distributing the online survey link via a student platform such as Canvas in each specific course. As students usually receive notifications of new posts in Canvas, this could significantly increase the response rate. Further, Saleh and Bista (2017) identified four critical factors necessary to increase the response rate:

- pre-notification sent by email/post, survey structure (name and email with a clear research subject heading;
- a professional invitation via email/post; and
- a reminder to be sent to all students after half of the response time has passed.

Additionally, Saleh and Bista (2017) identified that students are less likely to respond during holidays, summer, the beginning of the school year or the end of the school year. Therefore,

it is stressed that further survey research be performed at the beginning of the day and preferably in the middle of the semester/school year to increase response rates.

Future research

More broadly, one university has been evaluated to get a comprehensive view of sustainability in HEIs, especially the student's skills in terms of the five competencies. Valuable and interesting information has been gathered and has paved the way for future research. Based on this study's experience, using survey format tools in a HEI environment must be carefully considered to trigger students' participation (Park *et al.*, 2019). Moreover, it could be useful to study the relevance of the WIL-project method using a qualitative approach to capture an in-depth understanding of real-world learning opportunities. Additionally, it would be helpful to collaborate these ideas with other universities; as noted, the AGERA project in Sweden provides a HEI sustainability education community that could be used to consider these questions from campus to campus. Furthermore, it is crucial to study how to maximize students' response rate when conducting an online survey for future research in this area. Researchers need to understand the specific needs of reaching students as participants, build awareness among students and emphasize that feedback is needed and valued; students need to know concerns will be considered and acted upon (Sid Nair *et al.*, 2008).

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Appendix 1

EvaSys	Sustainability Survey HKR	Electric Paper

Mark as shown:	☐ ☒ ☐ ☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.
Correction:	☐ ■ ☐ ☒ ☐ Please follow the examples shown on the left hand side to help optimize the reading results.

Dear survey participant,

Thank you for taking part in this survey.

We are students of the Masters program "International Business" and are conducting this survey for our WIL-Project.

By answering the survey you not only help us, but also provide useful information to improve study programs at HKR.

Of course, all responses will be treated anonymously and no individual will be identifiable from the survey results.

Continuing with this survey indicates your consent for participation. We hope that you will complete the survey, but you are under no obligation to do so.

Once you begin the survey you may discontinue participation at any time.
We estimate that only 5 minutes are needed to complete the survey.

If you have any questions or concerns about the survey, please contact Mr. Thomas Beery at thomas.beery@hkr.se.

Again, thank you very much for participating!

1. Demographical Questions

1.1 In which faculty at HKR are you currently enrolled?
☐ Faculty of Business   ☐ Faculty of Health Science   ☐ Faculty of Education
☐ Faculty of Natural Science

1.2 At which level do you currently study?   ☐ Bachelor   ☐ Master

1.3 In which study program are you currently enrolled at the HKR?
☐ Master in Computer Science, Emphasizing Sustainable Development   ☐ Master in Integrative Health Science   ☐ Master in Business Administration - Auditing and Control
☐ Master in Business Administration - International Business and Marketing   ☐ Master in Educational Sciences   ☐ Master in Informatics
☐ Graduate Diploma in Specialist Nursing   ☐ Master in Psychology   ☐ Postgraduate Diploma in Primary Health Care Specialist Nursing
☐ Postgraduate Diploma in Specialist Nursing - Elderly Care   ☐ Program in Special Needs Training - Learning disabilities   ☐ Program in Special Needs Training - Mathematics
☐ Program in Special Needs Training - Swedish   ☐ Special Education Program

1.4 Which rate of study does your current course have?
☐ 25%   ☐ 50%   ☐ 100%

1.5 Are you a distance or a campus student?
☐ Distance   ☐ Campus

(Continued)

EvaSys	Sustainability Survey HKR	Electric Paper

2. General Questions about the knowledge on sustainability

2.1 Are you familiar with the UN Sustainable Development Goals (as shown in the picture)?
☐ Yes
☐ No

2.2 Do you engage in issues around sustainability? (e.g. job, volunteer activities, university, household practices, etc.)
☐ not at all   ☐ occasionally   ☐ on a regular basis
☐ deeply involved

2.3 The SDGs were an identifiable part of ...
☐ 0 classes   ☐ 1-2 classes   ☐ 3-4 classes
☐ more than 4 classes

2.4 Aside from course experiences and research on campus, how would you describe your university's performance in terms of sustainable practices? (e.g. green campus initiatives, energy consumption, ethics, labor conditions of employees, etc.)
☐ non-existent   ☐ insufficient   ☐ satisfactory
☐ high performance

2.5	Do you believe sustainability is important for your future work career?	strongly dis-☐ agree	☐	☐	☐	☐ strongly agree

3. Sustainability related competencies - System-thinking

3.1	In your opinion, sustainability is ...	a local matter ☐	☐	☐	☐	☐ a global matter
3.2	In your opinion, sustainability is ...	in the ☐ responsibility of organizations	☐	☐	☐	☐ in the responsibility of the government
3.3	In your opinion, sustainability is ...	perceived ☐ equally in all cultures	☐	☐	☐	☐ perceived differently in all cultures
3.4	In your opinion, sustainability is ...	affected by ☐ every person	☐	☐	☐	☐ affected by big CO_2-emissioners

4. Sustainability related competencies - Anticipatory

Please rate the following statements: (from 1= "I completely disagree" to 5= "I fully agree")

4.1	The importance of sustainability will grow further in the future.	1 ☐	☐	☐	☐	☐ 5
4.2	It is the responsibility of every generation to act sustainably.	1 ☐	☐	☐	☐	☐ 5
4.3	Future sustainable developments will be driven by new technologies and innovations.	1 ☐	☐	☐	☐	☐ 5
4.4	Educating students in sustainability is crucial for the long-term sustainable development.	1 ☐	☐	☐	☐	☐ 5

(Continued)

EvaSys	Sustainability Survey HKR	Electric Paper

5. Sustainability related competencies - Normative

Please rate the following statements: (from 1= "I completely disagree" to 5= "I fully agree")

5.1	Sweden is working towards sustainability.	1 ☐	☐	☐	☐	☐ 5
5.2	I feel encouraged to introduce and implement new sustainable ideas and concepts in my future workplace.	1 ☐	☐	☐	☐	☐ 5
5.3	The ecological aspect of sustainability is the most important for the future.	1 ☐	☐	☐	☐	☐ 5
5.4	Every person should act as sustainble as possible in the private life.	1 ☐	☐	☐	☐	☐ 5

6. Sustainability related competencies - Strategic

Please rate the following statements: (from 1= "I completely disagree" to 5= "I fully agree")

6.1	Organizations must work together in order to fulfil future sustainability goals.	1 ☐	☐	☐	☐	☐ 5
6.2	Sustainability affects all industries equally.	1 ☐	☐	☐	☐	☐ 5
6.3	The government should subsidize activities for organizations to achieve sustainable development goals.	1 ☐	☐	☐	☐	☐ 5
6.4	Organizations should put more effort into research and development in the field of sustainability.	1 ☐	☐	☐	☐	☐ 5

7. Sustainability related competencies - Interpersonal

Please rate the following statements: (from 1= "I completely disagree" to 5= "I fully agree")

7.1	I am capable to make use of my education in sustainability to solve problems.	1 ☐	☐	☐	☐	☐ 5
7.2	During my studies I learned to work in diverse groups.	1 ☐	☐	☐	☐	☐ 5
7.3	For my future work, I feel confident to take over responsibility and lead my team in a sustainable way.	1 ☐	☐	☐	☐	☐ 5
7.4	I feel confident to discuss and debate sustainability matters in peer groups.	1 ☐	☐	☐	☐	☐ 5

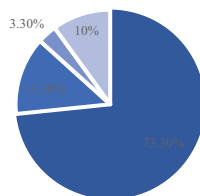Thank you very much for participating in the survey!

After pressing the "submit" button you can close your browser window.

Have a nice day!
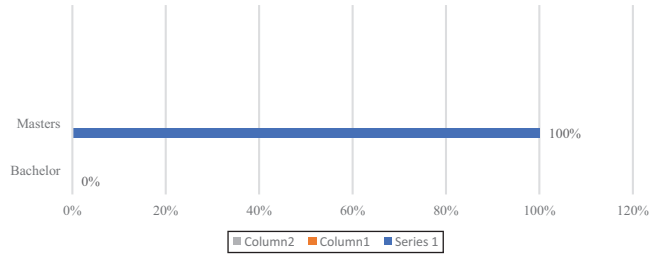
Appendix 2

Demographics questions:

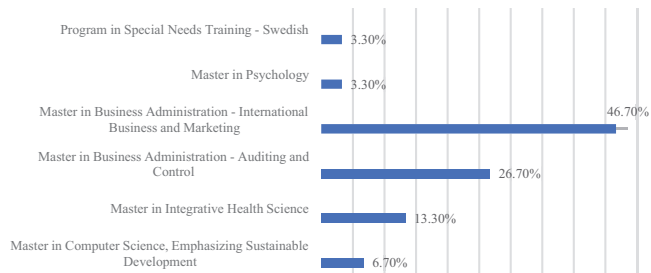1.1 In which faculty at HKR are you currently enrolled?

3.30%   10%

■ Faculty of Business ■ Faculty of Health Science ■ Faculty of Education ■ Faculty of Natural Science
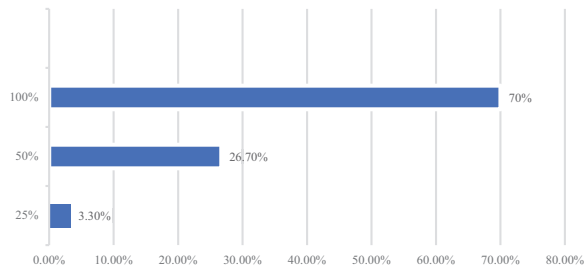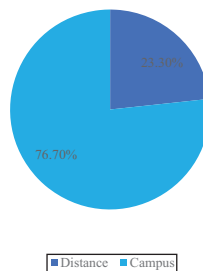
1.2) At which level do you currently study?

Masters	100%
Bachelor	0%

Column2 Column1 Series 1

1.3 In which study program are you currently enrolled at the HKR?

Program in Special Needs Training - Swedish	3.30%
Master in Psychology	3.30%
Master in Business Administration - International Business and Marketing	46.70%
Master in Business Administration - Auditing and Control	26.70%
Master in Integrative Health Science	13.30%
Master in Computer Science, Emphasizing Sustainable Development	6.70%

1.4 Which rate of study does your current course have?

100%	70%
50%	26.70%
25%	3.30%

1.5 Are you a distance or a campus student?

23.30%
76.70%

Distance Campus

Appendix 3
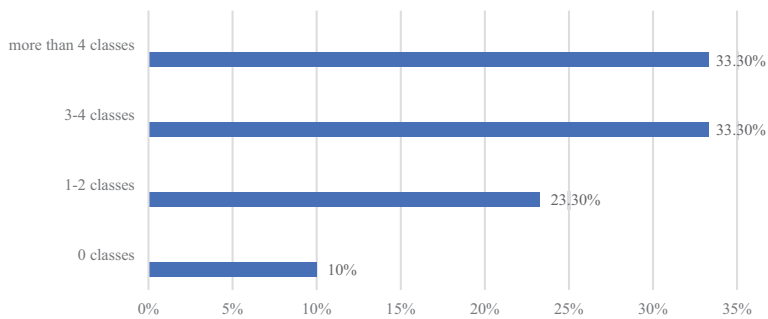General questions:

2.1) Are you familiar with the UN Sustainable Development Goals (as
shown in the picture)?

6.70%

■ Yes ■ No

2.2) Do you engage in issues around sustainability? (e.g. job,
volunteer activities, university, household practices, etc.)
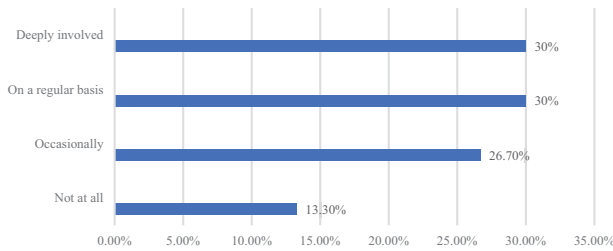
2.3) The SDGs were an identifiable part of ...

2.4) Aside from course experiences and research on campus, how would you describe your university´s performance in terms of sustainable practices? (e.g. green campus initiatives, energy consumption, ethics, labor conditions of employees, etc.)
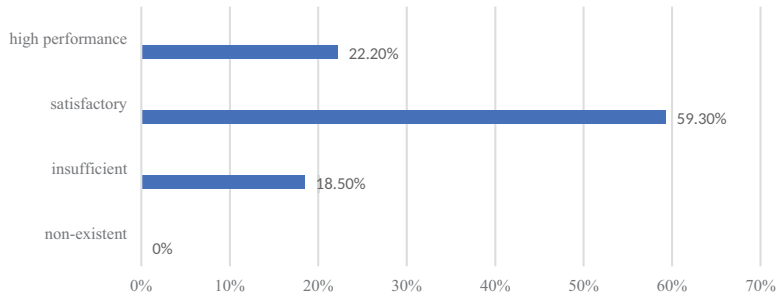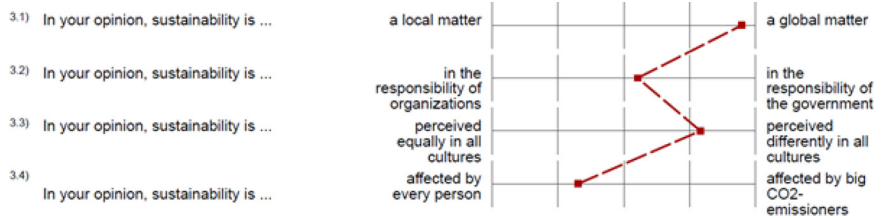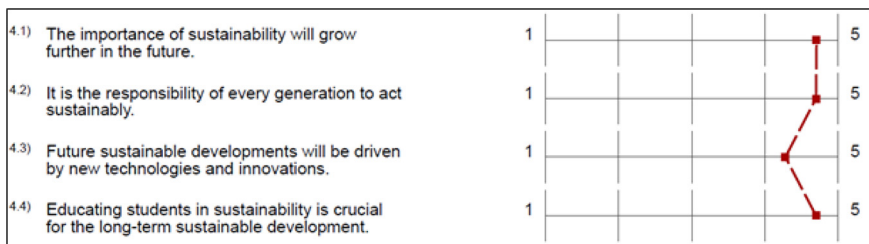

Appendix 4

Participants' scores on Wiek *et al.*'s (2011) five key competencies in sustainability:

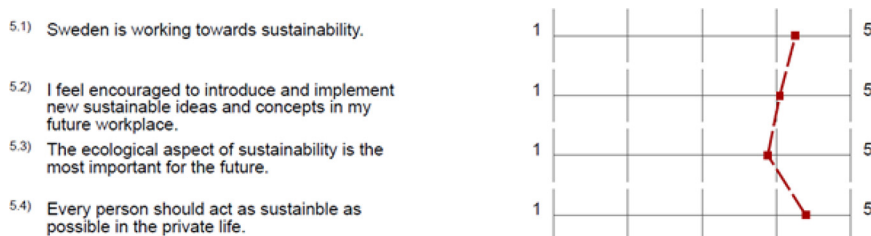The questions focused on the five key competencies: system-thinking, anticipatory, normative, strategic, and interpersonal competence. Each of these competencies was evaluated using the Likert scale, and each competence was tested through four different survey questions. (Figures A1, A2, A2 and A4)

Figure A1.
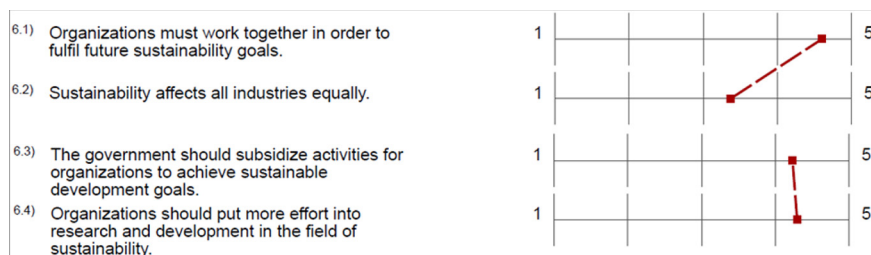Participants' scores: system-thinking competence

Figure A2.
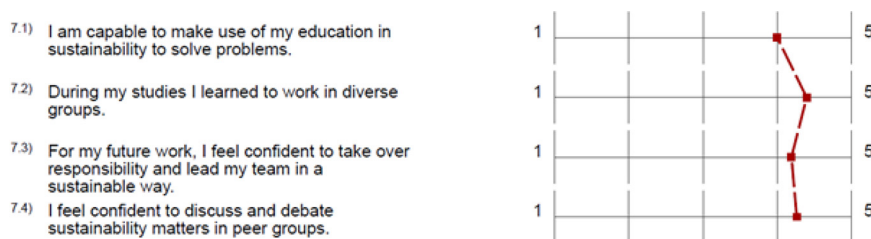Participants' scores: anticipatory competence

5.1) Sweden is working towards sustainability.

5.2) I feel encouraged to introduce and implement new sustainable ideas and concepts in my future workplace.

5.3) The ecological aspect of sustainability is the most important for the future.

5.4) Every person should act as sustainble as possible in the private life.

Figure A3.
Participants' scores:
normative
competence

6.1) Organizations must work together in order to fulfil future sustainability goals.

6.2) Sustainability affects all industries equally.

6.3) The government should subsidize activities for organizations to achieve sustainable development goals.

6.4) Organizations should put more effort into research and development in the field of sustainability.

Figure A4.
Participants' scores:
strategic competence

7.1) I am capable to make use of my education in sustainability to solve problems.

7.2) During my studies I learned to work in diverse groups.

7.3) For my future work, I feel confident to take over responsibility and lead my team in a sustainable way.

7.4) I feel confident to discuss and debate sustainability matters in peer groups.

Figure A5.
Participants' scores:
interpersonal
competence

About the authors

Karin Alm is a lecturer in marketing and sustainability at Kristianstad University (Sweden) where she is the academic leader and coordinator for Principles for Responsible Management Education and teaches international marketing, corporate social responsibility, business ethics and sustainability. Karin is also engaged in teaching for sustainable development on pedagogical courses for university teacher. Karin's research has resulted in publications focusing on corporate social responsibility, sustainable retailing and sustainability in higher education and the impact of sustainability in business and society. Karin Alm is the corresponding author and can be contacted at: karin.alm@hkr.se

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