




Global    

Insights   

into     

Transdisciplinary

Higher    

Education  

Initiatives  



Edited by Todd E. Nicewonger and Catherine T. Amelink

Interest in transdisciplinary learning has continued to expand across higher education, building on previous efforts and creating spaces for new learning experiments. Institutional stakeholders tasked with leading these initiatives have developed important insights and management practices, which the chapters in this volume highlight. The case studies gathered in this volume provide a behind-the-scenes look at lessons learned, shedding light on the past and future of transdisciplinary learning in higher education.

Global Insights into
Transdisciplinary Higher Education Initiatives

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*TODD E. NICEWONGER
AND CATHERINE T. AMELINK*


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Contents

Introduction	1
Todd E. Nicewonger and Catherine T. Amelink	
1. Bridging Disciplines in Undergraduate Education	11
<i>Overcoming Barriers to Transdisciplinary Learning at a Public Research University</i>	
Jeanette Herman and Pauline Turner Strong	
2. Transdisciplinary, Challenge-Based Education Design	31
Using Knowledge Creating Teams from Five European Universities	
A Case Study	
Gemma O'Sullivan	
3. Evaluating and Scaling Best Practices in Interdisciplinary, Project-Based Learning	59
Edward J. Balleisen and Laura Howes	
4. Open Spaces of University Campuses as Living Labs for Urban Sustainable Transformation	81
A Case Study	
Christoph Kueffer; Irina Glander; Sascha A. Ismail; Mark Krieger; Gabi Lerch; and Jasmin Joshi	
5. University of California Los Angeles (UCLA) Sustainable LA Grand Challenge Undergraduate Research Scholars Program	105
<i>Preparing the Next Generation of Transdisciplinary Leaders</i>	
Rebecca Shipe; Jane Lee; Casandra Rauser; Elizabeth Reid-Wainscoat; Rachel Kennison; Marc Levis-Fitzgerald; and Erin M. Sparck	

6. Fickle Winds	125
<i>Faculty Maintenance, Labor, and the True Cost of Transdisciplinary Initiatives</i>	
Stephanie Sadre-Orafi and Jordan Tate	
7. How Does Transdisciplinary Teaching Transform Those Who Teach It?	143
<i>Experiences from the University of Technology Sydney</i>	
Alex Baumber; Bem Le Hunte; Giedre Kligyte; Susanne Pratt; Jacqueline Melvold; and Lucy Allen	
8. Effective Transdisciplinary Teaching Teams	163
<i>Professorial Perspectives on Collaboration and the Circular Model for Collegiate Co-Teaching</i>	
Anne-Lise K. Velez; Ralph P. Hall; Stephanie N. Lewis; Zachary Underwood; and Daron Williams	
Contributors	191

7. How Does Transdisciplinary Teaching Transform Those Who Teach It?

Experiences from the University of Technology Sydney

ALEX BAUMBER; BEM LE HUNTE; GIEDRE KLIGYTE; SUSANNE PRATT;
JACQUELINE MELVOLD; AND LUCY ALLEN

In Australia, there is a recognition that global crises, including a changing climate, disruptive technologies, and increasing social, economic, and political instability, require new coordinated responses. Education of high-skilled workers is one way to address these disruptions (Australian Government, 2022; Australian Productivity Commission, 2022). However, this is typically framed in economic terms, with Australian universities being steered through policy to develop “job-ready” graduates who can fulfill employer needs (Australian Government Department of Education, Skills and Employment, 2020). The narrow employability discourse that links outcomes of university education to current industry needs fails to acknowledge that future shocks are likely to demand new, yet unknown types of responses and capabilities. As an alternative to this employability discourse, some Australian universities are experimenting with transdisciplinarity and real-world, challenge-driven approaches to education (e.g., University of Technology Sydney, Australian National University, Western Sydney University).

Transdisciplinary approaches to higher education are underpinned by the belief that university graduates should be equipped with the skills and tools required to face uncertainty and disruption and contribute to positive social and environmental impact. Transdisciplinary approaches have been expanding globally across a diverse range of contexts in higher education over recent years, including sustainability (Evans, 2015), health (Hudson, 2016), and entrepreneurship (Penaluna & Penaluna, 2009). This type of education is characterized by a focus on learning between and across disciplines in recognition that many of the complex societal challenges we face cannot be addressed by any single discipline and instead require a combination of deep

disciplinary knowledge and collaborative, integrative, and creative capabilities (Fam et al., 2020; Markauskaite et al., 2020).

The Bachelor of Creative Intelligence and Innovation (BCII) at the University of Technology Sydney (UTS) is an example of a transdisciplinary undergraduate program that was introduced in 2014. It consists of a “core” degree in one of twenty-five different fields (e.g., business, science, communications, design) alongside a four-year transdisciplinary curriculum that brings students together from the different core degrees to work together. These transdisciplinary subjects typically involve working together to address complex real-world challenges set by external partners while progressively building up a repertoire of methods such as rich pictures and causal loops to analyze complex systems and transdisciplinary activities like the “perspective relay” in which students generate insights by adopting the perspective of a different discipline over multiple “laps” of an area.

The BCII initial intake in 2014 was around one hundred students but has since grown to exceed three hundred new starters each year and over one thousand students across its four-year program. Its success has been recognized on the global stage through a Reimagine Education Award and an International Green Gown Award for Next Generation Learning, as well as through national awards from Engagement Australia and the Australian Awards for University Teaching (AAUT). Internally, BCII teaching staff have been recognized for their scholarship in transdisciplinary learning practices with the awarding of the 2021 UTS Medal for Excellence in Research-Teaching Integration. Previous research into the BCII program has analyzed different ways of conceptualizing partnerships with students around curriculum co-creation (Baumber et al., 2020), creating “third spaces” in which boundaries can be transgressed (Kligyte et al., 2019; Kligyte et al., 2022), and enabling factors for teaching system resilience during the COVID-19 pandemic (Baumber et al., 2021).

The BCII's success has resulted in the creation of a dedicated pan-university entity, Transdisciplinary (TD) School, to promote transdisciplinary approaches at UTS. In addition to the BCII, TD School also hosts master's programs in data science and creative intelligence, the Diploma in Innovation, and a new Transdisciplinary Electives Program that offers every undergraduate student a BCII-like experience during their time at UTS. While the BCII proved popular with students from its launch in 2014, its success was not assumed from the outset. Rather, BCII was viewed as a “safe-to-fail experiment” at UTS, operating under early financial constraints with only

one full-time salary invested in the program for the first three years of its life. Designing a new transdisciplinary program from scratch demonstrated the radical ambition and strong institutional support that have been crucial to the program's success over the past decade.

A transdisciplinary agenda like the one that led to the creation of the BCII is wildly ambitious, and the uncertainty about the outcome had to be accepted on some level. Previous institutional attempts to assemble transdisciplinary education offerings at UTS had lacked the BCII's ambition and had not come to fruition. They had been designed as a patchwork of courses from across the faculties rather than the BCII's ultimate model of an entirely new curriculum, which enables students from different faculties to come together around shared, partner-led, complex challenges. Upon witnessing the success of the BCII as an experimental innovation, the university has been inspired and transformed by it. The tried and trusted (and externally recognized) transdisciplinary education approaches are now placed within TD School as a pan-university entity and positioned to have greater institutional impact.

Some of the key transdisciplinary concepts that the BCII curriculum draws on include the integration and transcendence of academic disciplines, the participation of diverse stakeholders, creativity, a focus on "real-world" problems, a recognition of complexity, and the need for explicit processes of reflexivity to enable mutual learning and knowledge integration (Klein, 2017). The integration of different knowledges and epistemologies requires participants—students, educators, and external partners—to be both willing and able to respect, understand, adopt, and generate new forms of knowledge, and to challenge traditional roles and power structures in the pursuit of mutual learning (Polk & Knutsson, 2008). In adopting the principle of mutual learning, students are not the only ones who learn in transdisciplinary teaching programs. Teaching staff are also positioned as learners who can be transformed through the delivery of the BCII program.

Transformative learning is of particular interest to transdisciplinary scholars and practitioners seeking to create real-world impact through engagement with diverse perspectives. In addition to seeking to create change, it involves the transformation of one's beliefs about themselves and the world around them (Mezirow, 1991). Transformative learning may be facilitated by exposure to alternative viewpoints and "consciously directed processes" that enable one to critically analyze their received assumptions and worldviews (Elias, 1997). These moments of learning can happen through "peak trans-

formative experiences” where profound and lasting insights into self-identities, values, and the nature of reality are obtained (Le Hunte et al., 2022). The ability for transdisciplinary approaches to stimulate transformative learning in higher education has been highlighted in previous studies (Baumber, 2021; Leal Filho et al., 2018), but the focus has typically been on how students rather than staff are transformed through their learning.

In this chapter we analyze what we have learned as a group of transdisciplinary teaching staff through our delivery of the BCII program over several years—and how this learning has transformed our practices, worldviews, and underlying assumptions about teaching and learning, knowledge, and the purpose of university education. We also seek to identify the key moments in which these transformations have taken place and the factors that enabled this transformation.

Methodology

To identify our peak transformative experiences in teaching BCII and the factors that enabled them, we came together as a diverse team of six current BCII teaching staff who had recently been awarded the 2021 UTS Medal for Research-Teaching Integration. Most team members had around five years of teaching experience in BCII, including Alex (disciplinary background in environmental policy); Giedre (education); Susanne or “Susie” (creative arts and environmental humanities); and Jacqueline (science). One member, Bem (anthropology and creative writing), had considerably more experience as the Course Director who launched the program in 2014, and another member, Lucy, was a BCII graduate with a core degree in design who had transitioned into an academic role in 2018.

Drawing on the transdisciplinary principle of reflexivity (Polk, 2015), we formed a “reflection circle” (Labonté, 2011) positioning co-authors as equals in a conversation. In our reflection, we employed an appreciative inquiry approach, a strength-based positive form of inquiry focused primarily on identifying positive moments of transformation (Jones & Masika, 2021). Our sixty-minute dialogue was recorded over Zoom, with one absent team member integrating everyone’s responses afterwards. To ensure that all team members had equal opportunity to speak, participants had to use the “raise hand” reaction on Zoom to indicate they wished to take their “talking turn”

(Itzchakov & Kluger, 2017). The discussion transcript was summarized by the lead author using thematic analysis to identify recurring themes before being reviewed by all participants as part of a collaborative writing process for the discussion section of the chapter.

The three guiding questions for our discussion of transdisciplinary teaching and transformative learning were:

- How have we been transformed since coming to TD School (i.e., how have our preconceived assumptions or premises about learning and teaching been challenged)?
- What have been our peak transformative learning moments?
- What helped or enabled us to transform (e.g., processes, conditions, etc.)?

Results – Reflection Circle

Q1: How have we been transformed since coming to TD School?

The first discussion question focused on how we had each transformed since coming to TD School. Key themes arising in response to this question included: a shift from feeling the need to be an expert toward a more open approach; becoming comfortable with uncertainty; negotiating power dynamics; and adjusting to different language and terminology.

With regards to the change in teaching styles, Susie described this as moving from the “sage on stage” mentality and lecture-tutorial format that is dominant in traditional education settings toward “creating space for emergence to happen and holding space for that emergence.” For Giedre, the change was from “imagining something quite concrete or prescribed that the students might achieve” to “a much more open and invitational approach to how you engage students.” Jacqueline also reflected on the different positioning of the teacher as feeling like needing to have “seventeen different hats” when walking into a classroom in order to deal with the complexity and diversity of the challenges that students are working on, recognizing the dif-

ferent stages of creative problem-solving and dealing with the uncertainty around how this process might play out.

Becoming comfortable with uncertainty was a key change that many of the team reported undergoing since joining TD School. For Alex, this was about “knowing that emergence is going to happen, but not what direction it’s going to take.” Bem noted that we not only encourage and enable our students to explore unknowns but also have had to do this work ourselves. She noted that “when I started as Course Director, we had to invent our type of transdisciplinary education from scratch. There was no blueprint, so we were always tackling unknowns. We had to question everything and anticipate student responses. Would assessments befuddle or inspire students? How far could we push them?”

Shifting power dynamics was something that each teaching team had needed to adjust to upon joining TD School. This was particularly pronounced for Lucy, who had made the transition from a BCII student to a member of the teaching team. She noted that key challenges were becoming comfortable with collaborative teaching and feeling out of her depth, but support from colleagues helped her to feel that her expertise and perspectives were valued, regardless of “whether I had ten years of experience or six months.” Bem argued that transdisciplinarity destabilizes traditional power relationships through mutual learning in which “the teacher is the student, and the student is also the teacher.” This idea on mutual learning was also reflected on by Susie, who noted that external industry and community partners are also part of that relationship, with the role of academic staff member often flipping between teacher, learner, and a kind of “events coordinator,” facilitating interactions between students and external partners.

The final theme that was discussed in relation to the opening question was around language. Coming together with colleagues and students from such diverse disciplinary backgrounds meant exposure to a range of new terms and concepts. Some of this new language also featured in our attempts to research and document our shared transdisciplinary practice, including terms like reflexivity, mutual learning, systems thinking, boundary objects, and safe-to-fail experiments. Alex noted that “I came in with a fairly narrow idea of interdisciplinarity as bringing people with different disciplinary expertise together, but I hadn’t engaged with transdisciplinary concepts like reflexivity at all—that was new to me.” For Jacqueline, being able to find the

language to describe BCII and answer the question “what do you do for a living?” was a “really big transformational moment.”

Q2: What have been our peak transformative learning moments?

The second discussion question shifted the focus from how we had been transformed to when this occurred and in what context. Some of these moments were touched on in the responses to Question 1, such as Bem’s early experiences in curriculum design as the inaugural Course Director, Lucy co-coordinating a subject for the first time after transitioning from student to teacher, and Jacqueline’s moment of transformation upon being able to find the words to describe what she did for a living. The “first kiss” with BCII was viewed by all the participants as a key moment, with other responses focusing on times when they started coming together for research as well as teaching, when they branched out into new contexts, and when the COVID-19 pandemic hit.

While each participant had their own story of joining TD School and the “rapid learning curve” they underwent, Bem was able to reflect on what this was like at the very beginning of BCII:

There’s nothing quite as memorable as that first time we ran an intensive BCII subject in 2014. Our first team of academics who had helped create the BCII were simultaneously trepidatious and excited, watching the story that we had created unfold with unimaginable enthusiasm because we saw the impact of it almost immediately. The peak transformative energy in the room was palpable.

Giedre and Alex reflected on the transformative power of coming together with the aim of collaborating on research into transdisciplinary education practice rather than on the teaching delivery and curriculum design that had driven previous collaborations. For Giedre, this was about moving “from implicit practice to much more explicit understanding” driven by an openness to sharing and learning from one another. For Alex, this process “really made me reflect on the fact that we are all from different disciplines and there’s a whole history and baggage in terms of assumptions and language that comes from that.”

Lucy reflected on the transformative power of stepping outside of one's usual context, in this case by participating in a project that involved working with high school teachers to deliver the kinds of transdisciplinary learning activities that are applied in the BCII and evaluating the outcomes. Jacqueline also reflected on this experience, noting that "I had a conversation with a school at the end of our project where we were looking at the impact that we've had on the school. It's one of those recordings I will always keep because I never have more confidence in my ability than after hearing the type of impact and transformation we'd had on their ecosystem." For Bem, a key shift in context was running a BCII school overseas in Auroville, India and the way this challenged notions of "individualism, ego, and the sense that we are separate from the world."

The rapid pivot to online learning as the COVID-19 pandemic arrived was a key transformative moment for all participants in the reflection circle. BCII subjects had always run in person up until this point, and the shift to online learning came as some subjects were just commencing. For Susie, this raised complex questions such as "How do you support meaningful collaboration and teamwork if it's completely online? How do you run a sensory workshop focused on smelling and have multisensory dimensions that are part of the experiential learning and embodied experiences that we're trying to embed in the transdisciplinary work we do?" Factors that enabled this transformation were being able to rapidly bounce ideas around with colleagues, as well as a sense of playfulness and openness to experimentation.

Q3: What helped or enabled us to transform (processes, conditions, etc.)?

The third question completed the shift from *how* we had changed and *when* it had happened to *what* enabled these transformations to occur. Key themes in our responses include institutional support, staff cultures and individual mentalities, and the value placed on learning from and conducting research into what we do.

"From a systems perspective," Lucy noted, "the university's support for transdisciplinarity is core for any of these moments of transformation to take place, in terms of resourcing, structure, leadership." Bem noted that, in relation to the BCII, "If it wasn't for our Deputy Vice Chancellor Education coming up with this idea and supporting it at the highest level, we would not

have been able to work across the faculty fiefdoms that exist in every university.” Jacqueline and Susie cited specific support structures that had enabled their growth, including the school’s Industry Partnerships Team, onboarding processes when they first started, administrative support in TD School, and communities of practice such as the First and Further Year Experience (FFYE) program at UTS.

In terms of staff culture, key elements that were mentioned included sharing, openness, generosity, reciprocity, experimentation, playfulness, trust, respect, and care. One point of discussion was around the extent to which these were individual characteristics of the people who helped form TD School and the extent to which they were enabled as a culture. Bem highlighted the importance of the individual decision to stretch oneself: “I think everyone in TD school on some level, from the minute they join us, decides to start stretching themselves, often beyond their comfort zones.” Alex discussed how the diversity of people in TD School fed into this culture, noting how he had been struck by how many creative people there were in TD School, “which I wasn’t used to coming from science and social science faculties.” Giedre highlighted how a culture of experimentation had been enabled because “we’ve been given the space to create—if you have an idea, you just go ahead and do it, and nobody’s there to stop you from experimenting.”

The final theme discussed in the reflection circle was the way that having explicit spaces and processes for reflection on our teaching and learning practice had been a key enabler for transformation. Susie argued that “an enabling dimension for transformation is having those spaces to reflect, along with the role and power of narrative to support bringing in new people and having questions or assumptions spoken about from different viewpoints.” Alex highlighted the importance of having “a belief that what we’re doing is groundbreaking and creates new knowledge that is worthy of research.” As someone who had made the transition from student to teacher, Lucy felt that “something that’s very unique about TD School and our little corner of academia is that someone who is so new to this space can be included in those research opportunities.”

Discussion

[Figure 1](#) summarizes the major themes arising from the reflection circle, divided into the kinds of transformations experienced, the moments at which they occurred, and the factors that enabled them. Several of the transformations that were cited related to challenging previous assumptions about how to structure learning activities, including a move away from lecture-style content delivery and toward project-based learning with uncertain emergent outcomes and high levels of staff collaboration. Other transformations related to new concepts and language and shifting power dynamics. The challenging of previous assumptions and worldviews was central to many of these transformations.

Key moments in which teacher transformations were observed included the initial entry into a transdisciplinary teaching environment, as well as transitions and pivots such as changing roles and responding to the COVID-19 pandemic. Other moments were less reactive and involved deliberate reflexive processes to come together and make sense of shared experiences. The enabling factors for transformative learning were seen to operate at a variety of levels, including personal traits (e.g., around collaboration, boundary pushing, and experimentation), school culture (e.g., openness, trust, and reciprocity), and higher-level institutional support that provided resources and enabled risk-taking.

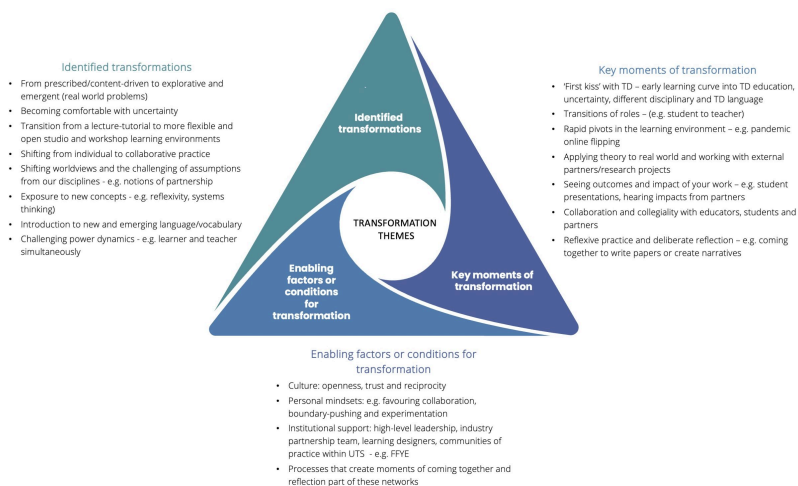


Figure 1: Key themes emerging from the reflection circle. [See Appendix for a description of this image.](#)

Many of the transformative moments cited in our discussion featured an element of feeling “unsettled” before things began to make sense and the new learnings were able to be incorporated into our practice. Mezirow (1991) contends that “disorienting dilemmas” of this nature can act as enablers of transformative learning by encouraging self-examination and assessment of one’s prior assumptions. However, for transformative learning to happen in a collective manner, particularly amongst academics from diverse disciplinary backgrounds, it is important that a supportive social context exists in which these disorienting dilemmas can be examined and prior assumptions can be questioned and explored (Kligyte, 2011).

Liminality was a common feature in many of the transformative moments cited, including a sense that TD School academics occupy a space in between their disciplinary and transdisciplinary worlds. This liminality was also evident in the discussion of transitions, such as from student to teacher and back to learner again. However, to effectively enable transformative learning, it is important that participants are not simply left feeling disoriented and “betwixt and between” but rather that they are provided with safe and supportive transitional spaces in which to undertake self-examination, share their experiences with others, and reintegrate their learning into practice (Bentz & O’Brien, 2019). Transformation does not simply happen through collaboration on teaching tasks (Kligyte et al., 2021). Mezirow (1991) also high-

lights the importance of participants being able to see that others are also experiencing, or have experienced, what they are going through.

The environments in which TD School teaching staff interact with students, partners, professional staff, and other academics often have the characteristics of “third spaces” in which new ways of doing things are encouraged and existing power dynamics can be challenged (Kligyte et al., 2019). This includes the physical studio-based learning environments as well as the relational spaces created through the diverse ways in which students, teachers, and partners interact with one another. Breaking down the traditional “teacher-student” dichotomy can also enable mutual learning, in which all participants are open to learning and have something new to offer one another (Polk & Knutsson, 2008). Schnitzler (2020) emphasizes the importance of these “collaborative learning spaces” for enabling transformative learning.

The collaborative third spaces in BCII have emerged partly by design (e.g., studio-based learning focused on external partner challenges) and partly through the cultural norms of openness, trust, and experimentation cited in our reflections. “Trustful communication” has been cited as a key success factor for transformative learning (Schnitzler, 2020), as has a culture of active experimentation (Bentz & O’Brien, 2019). It is likely that the pre-existing traits of the people who came into TD School contributed to these cultural norms, as did the necessity of collaborating when doing something so new and different. However, it is also likely that reinforcing feedback has played a role (e.g., positive experiences around sharing led to greater trust and openness). Similarly, it is conceivable that different early experiences around sharing and collaboration would have generated different feedback and led to a different school culture today. Supportive external environments have also helped, such as the opportunity to tap into existing communities of practice for teaching at UTS and beyond.

Aside from the creation of a safe and supportive enabling environment for transformative learning, it is also important to employ “consciously directed processes” that enable the critical analysis and reflection necessary to transform one’s own assumptions and worldviews (Elias, 1997). Given that reflexivity is a central principle of TD practice (Polk, 2015), deliberate attempts have been made in TD School to pause and reflect on what staff have learned and to compare our experiences and perspectives coming from different disciplinary backgrounds. This has commonly taken the form of research projects, including on student-staff partnerships (Baumber et al., 2020); the creation

of third spaces (Kligyte et al., 2019); pandemic responses (Baumber et al., 2021); and the design of new teaching programs (Kligyte et al., 2022). Reflexive practice has also been incorporated into team building sessions and the onboarding of new staff.

Reflexive practice informs our work and anticipated future needs and aspirations. In the wake of recent bushfires, floods, and the COVID-19 pandemic, there have been significant externally driven transformations to our university and the higher education sector in Australia. During the transition back to face-to-face study after COVID-19 lockdowns, the insights from online learning were integrated with face-to-face practice at TD School to establish a new technology-enhanced transdisciplinary student learning experience (Melvold et al., in press). In the coming years, challenges posed by climate change are likely to require further transdisciplinary engagement and transformative learning involving staff members, students, and external partners as part of a broader UTS commitment to becoming carbon neutral and moving investment to a fossil free fund. We also anticipate that reflexive mutual learning centered around anti-colonial practices and Indigenous knowledges will further transform our practice with the implementation of the Indigenous Graduate Attribute into all UTS degrees, including BCII (Bodkin-Andrews et al., 2019).

Building on the success of the BCII, the impact and reach of UTS transdisciplinary education are growing. In 2022, UTS began implementing a Transdisciplinary Electives Program, whereby every undergraduate student at UTS will undertake a TD elective as part of their core degree, with transdisciplinary capabilities being seen as a key component of UTS graduate distinctiveness in the workplace. TD School is often contacted by other universities and institutions to understand how BCII was developed. We are also working with universities overseas to implement the BCII model in other contexts, extending the impact of our learnings internationally.

Conclusion

Transdisciplinary approaches to higher education have been shown to enhance student learning through exposure to diverse perspectives, real-world challenges, and critical analysis of prevailing norms and assumptions about the world (Evans, 2015; Hudson, 2016; Fam et al., 2020). This study

shows that learning in transdisciplinary programs is not limited to students. Teaching staff can also learn and be transformed by what they learn in the process of designing and teaching these programs.

Experiences at UTS' TD School show that transdisciplinary teachers undergo diverse transformations, including in relation to how they conceptualize teaching, the ways they work together, the language and concepts they use, and the assumptions they bring with them from their “home” disciplines. These transformations have the potential to make them both better teachers and better learners, but they cannot be expected to simply happen without the right enabling conditions and processes. While each context is different, we suggest the following action items that others may wish to consider:

- Ensure strong institutional support, including adequate staffing and resources and the removal of structural barriers to transdisciplinarity within university systems. This may include establishing dedicated roles to support the delivery of transdisciplinary programs, offering onboarding programs to support staff transitioning into transdisciplinary learning environments, and creating opportunities for cross-faculty collaboration.
- Create an environment of trustful collaboration and a culture of openness and experimentation by hiring people who share this mindset, respecting their ideas, challenging assumed roles and hierarchies, and showing that it is safe to fail and feel “unsettled” at times.
- Employ deliberate reflexive processes such as reflection circles and writing from one’s disciplinary perspective to help staff generate insights and make sense of what they are experiencing.
- Target support and reflection around key moments where transformative learning may occur, such as the “first kiss” with transdisciplinary teaching, changes in team composition, shifts in context, rapid pivots, and times when staff are changing roles.

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Appendix: Image Long Description

Figure 1:

The three transformation themes are as follows:

Identified transformations: from prescribed/content-driven to explorative and emergent (real world problems); becoming comfortable with uncertainty; transition from a lecture-tutorial to more flexible and open studio and workshop learning environments; shifting from individual to collaborative practice; shifting worldviews and the challenging of assumptions from our disciplines (e.g., notions of partnership); exposure to new concepts (e.g., reflexivity, systems thinking); introduction to new and emerging language/vocabulary; challenging power dynamics (e.g., learner and teacher simultaneously).

Enabling factors or conditions for transformation: culture (openness, trust, and reciprocity); personal mindsets (e.g., favoring collaboration, boundary pushing, and experimentation); institutional support (high-level leadership, industry partnership team, learning designers, communities of practice within UTS, e.g., FFYE); processes that create moments of coming together and reflection part of these networks.

Key moments of transformation: “First kiss” with TD—early learning curve into TD education, uncertainty, different disciplinary and TD language; transitions of roles—e.g., student to teacher; rapid pivots in the learning environment—e.g., pandemic online flipping; applying theory to real world and working with external partners/research projects; seeing outcomes and impact of your work—e.g., student presentations, hearing impacts from partners; collaboration and collegiality with educators, students, and partners; reflexive practice and deliberate reflection—e.g., coming together to write papers or create narratives.

([Return to text](#)).

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