37. A facilitating platform for transdisciplinary partnerships to co-create sustainability education

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INTRODUCTION

Although sustainability education has been applied in higher education for several decades (Wals, 2012), there is a call for more urgent action to transform education (Barth et al., 2023; Brundiers et al., 2021; Redman & Wiek, 2021) towards a more holistic and transdisciplinary approach. Transdisciplinarity provides sustainability learning through interdisciplinary knowledge and knowledge from practice that combines to produce new understanding (Scholz & Steiner, 2015). There have been efforts to create interdisciplinarity in higher education for student learning experiences through programme exchanges (Berasategi et al., 2020) and problem-based project work (Stentoft, 2017). Interdisciplinarity in research is also on the rise, but much more work needs be done to deepen understanding through different knowledge perspectives (Lawrence et al., 2022).

Institutional policy setting and management of sustainability campus greening has helped create knowledge about sustainability, awareness for sustainability (Anwar et al., 2020; Cho, 2017) and the whole school approach (Disterheft et al., 2015; Henderson et al., 2006). Also, the integration of sustainability into the curriculum in single courses, programmes or disciplines has provided insights about the differences between add-on lectures (Andersson & Boman, 2013; Holdsworth & Thomas, 2015) compared to alternative programme design and student co-creation in living-labs (Albareda & Alférez, 2016; Evans et al., 2015; Hald, 2010). Knowledge about how learning approaches facilitate capacity building for sustainability (Birdman et al., 2022; Denham et al., 2021; Lozano-García et al., 2008) has also provided insights into the efforts made to teach about sustainability within each discipline. However, teachers and research (Öhman & Sund, 2021) have pointed out that in order to create action, sustainability education is not just about what is taught or why sustainability is taught, but just as importantly *how* to teach sustainability education.

Capacity building in sustainability competence (Brundiers et al., 2021; Redman & Wiek, 2021) requires teachers to facilitate a learning experience through collaborative support and transdisciplinary opportunities on local, national, and international scales. Teachers call for the knowledge to understand transdisciplinary approaches and all stakeholders to create action to transform education systems towards new learning experiences (Annelin & Boström, 2024b). The purpose of our research project is to conceptualise the space for sustainability competency capacity building and how to create action for a transformation towards a student-centred learning approach to sustainability in higher education (SHE). Science, art, and practice need to benefit from studies on how we can best facilitate a transformation of educational

systems (Hart et al., 2009; Mokski et al., 2022) so that a holistic and transdisciplinary sustainability education can be imbedded in society (Spangenberg, 2011).

In dialogue with international students, teachers and practitioners we found several themes emerge. From these themes we have developed an online transdisciplinary platform that provides space for dialogue, resources, inspiration activities for teaching and learning, events, networking possibilities and much more. Firstly, we proposed that an online transdisciplinary platform can provide a space for support and exchange of creative approaches to facilitating sustainability education. Secondly, facilitating events, workshops and other opportunities to engage in futuring/anticipatory practice, and action research that emerges from these experiences, is a good tool to open dialogue. Lastly, a sustainability competence mindset map (SCCM) can help partners to co-create learning experiences. We continuously learn from our partners about the different needs and accessibility, which means that we continue to update the functions of the online platform. The following sections will explain the background to such a platform, how the platform has been designed and developed and results from participant users of the platform and its tools.

A TRANSDISCIPLINARY PLATFORM FOR CO-CREATION PARTNERSHIPS

We apply the didactics for sustainability education framework (Öhman & Sund, 2021) to conceptualise why, what and how students, teachers and stakeholders in practice can facilitate a transdisciplinary approach to sustainability education. Didactics in education (Dewey, 1963; Hopmann, 2015; Mård & Hilli, 2022; Meyer & Hudson, 2011) suggests that we learn by being self-aware and acknowledge emotions in the learning process (why), learn by intellectual knowledge (what), and learn by doing practical activities (how). In our hearts, we feel a need to transform sustainability education. In our heads, we know we need to transform sustainability education. Transforming sustainability education is in our hands.

Why: Being Self-Aware

The online transdisciplinary platform is designed as a space for co-creating a learning experience between all partners. According to Bovill (2020), the practice of co-creating both learning and teaching with students has enhanced inclusion and built positive relationships. Co-creating curriculum with students entails including students in the decision-making process and inclusion in the activities applied to the learning experience. Thus, the roles between teacher and student need to adjust to transform education systems. However, Bovill (2020) found that teachers struggle with implementing the co-creation approach in different class contexts and report that the change in role is challenging since perceptions of the roles must align with the practice of co-creating. Sustaining the co-creation method can be problematic within the current education system, since applying the whole class approach to each student group requires negotiation in the redesign of each class and a sensitivity to each class's needs. This whole class approach is not the norm for university teachers.

Similarly, Bergmark and Westman (2016) found that co-creation techniques can be an ambiguous process with lots of unpredictable experiences relative to more traditional controlled curriculum planning. However, they also found that collaborative and transformative

experience can be had by both students and teachers of the process. Since collaboration and transformative teaching approaches is vital for higher education to be able to apply a transdisciplinary sustainability education (Barth et al., 2023; Brundiers et al., 2021; Redman & Wiek, 2021), co-creation provides the flexibility needed to support student learning.

In the co-creation of a curriculum, relationships can become an emotional journey where partners learn new knowledge from different perspectives (Cook-Sather, 2014). Emotional development is an important part of a lifelong learning experience and crucial within didactic approaches to sustainability teaching (Öhman & Sund, 2021; Shephard, 2008). The inclusion of the whole student (emotion, intelligence, action) perspective can help to provide a student-centred learning progression approach (Fraser & Bosanquet, 2006). The co-creation approach provides opportunity for curiosity to drive the study experience and can help participant relationships to understand why they are learning the chosen study route.

What: Transdisciplinary Knowledge

The online transdisciplinary platform also provides resources for all partners to use and share regarding sustainability education, events and inspirational ideas that can be applied to sustainability challenges. Teachers have been teaching and researching about sustainability within their disciplines for several decades (Persson et al., 2023), creating more opportunities for student awareness and knowledge about sustainability in specific fields. Many educators and researchers (Barth et al., 2023; Baumber, 2022; Lang et al., 2017; Scholz & Steiner, 2015) champion a transdisciplinary approach, since scientific and practical knowledge that is combined can better inform how to tackle sustainability challenges. However, not all accept sustainability as a science (Wiek et al., 2012). Instead, many perceive sustainability as a concept, or a political value, or a subject to be taught about through each disciplinary perspective.

To overcome the challenges sustainability education faces, there is a need to nurture the mindset of educators (Persson et al., 2023). Also, this must be achieved without excluding the arts from the dialogue of sustainability as a science. Thus, an inclusive language for sustainability futures is needed to help better understand what to teach in a transdisciplinary field. Likewise, rather than only seeing knowledge in practice as a controversial influence in the learning process (Clements, 2009), stakeholders in practice could be seen as willing partners in the sharing of knowledge who want to enjoy the learning process. A transdisciplinary platform can provide a shared learning space and collaborative network that inspires engagement in transdisciplinary inquiry. While little pockets of passionate sustainability educators exist on an international scale, much could be done to support these educators across countries.

A sustainability mindset (Aghajani et al., 2023; Cripps & Smith, 2024; Kassel & Rimanoczy, 2018) is described as an ability to build the capacity to deal with sustainability challenges and create transformative action for sustainability opportunities. In a review of sustainability competency research (Bianchi et al., 2022; Brundiers et al., 2021; Redman & Wiek, 2021), it is generally agreed that eight key sustainability competencies (KSC) should be developed alongside a discipline's competency, general competency, and professional competency that is already taught. The eight KSCs that are considered relevant today (Bianchi et al., 2022; Brundiers et al., 2021; Redman & Wiek, 2021) are systems thinking, strategic thinking, future/anticipatory thinking, values/norms thinking, interpersonal thinking, intrapersonal thinking, implementational thinking and integrated problem-solving for sustainability. The online transdisciplinary platform provides access to a tool that can map the sustainability mindset of partners,

enabling leaders to facilitate the learning experience with an informed formative assessment that supports other learning tools.

How: Partnership Activities

Principally, this project investigates how co-creation techniques can function on a transdisciplinary and international scale to help facilitate sustainability in higher education. The online transdisciplinary platform provides access to workshop experiences, networks for collaboration, research activities, resources for teaching and other inspirational resources for students as well as information about events in sustainability education. A collaborative support network can share transdisciplinary knowledge that will improve the sustainability learning experience for all, and sharing on an international scale will help even more partners of the world.

However, the ability to take action and work with solutions to the sustainability challenges is a complex and sometimes wicked problem of sustainability (Lönngren & van Poeck, 2021). It is understood that many severe and pressing sustainability challenges are out of time (Facer, 2019; Richardson et al., 2023) and action is needed now. Therefore, demands on teachers to teach sustainability require immediate action, but teachers say they have no time to transform their educational practices (Annelin & Boström, 2024b). In order to overcome this challenge of a lack of time, collaborative inspiration is needed for ease and efficiency of mindset transformation in relation to understanding of time.

There are several advances in transforming education, such as ecoversities (Ecoversities, 2018), network-alliances and online courses. Creating new environments for creative teaching activities can also be achieved within the existing structures, for example, using co-creation of the curriculum (Bovill, 2020). While co-creation of the learning experience is based on problem-based learning techniques (Andersson & Clausen, 2018), co-creating learning with a transdisciplinary approach can also be facilitated by thematic inquiry. Thematic inquiry enables students to explore their curiosity to learn about something within a facilitated theme that is co-created between teachers, students and practitioners. Teachers and practitioners across disciplines and workplaces facilitate learning through scientific, artistic and practical resources that emerge to help find answers to student curiosity.

Furthermore, there are opportunities in the 'emerging futures' approach that uses creative temporal imagination (Facer, 2022) to overcome challenges with time restraints in education. We propose that efficient and less time-consuming techniques that are provided on the online transdisciplinary platform (Annelin, 2023) and real-world experiential learning activities can offer a learning, knowledge and exchange culture for all partners. Engagement in such activities enables mindset transformation and direct action.

METHOD

In this action research project, activities that develop practical tools or resources form the basis of the study (Erro-Garcés & Alfaro-Tanco, 2020; Manfra, 2019). Contacts in Sweden and the Baltic region provided access to participants, which represented a snowball sample of lecturers, students, and organisational leaders across Europe, Canada, and Australia. All participants were informed and gave consent to use their data to improve the transdisciplinary

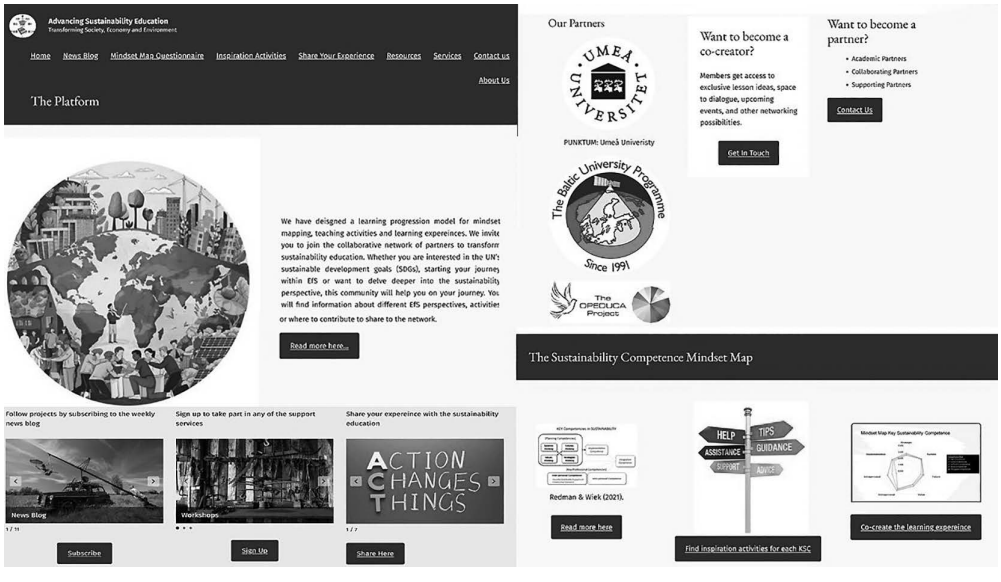
platform website applied in the research. We conducted interviews, planning days, seminars, workshops, and presentations with all disciplines at universities and organisations.

In the first year of the online transdisciplinary platform, thousands of visitors came to our website (Annelin, 2023) from 39 different countries. In the second year, visitor numbers doubled and in the third year teachers and education developers have continued to reach out to join the network. This indicated a strong and growing international interest in the support we provide. The homepage of the first generation platform is in Figure 37.1.

To understand participant experiences, first, we developed and validated a Sustainability Competence Mindset Map (SCMM) (Annelin and Boström, 2024a). The SCMM is continually updated for validity checks across nations. Second, we explored learning from teachers, students and practice on co-created curriculum themes. Feedback from participating students, teachers and other organisations are collected through formal and informal interview techniques and provide suggestions for the next steps in this action research study. Third, we explored the pedagogical activities that were applied in different educational environments (Annelin and Boström, 2024b).

EMERGING RESULTS

Results from the action research study found that many teachers expressed their concerns with, 1) time, 2) students' sustainability competence, and 3) support to advance sustainability in their educational context. After several years creating solutions to this initial feedback, we



Source: Annelin, 2023.

Figure 37.1 Homepage of first generation online transdisciplinary platform

also found that partner engagement and willingness to share resources and knowledge about sustainability education can vary between disciplines and countries.

Time

Time has emerged as a multifaceted, complex, and possible wicked problem that is experienced by all partners. The lack of time has been presented when students reveal their anxiety towards their future and describe their understanding of the planet running out of time, for example with problems of climate change. Self-awareness and resilience as well as emotional welfare (intrapersonal competence) are evidently vital capacities that need to be nurtured in a safe space for all. Knowing what, why and how sustainability education can be applied in a learning experience is paramount to intrapersonal capacity building.

Time has also emerged when partners have discussed the demand from policy agendas such as the 2030 or 2050 goals for carbon reductions or other sustainability goals and not knowing how to apply this knowledge. Some partners felt that they had been working with sustainability education for decades with demands from policy setters but have not experienced great transformations in the education system. Furthermore, others reported that they observed a lag behind other countries in regard to policy setting but noticed great transformations in grassroots innovation at the teacher level. For teachers, the lack of time with work overload has repeatedly emerged in conversation when discussing the challenges faced with transforming education towards alternative transdisciplinary perspectives. Efficient resources, tools and support are in high demand and collaboration between partners is vital for overcoming such challenges.

However, time has also emerged as a positive tool that can be used as a futuring process to imagine how to transform sustainability education. Pedagogical tools such as futuring (Annelin et al., 2025) can provide teachers with the opportunity to break down and unpack the challenges and fears of transforming education. Also, the online transdisciplinary platform is designed to facilitate resources and workshops that provide support in an efficient, non-time-consuming manner to help facilitate easy first steps for those who find time a restraint to sustainability education development. We continue to update the functions of the platform to provide up-to-date, flexible and timeless content for all partners.

Sustainability Competence Capacity Building

Some teachers have experienced that student groups come with different levels of pre-knowledge about sustainability. Without an informed understanding of students' sustainability competence, it is challenging to accommodate a student-centred approach in lesson plans. In order to tackle this challenge, we developed a preliminary formative assessment tool as the KSC assessment scales (Annelin & Boström, 2022) and have conducted a validation test of a formative questionnaire (Annelin & Boström, 2024a).

Data from participating teachers indicate the benefits of communicating sustainability competence with their students using the SCMM. Partners have found they can communicate the relevance of the sustainability education and set goals with students to approach the co-creation and facilitation learning method within the traditional university setting. Some have also used the SCMM tool as a reflection activity to help students journal their own experience of the learning journey. Other teachers have used the tool throughout the whole programme,

helping to gauge the students' learning experience over time. Acknowledgements were made for the tool's usefulness in combination with other qualitative methods that help to aid understanding of the students' capacity building in sustainability in more depth.

Further validation of the SCMM in a business school showed that it is possible to provide a simple formative assessment. More in-depth testing has begun to provide similar support across disciplines and on an international scale. Several teachers from different disciplines, universities and countries, have reflected on how well the feedback from the SCMM and students can help shape and create ideas about how to plan their lessons and create a dialogue with the students about building sustainability capacity.

However, some teachers have also reflected on the difficulties of adapting their lessons to continuous feedback from the student-centred approach. Common challenges include time to adjust, time to learn and time to search for inspiration. The preliminary results of the pre-study show that we have more work to do to be able to support all teaching styles and capabilities.

Flexible Support

Teachers have called for support around implementing activities that can be put into practice to facilitate students' learning. We have developed the online platform for transdisciplinary partnership to help provide a space for a learning progression approach to sustainability in higher education. Here, transdisciplinary knowledge is shared through the online platform, partners meet each other and gain inspiration around the challenges experienced and possible solutions. Academic and non-academic partners facilitate the student-centred approach to build capacity for sustainability competence through transdisciplinary learning and different pedagogical activities shared online.

Creating a transdisciplinary sustainability education system requires adaptability and flexibility of activities applied to the learning experience, and the willingness to experiment and share resources. The experience we have had is that sharing, engaging, and experimenting can be challenging for some partners – while some are inspired to take direct action, others take time before they have been able to adapt to new learning environments. The process requires continuous support and engagement, with follow up activities to provide evolving engagement in sustainability capacity building.

The online facilitating platform for transdisciplinary partnership supports partners and creates practical contributions to the field. Feedback about the assessment tool and the support from the network of partners that share experiences and activity ideas is conducted online. Temporal anticipatory methods (Facer et al., 2021), such as imagining futures (Sharpe et al., 2016), has been applied to practical work with teachers and students during workshops. Organisations located locally, nationally and internationally also provide real-time sustainability challenges for students and teachers to use as learning activities. Student-centred learning for sustainability help provide the practical skills needed to find innovative solutions to organisations' sustainability challenges. As students learn how to act for sustainability, they are building their competencies for sustainability, and the students themselves become the driving force behind organisational change.

Future Plans

Since we experienced that the willingness to share and stay engaged in the online transdisciplinary platform can vary between partners, we see a need to expand our partners to help drive engagement. We have had several groups of interested partners reach out to join our network and take a larger role in collaboration work. Thus, the platform will expand on an international scale through sharing knowledge about sustainability across different disciplines and organisational contexts, and through sharing experiences with activities applied to learning experiences. Content will continue to present seeds of inspiration from all partners and engage international partners in learning experiences that occur on a local, national and international scale. The use of online tools helps to bridge the space in support, knowledge and time efficient functions.

CONCLUSION

The online facilitating platform for transdisciplinary partnership plays a pivotal role in alleviating the time constraints reported by educators when transforming sustainability in higher education (Annelin & Boström, 2024b). Through innovative experiential learning methods and forward-thinking activities, we can learn from practitioners, educators and student experiences about how to work with real-world sustainability challenges and apply this knowledge promptly. The project serves as a valuable source of information for both researchers and practitioners, shedding light on prospects for collaboration, transformation and the evolution of transdisciplinary sustainability education systems capable of adapting to students' needs. Emerging data tells us that the development of intrapersonal and implementation thinking in the context of sustainability competence is being significantly emphasised.

The process of transforming higher education is slow, but changes are occurring on an international basis. Countries have differing education systems, cultural influences and expectations, as well as learning experiences (Lam, 2013, 2019; Wright & Osman, 2018). Therefore, further research should provide insight from the experience of teachers, students and stakeholders in practice, to contribute to knowledge about how sustainability didactics function in a transdisciplinary environment.

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