JUTLP
Journal of University Teaching & Learning Practice

Teaching in a Volatile, Uncertain, Complex and Ambiguous World

Dr Filia J. Garivaldis[a], Gitanjali Bedi [a], Stathi Paxinos [a], Associate Professor Kelly-Ann Allen[b], and Professor Joannette J. Bos[a]

[a] Monash Sustainable Development Institute, Monash University, Australia; [b] Faculty of Education, Monash University, Australia

Abstract

This study explored the perceptions of a purposive sample of experienced educators teaching sustainable development at an Australian university, on the building of socio-emotional competencies in their students. Educators responded to a series of in-depth interview questions concerning their observations of their students' reactions to the volatile, uncertain, complex, and ambiguous (VUCA) nature of sustainable development, how they manage these reactions, and the benefits and barriers to teaching socio-emotional competencies to prepare students for sustainability challenges. An interpretive phenomenological analysis was used to provide a concise exploration of educators' lived 'classroom' experiences, and to add methodological diversity to the field. This analysis revealed observed inequities in learning and coping amongst students in response to VUCA, and the need for educators to manage these responses, often spontaneously, by drawing predominantly on personal experiences from their diverse disciplinary backgrounds. Importantly, educators report a lack of confidence in adequately preparing students for VUCA. The research lays a foundation for future inquiry into the actual experiences of students learning sustainable development, and highlights the need for the professional development of in-service educators, to equip them with tools to effectively integrate sustainability pedagogies into their teaching practice.

Editors

Section: Educational Psychology
Senior Editor: Prof Louise Taylor
Associate Editor: Dr Hilary Ng

Publication

Submission: 6 May 2025
Revised: 8 December 2025
Accepted: 2 February 2026
Online First: 11 February 2026

Practitioner Notes

1. Educators observe an array of student responses that they attribute to the volatility, uncertainty, complexity and ambiguity inherent in sustainable development education.
2. Both planned and spontaneous strategies are used, albeit haphazardly, to address student responses, many of which already address students' socio-emotional competency needs.
3. However, educators report a lack of perceived confidence and competence in addressing the socio-emotional competency needs of students
4. Higher education institutions can assist efforts to effectively embed sustainable development education into existing curriculum by providing recognition, support, and professional development opportunities to educators.

Keywords

sustainability education, VUCA, educator insights, interpretative phenomenological analysis, socio-emotional competencies

Citation:

Garivaldis, F. J., Bedi, G., Paxinos, S., Allen, K., & Bos, J. J. (2026). Teaching in a volatile, uncertain, complex and ambiguous world. *Journal of University Teaching and Learning Practice, 23*(1). https://doi.org/10.53761/26b0qg86

Introduction

Sustainability education, or Education for Sustainable Development, teaches students the knowledge, skills and mindsets to support sustainability transitions, such that our societies become environmentally restorative, socially just, and economically equitable (UNESCO, 2020). However, the field of sustainable development is fraught with conditions of volatility, uncertainty, complexity, and ambiguity (VUCA), with a strong presence of complex systems dynamics, indeterministic tendencies, emergent properties, and non-linear relationships (Schick et al., 2017). Climate change, Covid-19, ocean warming, biodiversity loss, entrenched poverty, increasing inequality and geopolitical crises disrupt our lives at an ever-increasing pace and reach. Characteristic of such challenges include the strength, magnitude, and speed in which changes occur (volatility); the unpredictable nature of change (uncertainty); the confounding of issues surrounding change (complexity); and the obscurity of reality and multiple interpretations of change (ambiguity). The term VUCA is used when these elements simultaneously occur (Chen, 2024).

Socio-emotional competencies, such as coping and emotion regulation, are invaluable for students to prepare for, understand, and adapt to VUCA conditions, both in the classroom and beyond (Frydenberg, 2022). While there is an open question about whether we can adequately prepare students for macro-scale change at all, it is increasingly recognised that such skills and competencies are important in ESD (Benavot, 2019). There is limited understanding about if and how such skills are taught or addressed in higher education institutions (HEIs; Wickson et al., 2025) and, in particular, the experiences and attitudes towards socio-emotional competencies of educators who are at the forefront of delivering ESD are underexplored (Ojala, 2022).

This paper begins this conversation by drawing on expert sustainable development educators to understand their experiences in engaging and preparing students for VUCA. The aims of the paper are achieved through exploratory qualitative interviews in the context of an Australian University that is implementing an ambitious strategy to prepare its students to positively contribute to a sustainable development agenda across a range of courses and disciplines. We report on educators' observations of their students in response to VUCA, how they manage these responses, and explore what educators perceive are the barriers and facilitators to better addressing these responses. Based on these insights, institutional efforts are needed to involve educators in policy and strategy implementation, to better support educator efforts to enhance students' learning in the classroom, and further the industry's sustainable development agenda.

Literature Review

Originally coined by the US military during the Cold War, the acronym "VUCA" has since been adopted in business and education to describe volatile, uncertain, complex, and ambiguous environments (Bennett & Lemoine, 2014). A particularly new application of VUCA concerns its impact on the educational environment (Minciu et al., 2025). ESD requires students to develop the ability to effectively navigate VUCA conditions, critically think about the nature of knowledge (Holdsworth & Thomas, 2021), engage in collaborative decision-making, and integrate knowledge with new insights to seek innovative options to address contemporary problems. However, VUCA conditions can prompt emotional reactions in both students and educators, which can impede learning and teaching (Ekström et al., 2021; Hadar et al., 2020). For example, stress and anxiety brought on by external factors (e.g. the COVID-19 pandemic or climate change) have shown to

be detrimental to learning and signal the importance of emotion regulation and emotional support (Ogunbode et al., 2022; Pandit, 2021; Wickson, 2025). Similarly, educators report mental anxiety, physical illness, and instructional frustration with relation to the development and delivery of education, in the context of VUCA (Cabanlit, 2024). A recent review of sustainability competencies has identified the need for emotional recognition and holding, as well as emotional processing and integration, as essential for facing up to the scale of current sustainability crises (Wickson, 2025). While there is a myriad of factors that can elicit negative emotional reactions in both students and educators, such as experiences of marginalisation, racism, effects of colonial legacies, dominant cultural beliefs and lack of political agency (Camangian & Cariaga, 2021; Stoll et al., 2025), this study focuses specifically on VUCA related responses.

HEIs have a critical role to play in preparing students, graduates, and educators to respond to 21st century challenges (Dufresne, 2019; Hadar et al., 2020; Holdsworth & Thomas, 2021). In addition to competencies, such as systems-thinking, anticipatory, strategic, interpersonal, implementation, and integration (Brundiers et al., 2021; Redman & Wiek, 2021), emotional factors including emotional recognition, containment, processing, and integration need to be embedded into the curriculum (Wickson et al., 2025). Equipping students with socio-emotional skills in managing VUCA is just as necessary as traditional disciplinary knowledge (Pettig & Singer-Brodowski, 2025; Rouvrais et al., 2023; Wickson et al., 2025).

To manage VUCA, specifically, students require a personal growth mindset (Seow & Koh, 2019), and attributes of curiosity, resourcefulness, integrity, engagement and self-reflection (Bastos et al., 2020; Bodea et al., 2020). Socio-emotional competencies, in particular, such as coping, self-awareness, managing one's own emotions, empathy, and developing resilience (Hadar et al., 2020), are necessary to prepare for, understand, and adapt to VUCA conditions, both in their learning environments and beyond (Frydenberg, 2022). The ability to plan and prepare for, absorb, withstand, recover from, and adapt to adverse events and disruptions, as well as tolerance for ambiguity (Brendel et al., 2016), enable learners to "adjust to everyday challenges, play an active role in their communities, and respond to an increasingly volatile, uncertain and ambiguous global landscape" across their lifetime (OECD, 2020, p. 21).

However, Education for Sustainable Development pedagogies have been criticised for being inadequate in teaching how to cope with VUCA (Evans et al., 2017; OECD, 2020, 2021; Qadir & Al-Fuqaha, 2020; Wickson et al., 2025), and for having little impact on the development of socio-emotional competence (Korbel & Paulus, 2018). Furthermore, the predicted benefits of socio-emotional competencies for managing VUCA (Gaultier Le Bris et al., 2019; Hadar et al., 2020) in the context of Education for Sustainable Development has not been explicitly explored, and the experiences and attitudes towards teaching socio-emotional competencies of educators, who are at the forefront of delivering sustainability education, are undocumented.

Challenges in teaching education for sustainable development

The role of educators is changing as HEIs integrate sustainability objectives into overarching education strategies for their institutions. Educators are embedding sustainability into their learning curriculum across a range of disciplines. From a pedagogical perspective, shifts are being made from instructional and didactic models of teaching, where the teacher assumes the role of facilitator, guide and mentor (Bastos et al., 2020; Ekström et al., 2021; Qadir and Al-Fuqaha, 2020). There is a further call for a change in learning philosophy to be adopted in

universities, from a linear transfer of knowledge to the co-creation of knowledge, toward being transformational in enabling societal transitions (Loorbach & Wittmayer, 2024). Finally, emerging research calls for the need for educators to effectively acknowledge and manage emotions when educating about sustainability challenges (Ojala, 2022).

Emotions, as critical to the learning process, are well documented in transformative learning theory (Grund et al., 2024; Mezirow, 2000)—also well documented in the Education for Sustainable Development literature (Kellner et al., 2025). Transformative learning captures how learners critically reflect on assumptions and undergo deep shifts in perspective throughout the learning process. These shifts require students to move through a discomforting and emotionally charged phase—often marked by anxiety, uncertainty, and disorientation—in order to reach clarity, empowerment, hope, and renewed confidence, which accompany new perspectives, deeper self-awareness, and more integrated ways of understanding and acting in the world (Carter & Nicolaides, 2023; Mälkki, 2011; Mezirow, 2000). Emotions both trigger and sustain transformation, and harnessing these emotions can foster resilience, motivation, and meaningful growth (Ford et al., 2024). Despite efforts to create transformative learning experiences, educators are not explicitly trained to address the myriad emotions that may arise (Ojala, 2022).

Instead, research points to inconsistent approaches being used by educators in the teaching of Education for Sustainable Development in HEIs (Kellner et al., 2025), which resemble trial and error, and could be attributed to a lack of confidence and competence, knowledge of what works, and a lack of institutional support, including professional development training (Brand et al., 2020; Evans et al., 2017). Other educators struggle to deliver on their sustainability objectives primarily because the concept is not well understood, and therefore, not received or embraced (Wood et al., 2016).

Against this backdrop, external VUCA conditions further challenge the work of educators, with emerging research literature signalling the need for educators to possess an awareness of the role of emotions in Education for Sustainable Development (Ojala, 2022), and socio-emotional competencies (Cabanlit, 2024). Socio-emotional competencies can assist educators in effectively managing the execution of their duties with adaptability and resilience in the face of a range of education challenges, within and beyond sustainable development, such as pandemics, the widespread use of artificial intelligence, and natural disasters such as floods, fires and storms (Chen, 2024).

There are many ways educators can assist students in navigating their emotional, cognitive and behavioural reactions when learning, to achieve good academic outcomes and well-being. Providing a safe environment for the students to try, fail and learn, using pedagogical tools and practices such as giving formative feedback (Cornwall, 2018), and providing opportunities for participative (Qadir & Al-Fuqaha, 2020) and experiential (Keinanen & Havia, 2022) learning, all help. Although educators' experiences in equipping students appropriately vary (Anderberg et al., 2009), little is known about what is already being done to address VUCA and students' socio-emotional competency needs in the context of Education for Sustainable Development.

The present study

Adopting an idiographic approach (Creely, 2016), our aims were as follows: 1) to explore educator perceptions of student experiences of sustainability curriculum that features VUCA, and how

educators address these experiences; 2) to uncover educators' beliefs and attitudes of the benefits and challenges to teaching socio-emotional competencies in the context of education for sustainable development, and 3) to gauge the perceived capability and confidence of educators to teach such competencies.

This study is undertaken within the context of an Australian university that considers itself at the forefront of addressing societal and environmental challenges through strategic priorities, campus initiatives, and its research and teaching and learning. The participants in the research, too, are well embedded both in education and the field of sustainable development.

Positionality

The research team comprises women and men of diverse cultural backgrounds—including Greek-Australian, Punjabi Indian, Indo-Fijian, Dutch, and Aotearoa New Zealand identities—whose lived experiences across different countries, communities, and professional fields shape their perspectives. An interdisciplinary group spanning behavioural science, sociology, education, sustainability, engineering, journalism, and creative pedagogies, they also hold varying degrees of institutional privilege within universities. Their identities as migrants, or children of migrants, women of colour, parents, and educators committed to social justice inform their sensitivity to issues of power, marginalisation, and voice. Collectively, they recognise that their worldviews, shaped by class mobility, cultural heritage, and professional trajectories, influence how they interpret evidence, frame research questions, and engage with concepts such as VUCA, transformation, and systems change. While some hold positivist leanings, others draw from interpretivist or transformative paradigms. Yet, they share a commitment to reflexivity, interdisciplinary inquiry, and amplifying diverse ways of knowing—acknowledging that their positionalities both enable and constrain the research process.

Method

Sampling

We adopted an idiographic approach to address our research question, using the method of interpretive phenomenological analysis (IPA). The intention was to offer insights into how educators experience teaching sustainable development in light of the potential need for students to learn socio-emotional competencies to navigate VUCA. IPA, as a method of inquiry, enables an in-depth understanding of the experiences of individuals that are otherwise private and sensitive in nature, and involve emotions and thoughts. IPA is a method whereby the researchers try to understand participants' unique points of view about how they make sense of a situation, rather than generalise from the findings (Creely, 2016).

Participants comprised a purposive sample of seven educators representing various faculties, with experience teaching sustainable development that ranged between 5 and 20 years. The use of a small sample to deliver open-ended and in-depth interviews is appropriate for this methodology (Pietkiewicz & Smith, 2014). Participants were selected and contacted by email from a mailing list of chief examiners of courses that teach sustainability at the University, and invited to participate in individual semi-structured interviews with a member of the research team. A total of six semi-structured interviews were conducted, five with individual participants and one with two participants who jointly contributed to the teaching of their course. Participants responded to

the interview questions with reference to the courses they taught at the time, which included 1) Leading sustainability focused change across a range of diverse contexts, 2) In-depth sustainable development and interactions between the environment and society, 3) Social, political, economic and environmental dimensions of the food system, 4) Team based industry projects around sustainability themes, 5) Complex systems, and 6) Sustainability focused approaches to learning and teaching in school curricula.

Two participants identified as cisgender men and five as cisgender women. Educator roles included teaching-level associate, senior lecturer, and professor. Pseudonyms were assigned to participants to ensure their anonymity.

Procedure

Informed written consent was obtained from all participants prior to scheduling the interviews, in line with ethical approval requirements from the institution's Human Research Ethics Committee (Project ID: 30294). Interviews were held via Zoom over a two-week period with an experienced member of the research team (FG), with the least familiarity with the interviewees and their courses, in order to enable them to respond to the interview questions freely, honestly and comprehensively. The interviews were recorded and automatically transcribed using transcription software in Zoom. In line with qualitative sampling principles (Bryant & Charmaz, 2007), short intervals were scheduled between interviews to allow for the refinement of responses from completed interviews, and to check for accuracy of the transcriptions. Each scheduled interview lasted 45-60 minutes and was semi-structured to facilitate deeper discussion.

At the start of the interview, prior to questioning, all participants were provided with a simple definition of VUCA adapted from Bennett and Lemoine (2014). Then participants were asked a series of questions that explored what they observe their students' reactions to VUCA to be, how they manage these reactions, and why students should or should not be taught socio-emotional competencies to prepare them for VUCA challenges.

Analysis process

Whilst our positionality as sustainable development educators gave us awareness of the broader context in which participants' responses were situated, this contextual sensitivity supported our interpretative engagement, helping us to attend to nuances in participants' accounts while remaining reflexive about our own perspectives.

To ensure confidentiality and anonymity, identifiable information was removed from the transcripts, and only codenames were used to identify the participant responses. Analyses followed Smith and Osborn's (2003) approach, comprising the following steps: 1) interview responses were repeatedly read by three researchers (FG, GB, and SP), who annotated initial thoughts and impressions in the margins, 2) multiple codes and themes in the data were identified, based on identified similarities vs polarisations, context vs purpose, and prevalence, 3) clusters of data were created that corresponded with codes and themes, and 4) discussions took place between the three researchers, during which the data was analysed in an inductive manner (Boyatzis, 1998), through the sharing of reflections and experiences with the process, and comparing, synthesising, and reflecting.

Results

We report on the key insights obtained from the interviews conducted, beginning with: what educators observed as student reactions to VUCA in their courses; how they managed these reactions; and why students should, or should not, be taught socio-emotional competencies to better prepare them with VUCA challenges.

Observations of VUCA reactions in students

Educators reported a mixture of positive and negative emotional responses in students who were learning sustainability, in relation to VUCA. In their descriptions, educators referred to ways of thinking and states of mind, and a range of coping behaviours.

Kiran and Sam recall the "overwhelming" nature of sustainability, which challenges the "reductionist black and white thinking" students have inherited from previous courses:

> "A fifth or so of the students really get it …and are comfortable with it….a handful of [other] students line up after class with their laptop and they ask us really specific questions about certain terms or they get really minutiae about, like the finer details…they [students] try to make sense of it and contain it by fitting things into neat little boxes, like with their assignments". (Kiran)

The educators reflect on the emotions they encounter, e.g. "I see both enthusiasm and ambivalence. I would like to say more on the enthusiastic side, to be honest, the minority are ambivalent … 'does it matter if we don't care about this?'."

Alternatively, Niko reports observing "anxiety, emotional disquiet, or confusion, and the need for reassurance and the need for a safe place where it's okay to "fail psychologically". Niko observes that their students' reactions vary considerably according to "cultural background, level of professional experience, level of life experience, and also disciplinary training that they come in with… the oldest students are a little bit more comfortable with having experienced it in the workplace". Niko also advocates strongly for the need for educators to provide a safe space, with "expectations of what it's going to be like" to avoid the situation where students "disengage from the process and give you something that they think you want to hear, rather than really leading into that uncertainty and getting more comfortable with that uncertainty".

Educators also mentioned that students appear challenged, and some would even say that students are transformed. For example, Mika recalls various mixed emotions and states of mind, which reflect the complex nature of the content being taught. Mika attributes these reactions to the opportunity that comes with having to deal with problems, deal with situations and issues that are "not simple [n]or linear":

> "Some students really react with a lot of uncertainty, …and some of them will seek a lot of advice and try and find clarity via guidance. Others will jump in with quite a lot of independence and then just require a little bit of support or check in. And then others forge their own path, for better or for worse". (Mika)

This sentiment is echoed by Ari, who talks about the need for students to take time to reflect on what they are learning before they can come to terms with it and appreciate it. Initially, "for some students that's a cognitive stretch and it's a kind of like, 'whoa, I never really thought about this',".

At the start, “there's a lot of scratching of heads”, but as ideas are shared and examples are provided, “there's aha moments…the ideas start to flow…but it’s not instant”.

All educators report mixed and complex thoughts and emotions expressed by students in their classes, and which they attribute to the VUCA nature of the learning material. There are also reports from all educators that “at the end, [there is] absolute transformation, [where] students are talking about personal transformation, a sense of self advocacy, a sense of empowerment for dealing with climate change issues which were previously overwhelming” (Niko).

Responding to student reactions

To manage student reactions when teaching VUCA content, educators made reference to the use of various intentional (planned) and spontaneous (unplanned) strategies. Intentional strategies include curriculum selection and design of appropriate pedagogies that explicitly enable students to manage VUCA. Examples discussed included case studies, role-playing, group work, and inviting guest speakers.

> “We use simulations in volatility…students will be given an issue, they learn about it and are thrown some kind of curveballs to react to. They have to quite quickly consider the implications of rapid or strange changes or unexpected changes.” (Mika)

> “Sharing…the emotional experience amongst peers in small groups or in a large [group], once that ice is broken…they realise that this experience is not anything to do with them - personally not being good enough - but a shared experience and natural part of dealing with uncertainty” (Niko)

Educators made explicit references to VUCA in their classrooms, referring to it as an “unavoidable reality” (Mika) of sustainable development.

> “The unit is designed [so] that you're getting more and more uncertain as you go along. In terms of the assessment tasks, they're more open-ended then more complex. We make it really clear that we're going to add more complexity and more openness and uncertainty and we reflect on how that feels as they’re going along with a large reflection task at the end” (Niko)

Spontaneous strategies, discussed just as much as intentional strategies, are those that are deployed ad hoc, as needed, in a way that meets students’ emerging and immediate needs. Table 1 summarises the various spontaneous strategies discussed by educators.

Table 1

Spontaneous pedagogical approaches and tools used in response to students' VUCA reactions.

Spontaneous strategies	Participant extract
Exploring different perspectives	"We show both sides of the debate….I try my best not to offer my personal opinion. I just say 'here's the evidence' and we'll look at the evidence and they can form their own opinions…, and that adds to them understanding the complexity as well - there's no right or wrong, necessarily" (Sam)
Providing clear assessment instructions	"I am so conscious that the content is really hard for them to get their head around so I try to be quite prescriptive in my description of the assignments, and it's bordering on spoon feeding and I'm quite aware of it, but I feel a little bit empathetic towards the students that a lot of them are grappling with quite new concepts…we take them through a pretty clear progression" (Kiran)
Allowing time for reflection	"We create reflective space in each class and also reflective assignments" (Niko)
Using metaphors	"Cave exploration, for example, has been one that I've been trying to use this year where we have different ways of illuminating what we're seeing…we can never have daylight in these kind of places where you can absolutely see everything, and even if you did you can't see what's behind you so there's always limitations to what we can perceive and grasp and so I'll often use that as a repeated metaphor" (Mika)
Providing pastoral care, or guidance and support as needed	"I would say personally I do a lot of pastoral support. And I also create a very psychologically safe environment. So I will never say an answer is wrong or right. I'll just say 'oh that's really interesting I love that perspective', and to give them the space" (Niko)
Validating reactions	"Validating the reactions that they have… normalise the notion of struggle and unfamiliarity and the lack of full ability to grasp it." (Mika)
Modelling	"I certainly try and model…the openness and curiosity and struggle. I'll frequently mention that I don't fully understand this, or, you know, that my expertise has limits or the knowledge that I think of is relevant or the students who take it in a certain direction will know more than me" (Mika)

Furthermore, Mika stated that "different components of VUCA require different kinds of support." For example, with regard to volatility "we do mention [theories of change] and we also highlight historical events and turning points, the idea that these kinds of areas evolve". With regard to uncertainty, however, "it's built into tasks, so the first task is a very open-ended task where they have to make a lot of choices … And I think that can often be a struggle … making decisions about what you need to attend to, or not, and learning how to do that in a way that's productive." For complexity, "talk about systems interconnections like when we explore the SDGs. Finally, Mika teaches ambiguity by demonstrating that "there is no fixed and correct viewpoint … and we start with frameworks of different narratives, different ways of talking about sustainability and students go through a process of reflection where they think about …how different ways of understanding situations can carry different kinds of validity. …It can be destabilising, but generally they tend towards an acceptance of ambiguity, even if they don't necessarily yet fully feel exactly how they're going to navigate that."

Preparing students for VUCA with socio-emotional competencies

All seven educators reported that equipping students with socio-emotional competencies to support their coping with VUCA is important, because, among others, these skills prepare students for employment, help them manage personal behaviour change and socio-emotional challenges and set-backs, promote environmental consciousness and pro-environmental actions, and enhance self-efficacy. It was also mentioned that these skills are being taught already, though informally and in a haphazard way, without knowing what strategies work best.

However, the reported barriers to teaching socio-emotional competencies were greater in number than the reported benefits. We discuss the three most common types of barriers raised by educators, which relate to the notion of an already crowded curriculum and competing priorities, a lack of confidence and competence to teach socio-emotional competencies well, and hesitation to deal with student emotion.

1. A crowded curriculum and competing priorities

This barrier appears as a lack of time and space to teach for VUCA within the current curriculum, and the challenge of aligning new content to existing course and course outcomes, within current education frameworks, and when technical skills and knowledge take priority. For Niko, the value of teaching "soft or transferrable skills" over "technical skills" would be a difficult sell. "[My staff will say] 'no, there's no room for it, that's going to take away space from the important content and scientific theory I need to cram into my curriculum, I don't have space for that'." However, Niko believes "no matter what Masters you're doing, it [learning socio-emotional competencies] should absolutely be in every Masters because these are mature people who are just thrown headlong into uncertainty in the workplace."

2. Confidence and competence to teach socio-emotional competencies well

Despite their extensive experience teaching sustainable development, all educators reported having received no formal training in addressing students' responses to VUCA and teaching socio-emotional competencies. All educators acknowledged or recognised that they were doing this to some degree, "it's something I've learned how to do" (Niko), and used their own personal experiences and education practice over time to inform their practice. They were able to identify examples and contexts that strengthened their competence to teach VUCA, such as other related training, e.g. facilitation training (Mika), teaching other "difficult" courses (Niko), working in challenging contexts in the field (Ari), or using intuition (Kiran). Two educators mentioned that they have tried to learn from others and from the literature, but that this has been self-driven, haphazard, and opportunistic.

Furthermore, all educators were unsure and only moderately confident that they were addressing students' needs effectively. Some mentioned that whilst they have received positive feedback from students about the sustainable development content of the course, this feedback does not represent all experiences:

> "It's hard to tell because I feel like there's some students … the ones that get this and feel confident [and] are really chatty and enthusiastic, but then we don't hear from the others, and … they're the ones that are probably trying to get their head around this content more" (Kiran)

3. Hesitation to deal with student emotion

Lastly, there was a high degree of hesitation and fear amongst the educators on how well they might cope with dealing with student emotions. Jo recalls a learning she had from an old colleague:

> "if you take students out of their comfort zone in terms of sustainability, and leave them there when they're overwhelmed with all the challenges…with the information and … a sense of powerlessness, that can be detrimental. And then it can leave students feeling [a] lack of agency. I think that would be a barrier if you didn't teach it effectively or properly." (Jo)

Similarly, according to Sam, "there might be that reluctance to open a big can of worms, if you start delving really deep … into the emotional well-being stuff. I appreciate that it takes a lot of time to bring students along that journey and I just wonder if that might be a barrier."

Discussion

This study explored educators' perceptions, attitudes and responses towards teaching socio-emotional competencies to students, based on their reflection on student responses to VUCA. There are several observations we make based on our educator interviews.

VUCA is inherent within [teaching for] sustainable development

It would be naive to think that the volatility, uncertainty, complexity and ambiguity that characterises sustainability issues do not manifest in the 'classroom'. According to the findings of this study, evidence of VUCA being present in Education for Sustainable Development exists via the emotional, cognitive, and behavioural responses of students, as observed by educators, and the reported need for educators to address these responses, and tailor their teaching strategies accordingly. For two educators, students demonstrate a combination of enthusiasm and ambivalence as they grapple with sustainability concepts, and offer extra time outside of classes for pastoral support. Another educator observes students demonstrating anxiety, confusion, and the need for reassurance, and ensures they validate and normalise these responses to create a safe learning space. Left untamed, negative emotions result in confusion and feeling overwhelmed, and impede on learning (Hadar et al., 2020).

According to other research, positive emotions, like enthusiasm, should be encouraged as they foster growth mindsets, and promote a range of positive behaviours such as seeking and utilising peer and teacher support, coping with challenges, and planning for the future (Ekström et al., 2021). In our experience, a combination of both positive and negative emotions in Education for Sustainable Development is to be expected, with each emotion having a critical role to play. Conducive to learning are emotions that facilitate the building of relationships and an action orientation, and, as corroborated by the educators in the present research, require educational practices that allow emotions to be experienced, expressed and understood with safety (Grund et al., 2024).

In the current research, educators report that some students understand the scale and breadth of sustainability challenges and their relevance and appear to be able to manage their reactions to VUCA, whereas others do not. Such differences between students reflect potential inequalities in the ability to grasp and utilise effectively the learning acquired from the sustainable development curriculum. Unless students possess competencies such as self-management, communication,

and self-awareness, their reaction to VUCA can interfere with any efforts made by educators to provide transformative learning experiences (Hadar et al., 2020). It appears pertinent, therefore, that learning sustainable development also requires the learning of how to manage VUCA and the emotions that manifest–and yet, this aspect of Education for Sustainable Development is seldom addressed in the design of sustainability curriculum.

Educators manage VUCA by drawing on intuition, past experience in teaching Education for Sustainable Development, and personal experience from the field

Interviews with educators revealed an awareness of the impact of students' emotional responses to VUCA on their learning, and some attempts towards managing these responses to enable learning. For example, one educator attempts to model the struggle of learning sustainable development, as well as curiosity and openness to new ways of understanding. Another educator incorporates different perspectives in their teaching, to show that all experiences are valid.

These strategies, despite often being unplanned, not only target the negative emotions known to arise in Education for Sustainable Development (Hadar et al., 2020; Sidiropoulos, 2022), but also explore zones of uncertainty and discomfort (Sterling et al., 2018), empower enthusiasm and motivation for agency (Williams, 2018), and go some way in acknowledging the emotional dimensions of sustainability issues. They are transformative and restorative, moderating the impact of external conditions on students and their learning (Hadar et al., 2020).

Whilst Education for Sustainable Development pedagogies in practice appear to predominantly address the technical and disciplinary content (or cognitive) element of VUCA (Lozano et al., 2017; Sharp et al., 2021), little is known to extent these approaches overlap with socio-emotional competencies. Even in research, a disproportionate degree of attention is given to cognitive competencies in Education for Sustainable Development, with behavioural and socio-emotional the least addressed. Consequently, a lack of socio-emotional competency building can render graduates incapable of adapting to changing future contexts, let alone thrive in these contexts (Benavot, 2019). Instead, our results show that the social and emotional elements of Education for Sustainable Development are subject to a haphazard approach, dependent largely on educators' previous background, opportunities to go above and beyond their role to provide support, and their level of concern for their students, exacerbating the existing inequalities between students in the management of VUCA. A greater understanding is needed of the extent to which socio-emotional competencies are addressed by existing Education for Sustainable Development pedagogies, or if additional pedagogies are needed, should be explored.

Whilst educators agree that the teaching of socio-emotional competencies is important, they express hesitation to do so

Whilst we found an overall consensus amongst educators on the importance of teaching socio-emotional competencies, with benefits that include building self-efficacy and coping with challenges, a significant number of barriers were also uncovered, ranging from personal to institutional. Like others (Kang, 2019; Timm & Barth, 2021), educators expressed practical concerns around embedding, teaching, and assessing socio-emotional competencies. For example, one of the more experienced educators may have learnt how to address students' emotional needs, but receives resistance from their staff to do the same due to a lack of time and space in the current curriculum.

Unique to this research, however, is educators' expressed reluctance with having to manage students' emotions, and not without justification. One educator in this research, for instance, reported feeling worried that taking students out of their comfort zone and not adequately addressing the consequences of that could be harmful.

Whilst abilities such as emotional intelligence (Guillen et al., 2022) and resilience (Vidal-Melia et al., 2022) improve learning engagement and academic performance, the development of these skills beyond simply modelling them involves learning practices, such as mindfulness (Vidal-Melia et al., 2022), or pedagogies that are intensive and specialised, such as teaching empathy (Ghita-Pirnuta & Cismaru, 2022), for which a reliable evidence base is still emerging.

Furthermore, a recognition of the value of emotions in learning enables the use of pedagogies that make effective use of these emotions. For example, framing learning spaces in terms of courage and bravery, as well as safety, is essential to transformation. Such spaces foster agency and meaningful growth by embracing discomfort and vulnerability (Carter & Nicolaides, 2023; Ford et al., 2024). In the present study, educators refer to both 'safe pedagogies', such as creating non-judgemental spaces for expression, as well as 'brave pedagogies', such as reflection tasks that allow students to come to terms with what they are learning. As such, obtaining the competence to teach socio-emotional competencies and navigate the fine line between what is 'safe' and what is 'brave' , in addition to the discipline-specific content academic staff have to master, is not simple. Emotionally-responsive pedagogies are those which identify agency, develop coping, and generate future expectations, and therefore, enable students' cognitive appraisal and emotional transformation (Dunlop & Rushton, 2022).

Finally, a lack of confidence and competence in addressing students' socio-emotional needs may further deter educators from embedding sustainability content and values in their courses altogether (Sidiropoulos, 2022; Wood et al., 2016). However, all educators expressed a clear desire to learn how to better teach sustainability, and to strengthen their own socio-emotional competencies–essential, if they are to be role-models of these skills to students (Cabanlit, 2024; Guillen et al., 2022).

Many of the barriers reported by educators can be addressed by higher education institutions

From this analysis of insights, there is an explicit expressed need for greater capacity for attention, space and time, and greater confidence and competence in teaching Education for Sustainable Development for educators. It may be within the remit of HEIs to address the reported barriers as a means of optimising its effort to embed Education for Sustainable Development effectively into its programs. For instance, alongside setting strategies and mission statements, universities could engage meaningfully with advancing Education for Sustainable Development pedagogy as follows: 1) extending deepened support from senior decision-makers, and working with educators for a smooth transition from policy to implementation, 2) creating dedicated space and time in the curriculum to address VUCA challenges and associated student responses, 3) articulating the expectations of roles and responsibilities of educators to establish consistent standards of practice, and 4) harnessing existing university expertise to offer professional development opportunities and peer support to frontline SD educators. Professional development, in particular, has been proposed as necessary to improve in-service educators' awareness of the role of emotions in learning, the need to normalise and validate complex emotions in Education for

Sustainable Development, the role of coping strategies and pedagogies, and how to apply them to improve learning (Ojala, 2022). Universities have a role to play to transform negative experiences into constructive energy and to enable positive learning to take hold (Ekström et al., 2021). To start, a better understanding of emotions and how they facilitate or prevent learning in a VUCA future is critical.

Conclusion

This study makes an original contribution to the field of Education for Sustainable Development by drawing attention to the experiences of educators in their efforts to teach sustainable development amidst a climate of VUCA. Various assumptions have been contested, including that Education for Sustainable Development pedagogy addresses VUCA by default, and that sustainability educators are able and willing to teach Education for Sustainable Development in ways that simultaneously meet the socio-emotional competency needs of students.

The findings of this study overall support the need to address students' socio-emotional competencies when learning Education for Sustainable Development, to cope with VUCA. The results align with emerging research that emotions in Education for Sustainable Development need to be experienced, processed, validated, and integrated into the sustainability curriculum (Grund et al., 2024; Wickson et al., 2025). The in-depth analysis of educators' experiences reveals that efforts are already being made to engage students' socio-emotional competencies, despite a lack of recognition, perceived support from the institution, and confidence. Likewise, previous research asserts that educators require specialised support and professional development to carry and harness these emotions for the benefit of student learning (Olaja, 2022).

Future research is encouraged to extend on the findings of this study, to help overcome the current limitations including the small sample size from a single institution, and the absence of the student voice. An understanding of students' self-reported emotional, cognitive, and behavioural reactions to VUCA will not only help validate the present findings but also initiate inquiry into how these responses can be addressed constructively (Minciu et al., 2025). Equally important is identifying which pedagogical approaches align best with specific reactions, enabling Education for Sustainable Development educators to design curricula and learning strategies using tools they are already confident with. Such insights can support more targeted professional development while also recognising and building upon the effective practices already in place.

In sum, Education for Sustainable Development educators often experience hesitation when navigating the emotional demands of sustainability teaching. Research highlights the importance of collegial support and professional communities of practice in helping educators, particularly those who are early in their careers, manage these challenges (Rieckmann & Barth, 2022). While many educators are willing to step into this transformative role, they require empowerment through institutional backing and the assurance of psychologically safe spaces in which to experiment, reflect, and grow (Ojala, 2022). Creating such environments not only strengthens educator confidence but also fosters resilience and innovation in sustainability education.

Finally, a range of practical and personal factors have been identified that need to be considered when changes to strategic directions in curriculum are being suggested, and there is a need for a collaborative approach to be had with educators delivering this curriculum. The predominance of self-reported barriers over benefits in teaching socio-emotional competencies highlights an

urgent need for higher education institutions to address these challenges, through in-service educator, curriculum and policy development. Without such action, the field of Education for Sustainable Development cannot progress toward integrating emotional competencies alongside cognitive ones, a step essential for preparing learners to navigate complex sustainability challenges fraught by VUCA. Finally, there is room for HEIs to begin by recognising existing efforts of educators towards VUCA conditions, before proceeding to advance sustainable development, and prepare graduates for careers in a rapidly changing world.

Acknowledgements

The authors thank Professor Alan Reid from Monash University for his contribution in steering this work, and Professor Iris Duhn from the University of Tasmania, for her early contributions to the development of the conceptual framework. The authors also wish to thank Monash University for funding this research.

The authors disclose that they have no actual or perceived conflicts of interest. The author(s) have not used artificial intelligence in the ideation, design, or write-up of this research. The authors confirm that they have met the ethical standards expected as per Purvis & Crawford (2024).

The authors list the following CRediT contributions: Garivaldis: Conceptualization, Methodology, Data Curation, Formal Analysis, Writing – original draft; Bedi: Conceptualization, Formal Analysis, Writing – original draft; Paxinos: Formal analysis, Resources, Writing – review & editing; Allen: Conceptualization, Methodology, Writing – review & editing; Bos: Conceptualization, Methodology, Writing – review & editing, Funding Acquisition, Supervision.

References

Anderberg, E., Nordén, B., & Hansson, B. (2009). Global learning for sustainable development in higher education: Recent trends and critique. *International Journal of Sustainability in Higher Education, 10* (4), 368–378. https://doi.org/10.1108/14676370910990710

Bastos, S. Silva, M. Poza-Lujan, & J. Schleutker, K. (2020). A reinvented education in business and accounting using a GBL approach for soft skills. *Academic Conferences International Limited Reading*, UK, 55-66. https://doi.org/10.34190/GBL.20.047

Bennett, & Lemoine, G. J. (2014). What a difference a word makes: Understanding threats to performance in a VUCA world. *Business Horizons, 5*7(3), 311–317. https://doi.org/10.1016/j.bushor.2014.01.001

Benavot, A. (2019). *Educational content up close Examining the learning dimensions of Education for Sustainable Development and Global Citizenship Education*. UNESCO Education. https://doi.org/10.54675/SRLJ8178

Bodea, C. N., Müller, M. P., Mogoş, R. I., & Dascălu, M. P. (2020). AI-based elearning for training project managers to navigate in VUCA environments. *eLearning and Software for Education Conference Proceedings*, Bucharest, 2, 319-327. https://doi.org/10.12753/2066-026X-20-126

Boyatzis R. (1998). *Transforming Qualitative Information: Thematic Analysis and Code Development*. London: Sage.

Brand, G. Collins, J., Bedi, G., Bonnamy, J., Barbour, L., Ilangakoon, C., Wotherspoon, R., Simmons, M., Misol, K., & Schwerdtle, P. N. (2021). “I teach it because it is the biggest

threat to health": Integrating sustainable healthcare into health professions education, *Medical Teacher, 43*(3), 325-333, https://doi.org/10.1080/0142159X.2020.1844876

Brendel, W., Hankerson, S., Byun, S., & Cunningham, B. (2016). Cultivating leadership Dharma. *Journal of Management Development, 35*(8), 1056-1078. https://doi.org/10.1108/jmd-09-2015-0127

Brundiers, K., Barth, M., Cebrián, G., Cohen, M., Diaz, L., Doucette-Remington, S., Dripps, W., Habron, G., Harré, N., Jarchow, M., Losch, K., Michel, J., Mochizuki, Y., Rieckmann, M., Parnell, R., Walker, P., & Zint, M. (2020). Key competencies in sustainability in higher education—toward an agreed-upon reference framework. *Sustainability Science, 16*(1), 13–29. https://doi.org/10.1007/s11625-020-00838-2

Bryant, A., & Charmaz, K. (Eds.). (2007). *The SAGE handbook of grounded theory*. SAGE Publications. https://doi.org/10.4135/9781848607941

Cabanlit, E. M. (2024). Reshaping education curriculum landscape: Lessons from unprecedented past. *European Modern Studies Journal, 8*(2). https://doi.org/10.59573/emsj.8(2).2024.33

Camangian, P., & Cariaga, S. (2021). Social and emotional learning is hegemonic miseducation: students deserve humanization instead. *Race Ethnicity and Education, 25*(7), 901–921. https://doi.org/10.1080/13613324.2020.1798374

Carter, P. L., & Nicolaides, A. (2023). Transformative learning: An emotional (r)evolution. *New Directions for Adult and Continuing Education, 177*, 1-133 https://doi.org/10.1002/ace.20476

Chen, T. (2024). The World of VUCA. In: *Endogenous Community Design. International Perspectives on Social Policy, Administration, and Practice*. Springer, Cham. https://doi.org/10.1007/978-3-031-56756-8_1

Cornwall, S. (2018). Failing safely: Increasing theology and religious studies students' resilience and academic confidence via risk-taking in formative assessment. *Teaching Theology and Religion, 21*(2), 110-119. https://doi.org/10.1111/teth.12429

Creely, E. (2016). 'Understanding things from within'. A Husserlian phenomenological approach to doing educational research and inquiring about learning. *International Journal of Research and Method in Education, 41*(1), 104–122. https://doi.org/10.1080/1743727X.2016.1182482

Dufrense, R. (2019). Using improvisation to develop leadership for a volatile world. *Journal of Leadership Education, 19*(4), 123-133. https://doi.org/10.12806/v19/i4/a2

Dunlop, L. & Rushton, E. A. C. (2022). Education for environmental sustainability and the emotions: Implications for educational practice. *Sustainability, 14*(8), 4441. https://doi.org/10.3390/su14084441

Ekström, M. C., Raatikainen, E., & Isacsson, A. (2021). Between despair and joy – emotions in learning. *Journal of Applied Research in Higher Education, 13*(1), 228-241. https://doi.org/10.1108/JARHE-08-2019-0215

Evans, N., Stevenson, R. B., Lasen, M., Ferreira, J., & Davis, J. (2017). Approaches to embedding sustainability in teacher education: A synthesis of the literature. *Teaching and Teacher Education, 63*, 405-417. https://doi.org/10.1016/j.tate.2017.01.013

Ford, N. J., Gomes, L. M., Lowe, E., & Harder, N. (2024). Embracing discomfort and vulnerability: cultivating brave learning spaces within simulation-based nursing

education, *International Journal of Healthcare Simulation,* 1-7. https://doi.org/10.54531/fokp9401

Frydenberg, E. (2022). *Coping in Good Times and Bad: Developing fortitude*. University of Melbourne Press.

Gaultier Le Bris, S., Rouvrais, S., & Waldeck, R. (2019). Learning methodology for VUCA situations. In R. Waldek (Ed.) *Methods and Interdisciplinarity* (pp. 117-148). Wiley. https://doi.org/10.1002/9781119681519.ch6

Ghita-Pirnuta, O-A., & Cismaru, L. (2022). Developing the emotional intelligence of millennial students: A teaching strategy. *Sustainability, 14*, 13890. https://doi.org/10.3390/su142113890

Guillen, M. E., Tirado, D. M., & Sanchez, A. R. (2022). The impact of COVID-19 on university students and competences in education for sustainable development: Emotional intelligence, resilience and engagement, *Journal of Cleaner Production, 380*(2), 135057. https://doi.org/10.1016/j.jclepro.2022.135057

Grund, J., Singer-Brodowski, M., & Büssing, A. G. (2024). Emotions and transformative learning for sustainability: a systematic review, *Sustainability Science, 19,* 307-324. https://doi.org/10.1007/s11625-023-01439-5

Hadar, L. L., Ergas, O., Alpert, B., & Ariav, T. (2020). Rethinking teacher education in a VUCA world: Student teachers' social-emotional competencies during the Covid-19 crisis. *European Journal of Teacher Education, 43*(4), 573-586. http://dx.doi.org/10.1080/02619768.2020.1807513

Holdsworth, S., & Thomas, I. (2021). Competencies or capabilities in the Australian higher education landscape and its implications for the development and delivery of sustainability education. *Higher Education Research and Development, 40* (7), 1466-1481. https://doi.org/10.1080/07294360.2020.1830038

Kang, W. (2019). Perceived barriers to implementing education for sustainable development among Korean teachers. *Sustainability, 11*(9), 2532. https://doi.org/10.3390/su11092532

Keinänen, M., & Havia, M.V. (2022). Embedding Uncertainty in the Learning Process—An Evaluation Case-Study of VUCA Model in Education. In Hong, C., Ma, W.W.K. (Eds) *Applied Degree Education and the Future of Learning. Lecture Notes in Educational Technology*. Springer, Singapore.

Kellner, P., Ngo, C-L., Bedi, G., Garivaldis, F., Tsering, D., Delafosse, V., & Bos, J. J. (2025). Emerging themes in sustainability education in higher education institutions: A scoping review of reviews. Manuscript submitted for publication. Monash Sustainable Development Institute, Monash University.

Korbel, V. & Paulus, M. (2018). Do teaching practices impact socio-emotional skills? *Education Economics, 26*(4), 337-355. https://doi.org/10.1080/09645292.2018.1460320

Loorbach, D. A. & Wittmayer, J. (2024). Transforming universities: Mobilizing research and education for sustainability transitions at Erasmus University Rotterdam, The Netherlands. *Sustainability Science, 19*, 19-33. https://doi.org/10.1007/s11625-023-01335-y

Lozano, R., Merrill, M., Sammalisto, K., Ceulemans, K., & Lozano, F. J. (2017). Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education: A Literature Review and Framework Proposal, *Sustainability, 9(10)*, 1889. https://doi.org/10.3390/su9101889

Mälkki, K. (2011). Building on Mezirow's theory of transformative learning: Theorizing the challenges to reflection. *Journal of Transformative Education, 8*(1), 42-62. https://doi.org/10.1177/1541344611403315

Mezirow, J. (2000). Learning to think like an adult: core concepts of transformation theory. In J Mezirow (Ed) *Learning as transformation: critical perspectives on a theory in progress.* Jossey-Bass, San Francisco, pp 2–33.

Minciu, M., Veith, C., Dobrea, R. C., & Ciocoiu, C. N. (2025). The challenges of the VUCA world and the education system: The need for change to ensure sustainable learning process. *Sustainability, 17*(14), 6600. https://doi.org/10.3390/su17146600

OECD. (2020). *Lessons for Education from COVID-19: A Policy Maker's Handbook for More Resilient Systems*, OECD Publishing, Paris, https://doi.org/10.1787/0a530888-en

OECD. (2021). *Education Policy Outlook 2021: Shaping Responsive and Resilient Education in a Changing World*, OECD Publishing, Paris, https://doi.org/10.1787/75e40a16-en

Ogunbode, C. A., Doran, R., Hanss, D., Ojala, M., Salmela-Aro, K., van den Broek, K. L., Bhullar, N., Aquino, A. D., Marot, T., Aitken Shermer, J., Wlodarczyk, A., Lu, S., Jiang, F., Acquadro Maran, D., Yadav, R., Ardi, R., Chegeni, R., Ghanbarian, E., Zand, S., Najafi, R…Karasu, M. (2022). Climate anxiety, wellbeing and pro-environmental action: correlates of negative emotional responses to climate change in 32 countries, *Journal of Environmental Psychology, 84*, 101887. https://doi.org/10.1016/j.jenvp.2022.101887

Ojala, M. (2022). Climate-change education and critical emotional awareness (CEA): Implications for teacher education. *Educational Philosophy and Theory, 55*(10), 1109–1120. https://doi.org/10.1080/00131857.2022.2081150

Pandit, M. 2021. Critical factors for successful management of VUCA times. *BMJ Leader, 5*(2), 121–123. https://doi.org/10.1136/leader-2020-000305

Pietkiewicz, I. & Smith, J.A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal, 20*, 7-14. https://doi.org/10.14691/CPPJ.20.1.7

Pettig, F., & Singer-Brodowski, M. (2025). Learning in relation with a changing world: Thinking beyond ESD 1 and ESD 2 towards ESD 3. *Journal of Education for Sustainable Development, 18*(2), 176-201. https://doi.org/10.1177/09734082251347383

Purvis, A.J. & Crawford, J. (2024). Ethical standards in educational research and publication. *Journal of University Teaching and Learning Practice, 21*(9). https://doi.org/10.53761/hqnqr710

Qadir, J., & Al-Fuqaha, A. (2020). A student primer on how to thrive in engineering education during and beyond COVID-19. *Education Sciences, 10*(9), pp. 1-22. https://doi.org/10.3390/educsci10090236

Redman, A., & Wiek, A. (2021). Competencies for advancing transformations towards sustainability. *Frontiers in Education: Higher Education, 6*, https://doi.org/10.3389/feduc.2021.785163 Rieckmann, M., Barth, M. (2022). Educators' Competence Frameworks in Education for Sustainable Development. In: Vare, P., Lausselet, N., Rieckmann, M. (eds) *Competences in Education for Sustainable Development.* Sustainable Development Goals Series. Springer, Cham. https://doi.org/10.1007/978-3-030-91055-6_3

Rouvrais, S., Winkens, A.-K., Leicht-Scholten, C., Audunsson, H., & Gerwel-Proches, C. (2023). VUCA and resilience in engineering education - Lessons learned. *19th International CDIO Conference*, NTNU, Jun 2023, Trondheim, Norway. hal-04089351.

Schick, A., Hobson, P. R., & Ibisch, P. L. (2017). Conservation and sustainable development in a VUCA world: The need for a systemic and ecosystem-based approach. *Ecosystem Health and Sustainability, 3*(4), e01267 https://doi.org/10.1002/ehs2.1267

Seow, P. G., & Koh, G. (2019). Examining an experiential learning approach to prepare students for the volatile, uncertain, complex and ambiguous (VUCA) work environment. *The International Journal of Management Education, 17*(1), 62–76. https://doi.org/10.1016/j.ijme.2018.12.001

Sidiropoulos, E. (2022). The influence of higher education on student learning and agency for sustainability transition, *Sustainability, 14*(5), 3098. https://doi.org/10.3390/su14053098

Sharp, E. L., Fagan, J., Kah, M., McEntee, M., & Salmond, J. (2021). Hopeful approaches to teaching and learning environmental “wicked problems”, *Journal of Geography in Higher Education, 45*(4), 621-639. https://doi.org/10.1080/03098265.2021.1900081

Smith, J. A., & Osborne, M. (2003). Interpretative phenomenological analysis. In J. A. Smith (Ed.), *Qualitative psychology: A practical guide to methods* (pp. 53-80). Thousand Oaks, CA: Sage.

Sterling, S., Dawson, J., & Warwick, P. (2018). Transforming sustainability education at the creative edge of the mainstream: A case study of Schumacher College. *Journal of Transformative Education, 16*, 323-343. https://dx.doi.org/10.1177/1541344618784375

Stoll, N., Kayn, S., Lempp, H., & Hatch, S. (2025). Impact of racial discrimination in education and other adverse childhood experiences on black students’ mental health and wellbeing: an interpretative phenomenological analysis study. *International Journal of Qualitative Studies on Health and Well-Being, 20*(1). https://doi.org/10.1080/17482631.2025.2507754

Timm, J. M., & M. Barth. (2021). Making education for sustainable development happen in elementary schools: The role of teachers. *Environmental Education Research, 27*(1), 50–66. https://doi.org/10.1080/13504622.2020.1813256

UNESCO. (2020). *Education for sustainable development: A roadmap.* UNESCO. https://doi.org/10.54675/YFRE1448

Vidal-Meliá, L., Estrada, M., Monferrer, D., & Rodríguez-Sánchez, A. (2022). Does mindfulness influence academic performance? the role of resilience in education for sustainable development. *Sustainability, 14* (7), 4251. https://doi.org/10.3390/su14074251

Wickson, F., Lambert, L., & Bernstein, M. (2025). Growing through transformation pains: integrating emotional holding and processing into competence frameworks for sustainability transformations. *Current Opinion in Environmental Sustainability, 74.* 101525. https://doi.org/10.1016/j.cosust.2025.101525

Williams, L. (2018). Transformative sustainability education and empowerment practice on indigenous lands: Part one. *Journal of Transformative Education, 16*, 344-364. https://dx.doi.org/10.1177/1541344618789363

Wood, B. E., Cornforth, S., Beals, F., Taylor, M., & Tallon, R. (2016). Sustainability champions? Academic identities and sustainability curricula in higher education. *International Journal of Sustainability in Higher Education, 17*(3), 342-360. https://doi.org/10.1108/IJSHE-12-2014-0171