Design for Impact: A model for embedding education for sustainability across an undergraduate design program

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Abstract

Growing imperatives to 'future-proof' design students' knowledge, skills, capabilities and careers provided the impetus to develop four 'Impact Lab' design units, titled Place, People, Planet and Purpose, as central to a new Bachelor of Design degree at the Queensland University of Technology (QUT), Australia. Labs are scaffolded across students' three years of study as a compulsory spine performing the role of transdisciplinary integrator and facilitator. Collectively the labs answer to key facets of Education for Sustainability (EfS), developing students' theoretical knowledge of societal and global issues, and skills and capabilities to address these via a critical combination of content and enabling pedagogies. Learning encourages students to shift the focus of their design work beyond the economic, to a more holistic frame. Design challenges are situated in, or closely mimic real-world problems – across the labs, there has been engagement with over 45 local and global industry and community partners. With social, environmental and global issues at their heart, the Impact Labs are acknowledged as leading the way in the EfS space at QUT, through their themes, content and pedagogies, constantly endeavouring to deliver on the School of Design manifesto of positive 'change by design'. The model is supported by feedback from students, staff and partners and has been endorsed by academics and partners globally.

Introduction and background context

A suite of four 'Impact Lab' units, titled Place, People, Planet and Purpose was rolled out in 2019 as core to the Bachelor of Design degree at the Queensland University of Technology (QUT), Australia[1]. The units answer to a shifting design industry that now sees design challenges straddling a wide range of disciplinary spaces, as well as student, industry and other stakeholder expectations to 'future-proof' design students, not only in terms of their skills and knowledge, but also as ethical citizens. At the heart of this 'future-proofing' imperative lies the need to equip students to thrive as graduates and citizens in an uncertain and ever-changing world. The challenges embodied for example in the UN SDGs[2] are characterized by complexity, uncertainty, and value conflicts, and many prove hard to address, partly due to reductionist thinking, working in silos, and ignoring uncertainty[3]. Because of the interconnectedness of constantly evolving global challenges, Education for Sustainability (EfS) cannot be approached in the same way as other disciplinary studies. While the development of specialist disciplinary knowledge will always be critical, the labs answer to key facets of EfS, developing students' theoretical knowledge of societal and global issues, and skills and capabilities to address

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[1] Meth et al, (2021), Design Curricula: Navigating Process and People.
[2] https://sdgs.un.org/goals
[3] SDSN, Accelerating Education for the SDGs in Universities

these via a critical combination of content (spanning the necessary knowledge, skills and mindsets we aim to develop) and enabling pedagogies[4].

Design as a discipline and practice has a complex history, with direct implications for and connections to global sustainability imperatives. In part, design has a history as an industrial or trade profession concerned with making things[5], and linked to this, a central mission to contribute to global 'progress'[6] with a continuous drive for innovation and differentiation, embodied within a culture of consumption[7]. We now recognize today the urgent need to revisit design's role in fueling unsustainable living and widescale planetary damage, and to bring greater criticality to how designers approach their work and consider more deeply the impacts of their designs. This shift is now seen mirrored in the evolution of design education. The paper offers examples of the way in which the two key facets of EfS might be realised, also outlining key features of a transdisciplinary, experiential curriculum model, including underpinning concepts, and teaching and assessment approaches. Foregrounding interlinkages and the integrated nature of global challenges, the Impact Labs respond explicitly to the EfS brief.

The model

The four labs are situated as central to a new Bachelor of Design curriculum at QUT. The model sees labs scaffolded across students' three years of study as a compulsory spine performing the role of transdisciplinary integrator and facilitator. Figure 1 summarises the key themes and features of each lab, as well as themes that are scaffolded across students' three years of study.
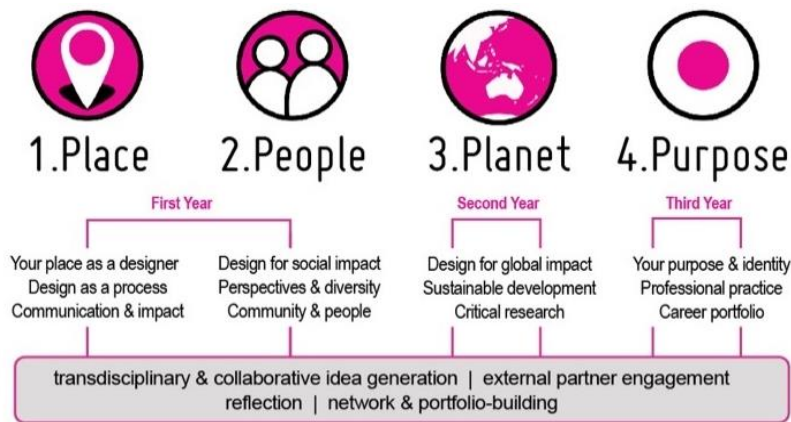
Figure 1: Graphic summarising the suite of Impact Lab units and their key features (Credit: logo design, Andrew Scott).

'Place' draws out students' intentions as designers, identity and empathy, and 'People' focuses on design for social good and healthy communities through partner-generated topics including mental health and disability. 'Planet' is a direct response to the United Nations (UN) call for transdisciplinary collaboration[8] to sustain impact on the ground by building capacity and raising awareness as part of the 'Decade of Action'. It focuses on engaging students with partners on health, education and community issues specifically framed around the 17 UN Sustainable Development Goals. 'Purpose', undertaken in final year, offers greater flexibility of projects aligned to students' lifegoals, including a work-integrated option. Since 2019, lectures, workshops and immersive experiential, inquiry-led transdisciplinary design challenges have enabled small-group collaborations for over 4000 students from seven design study areas, including architecture, industrial design and fashion, and 20 other

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[4] Santone, *Reframing the curriculum: Design for social justice and sustainability.*
[5] Buchanan (1998), "Education and professional practice in design."
[6] Escobar-Tello et al., "Decolonising design in peacebuilding contexts."
[7] Margolin, "Design for a sustainable world."
[8] Leal Filho et al., *Partnerships for the Goals.*

disciplines, including business, law and engineering. The labs introduce authentic learning collaborations as a 'must' while intensifying students' engagement with society's wicked problems[9]. Labs also develop necessary design foundations, including ideation, concept mapping and iteration, as well as 21st century skills[10] of transdisciplinary collaboration, reflection, external networking and profile/portfolio building.

Unlike many transdisciplinary learning models, ILs shift the status of undergraduate transdisciplinary learning from occasional and peripheral to habitual and essential. By default, EfS has relevance to all people, as experts, professionals or citizens, and such multiple actors are affected by, and have roles to play in addressing the SDGs. EfS should therefore attempt to involve, or at least consider a wide range of contexts and actors. Learning encourages students to focus on self, others and society,[11] helping to shift the focus of their work beyond the economic, to more holistic frames with wider intent.

Since 2019, we have worked with over 45 local and global industry and community partners. Design challenges are developed collaboratively with partners to address current issues at partner organisations relevant to specific IL themes. For example, 'Planet' partner ActionAid India proposed a communal housing project in the Govindpuri slums, and for 'People', KidsHelpline projects addressed disadvantaged community engagement. New products, visual identities and concepts have been pitched by students to community and industry partners, with some design solutions now adopted by partner businesses. With large cohort sizes, sustainable industry partnerships are key to the IL's continued effectiveness. We prioritise using our extensive networks to secure partners that support the authenticity of our design challenges. We work hard to retain industry partners, avoiding partner overload through careful management of their involvement. Prior to unit commencement we collaborate with partners to develop design briefs pertinent to the unit theme and to capture background information digitally. During design challenges, we maximise opportunities for student-partner interactions using face-to-face and digital formats, including online portfolios[12] and social media channels. Such approaches allow students to experience intimate collaborations in small groups (below five) even when cohorts approach 700, without overburdening external partners.

Impact Lab 1: Place

As the first unit in the suite, and most often taken by students early in their learning journeys, 'Place' opens the conversations with the 'why?' of design, encouraging students to think holistically and expand their awareness of the kinds of problems as designers, they might help to solve. Students explore their personal expectations and motivations for studying design and consider how their impact as designers might be shaped by their values and ethics. A key aspect of this is considering the role of designers in the world today, and the accusation of designers feeding perpetual consumerism, waste and unsustainability, and Monteiro's opening chapter on the ethics of design[13] provides the perfect reading to aid in this. Beyond exploration of future designerly 'selves', place is explored more deeply as a complex concept, drawing on place attachment theory[14] to do this. Lectures and workshops introduce concepts of place-based consciousness and place-based pedagogies in working with students to see all dimensions and framings of place. This is underpinned by notions of designing for more than people, and includes considering how people make connections with places, and the stories places tell about connections to nature, also including consideration of Aboriginal and Torres Strait Islander peoples' deep connections to Country[15].

Building on content covered in workshops, the design challenge statement prompts students to evolve our city, as a place where meaningful and transformative human plus nature connections might occur

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[9] Buchanan (1992), "Wicked problems in design thinking."
[10] Bridgstock "Professional capabilities for twenty-first century creative careers"
[11] Booth et al., "Self, others and society: a case study of university integrative learning"
[12] Meth et al. (2020). "The graduate professional portfolio as "synergy" tool"
[13] Monteiro, The ethics of design.
[14] Scannell and Gifford, "Defining place attachment: a tripartite organizing framework".
[15] Liddle, *Why a connection to country is so important to Aboriginal Communities.*

in engaging and innovative ways. This year's design intensive began with the trigger statement: 'Cities are key places for reconnecting people with nature. Yet it is time for cities to take nature connections to the next level: to go beyond making urban landscapes pleasant for their inhabitants to become places that drive transformation.'[16]
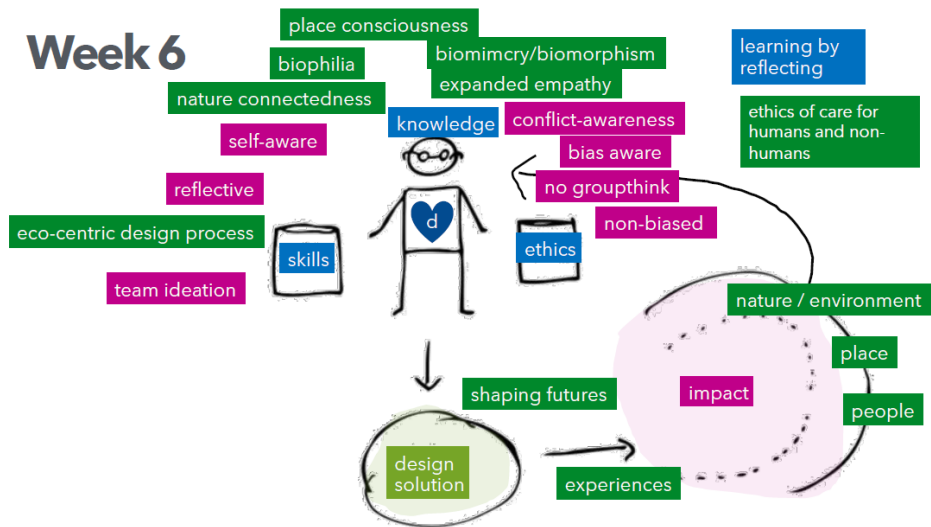

Figure 2: Image encapsulating the collective underpinning knowledge, skills and ethics concepts explored by students across the first 6 weeks of lectures and workshops, in preparation for their group design challenges.

The aim is for students to understand how spaces become places, and the fundamental difference between the two. While project slants vary across semesters, the overall goal is to find an urban space, or network of spaces where a place connection might be made through design solutions. Examples include working in decommissioned city cycle spots and other well used public spaces, such as adjacent to the Brisbane City Hall. In small groups, students follow the principles of design collaboration, using tools such as the UK Design Council's 'Double Diamond' to scaffold the stages of designing together. As an incentive for students' design work, and to endorse the value of their work for the city, the Brisbane City Council showcased a selection of projects at the 'Green the City' display at the Royal Agricultural Show (EKKA) in August this year.

Impact Lab 2: People

The model for Impact Lab 2 turns first-year design students towards the opportunity and responsibility[7&17] for design to enact meaningful social change (for further detail on Impact Lab 2 and design for social impact see Brophy et al.[18]. Impact Lab 2 is motivated by social objectives, and thus addresses sustainability from the perspective of such UN SDGs[2] related to poverty, education, decent work, well-being, and equality. To illustrate the social role of design[19], students are introduced to design approaches such as Co-Design and Participatory Design[20].

The guiding principles of participatory approaches - including but not limited to, power sharing, mutual learning, and active partnerships - provide an important foundation for socially focused design

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[16] Ives, *A New Reconnection Agenda for People and Nature. The Nature of Cities.*
[17] Manzini "Making things happen: Social innovation and design."
[18] Brophy et al., *Socially responsive design education: emerging designers and authentic transdisciplinary collaborations*.
[19] Vodeb, "Social innovation and design education: towards a socially responsive communication design pedagogy."
[20] Kensing and Greenbaum, "Heritage: Having a say"

education. To uncouple the 'problem-solving' power frequently bestowed upon design practice[21&22], the tools used in practice are motivated by collaboration, and the creation of a space where the knowledge and experience of diverse stakeholders are considered.[20&23] Signature, community-led assessment projects realise these theoretical underpinnings and demonstrate notions of designing *with and for.*[22]

Project briefs are designed in collaboration with a breadth of external partners – from large, national charities, to small, local social enterprises, and the focus of the challenges span issues such as homelessness, mental health, energy poverty, and domestic violence. To support informed research and decision-making in the early exploration phase of the design process, project briefs include resources provided by the external organisation and suggestions for relevant peer-reviewed work. The briefs are presented as 'How Might We' statements:

- *How might design contribute to the work of community organisations so that they can continue increasing the scope and impact of their work?*
- *How might we tackle issues of energy poverty for youth in disadvantaged Australian communities so that young people have safe and positive things to do in the evenings?*
- *How might we address harmful language online so that the digital world can become a safer space?*

The model of Impact Lab 2 addresses increased expectations of co-creation skills in design practice, and the expanding community of collaborating partners continues to broaden the scope and diversity of projects students can engage with.
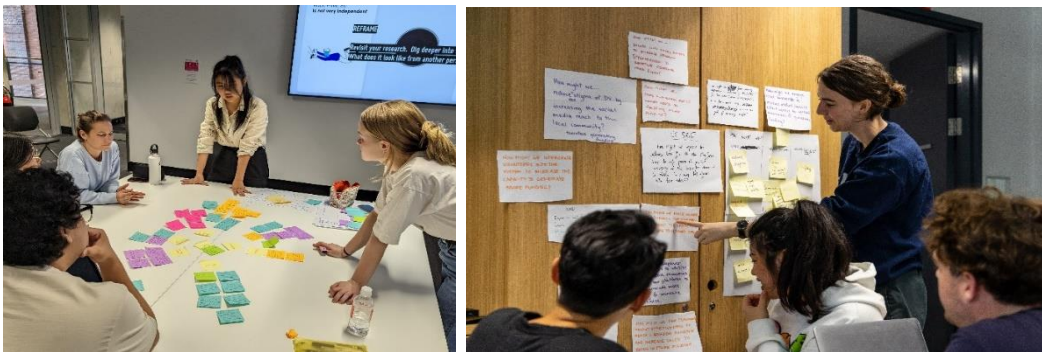
Figure 3: Multi-disciplinary groups of students use approachable, tangible methods to work through complex contexts collaboratively

Impact Lab 3: Planet

With Impact Lab 3, 'Planet', we developed a unique program as part of the United Nations (UN) Decade of Action framed around the implementation of the UN SDGs.[2] In partnership with international organisations problem-focused and research-led design proposals were based on real world projects determined by the external partner and their needs in pursuit of the shared aspiration to assist the global community in implementing the 17 SDGs. The projects were diverse and not limited to designed objects, but rather consider environmental conditions where people work, live, play and love as well as the complex systems and processes within their respective socio-cultural contexts. Within the first year alone, the team collaborated with Action Aid India, ARCADIS in collaboration with UN-Habitat, ARUP, Dreamtown, Future Cities Nigeria in partnership with Adam Smith International, Health Bridge, ISOCARP and the Institute of Wellbeing, Bangladesh. Transformative design solutions for humanitarian projects were developed for India, Bangladesh,

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[21] Blevis, "Must Do, Want to Do, Can Do, Can Know (Transdisciplinary Design)"
[22] Kolko, *Wicked problems: Problems worth solving.*
[23] Buur and Matthews, "Participatory innovation."

Vietnam, Sierra Leone, Fiji, Nigeria, South Africa, Tanzania, Zimbabwe, Australia, Denmark, Canada and Netherlands.

By applying the active learner approach[24] through co-operation, dialogue and critical thinking methodology based on transformative learning in design research by Brogden,[25] students were able to develop a deeper sense of self and fulfilment. Students responded to the defined partner challenge by developing their solutions following a four-stage process 'Discover, Define, Develop and Deliver'. Within the first stage students learned foundational knowledge and partner challenges to better understand communities while progressively deepening their appreciation of the complexities of the articulated real-world issue. During the second stage, students applied the SDGs to the partner challenge while analysing the system issue in an iterative manner. Within the third stage, students started to engage with design theory around design futures and backcasting as a method to develop a transformative design solution grounded in deeper ethics of humanitarianism. This stage included receiving formative feedback, iterative refinement of their solutions and critically reflecting on their work. Once the briefs were finalized, students moved to the delivery stage of their conceptual designs, while gaining further knowledge on concepts such as decolonising design, regenerative design, climate change and the future of design.

For 2021 and 2022, design challenges have focused on sustainable university campuses of the future. In partnership with the international interdisciplinary design firm, ARUP, design challenges focused on the 24-hour campus, the village campus, the digital campus or the city campus. As well as positioning their work within the construct of the SDGs, for this, students have also worked within the framework of QUT's own Sustainability Action Plan[26] and our Campus to Country[27] positioning strategy that outlines the importance of connecting to Country with guidance on designing culturally sensitive buildings, spaces and places that reflect local context.

Impact Lab 4: Purpose

Impact Lab 4, taken in students' final year of study, challenges students to consolidate learning from the first three labs and ponder their design future. Students are guided through exploration of their post-graduation goals and purpose, using theories such as Ikigai[28], and given personal feedback by an industry mentor session. Students analyse their potential contribution to the design industry considering world sustainability issues showcased by the World Economic Forum. This draws in and revisits the underpinning theme of the ethics of design and its social and environmental impacts that is threaded across all labs, giving students, now armed with deeper disciplinary expertise and experiences, the chance to revisit concepts in greater depth for more sophisticated design solutions.

Recognising this as a capstone experience and important to students heading on their own individual paths into employment, further study etc., the lab shifts away from the previous three labs of scaffolded learning and groupwork, and students are given the opportunity to complete a self-directed industry-based design project. Using KWHL metacognitive strategy[29] (What do I Know? What do I need to Learn? How will I learn it? What did I Learn?) students start to position themselves for their future. Studio activities include class discussions, thinking through making, peer feedback, question posing, summarising, predicting, and critical self-reflection[30].

With between seven and thirteen projects on offer each semester for between 110-180 students, Impact Lab 4 gives students real-world portfolio-worthy design opportunities. The breadth of projects on offer mimics the range of student post-graduation intentions and plans, for example, of industry

[24] Freire, *Pedagogy of the Oppressed.*

[25] Brogden, *From product to process and site to system*

[26] QUT (2021), https://www.qut.edu.au/about/social-responsibility/sustainability/action-plan

[27] QUT (2020), https://www.qut.edu.au/about/campus-to-country

[28] Eller, "Ikigai and higher education"

[29] Blakey and Spence, *Developing metacognition*.

[30] Huitt and Cain, *An overview of the conative domain.*

careers, entrepreneurship or research pathways, thus spanning industry, community and/or academic partners and supervisors. While students are no longer in transdisciplinary groups, the design problems in themselves all inherently require transdisciplinary approaches for future-focused thinking and solutions. Sustainability is inevitably the cross-cutting theme here, with projects drawing on real-world social, economic and environmental briefs. Examples of recent projects that have given students the opportunity to deepen their understandings of sustainability issues include:

- **Festival Waste** led by Alice Payne (Fashion academic), Kellie Vella (Computer Scientist) and Green Music Australia) explored finding circular economy momentum to reclaim materials from tents and other abandoned camping gear (tarps, marquees, shades, chairs) abandoned at music festivals. Recognising that finding uses for these materials at a large scale is missing. Three students were chosen to continue ideation of their work with Green Music Australia as part of the marketing of future festivals

- **The Shed project** saw students partnered with QUT institutional representatives from Sustainability and Capital Development and Planning offices, as well as Traditional Owner and QUT Elder-in-Residence, Mr Gregory Egert (known to the community as Uncle Cheg) in their mission to 'create a hub at a QUT campus where staff and students can meet to talk about sustainability, with Indigenous perspectives shaping and informing both the development and mission of the 'hub'. The hub will be a space to share ideas and knowledge, tell stories, participate in sustainability workshops, have swap meets for veggies and clothing, participate in health and wellness activities and provide feedback on sustainability initiatives, programs, plans and actions at QUT.

Figure 4: SHED tutor Michael Molloy (centre) works with 4 architecture students (from left, Michael Lynas, Kate Singleton, Michael Lyten and James Churchley)

- **Greener Urban Design** was led by Cat Simpson, a tutor and urban designer. The 2022 'Green the City' project brief read: 'In Brisbane, as a community we learned the benefits of greenspace particularly during Covid and have begun turning to some of our hotter and drier parts of the city to create greener streets, new parks and better connections to nature. Whilst we develop Victoria Park into a lush parkland, King George Square, almost universally disliked, sits hot, barren and grey within the city.' Students worked with Cat to create a biophilic park design.

Students appreciated the freedom of the briefs in Impact Lab 4, as well as close work with stakeholders. The maturity of students' designs is evidenced in a range of partners interested in both showcasing and extending the designs further towards full realisation. Five of the 'Suburban Renewal' students presented their work to the Brisbane City Council board, and a number of the SHED designs are being considered for the actual build in late 2022.

Discussion and Conclusion

Student feedback via focus groups, surveys, and social media, evidences their strong and passionate engagement with the labs' mission and learning experiences. Student comments include: 'opened my mind to a whole other side of designing which I have come to love and am grateful for' and

> 'The Impact lab's purpose and moral standing is exactly why I chose to be a designer and exactly what I hoped to find in a university degree. … there is nothing more impactful and helpful than 'doing' rather than imagining. More active learning, less classrooms.'

Returning to the two key facets of EfS, the accounts above evidence the ways in which the labs incorporate the necessary knowledge, skills and mindsets we aim to develop through developing students' cross-cutting skills and capabilities. Additional to skills of collaboration and design processes, and an understanding of concepts related to sustainability, the labs draw out students' self-awareness, empathy, and importantly, students' understanding of the interdependencies between ecological and social systems, sustainable development, human rights, social justice, diversity, and key global and local sustainability. In later labs in particular, students are able to start to draw on their disciplinary and profession-specific knowledge and skills, understanding how challenges are relevant to their work moving forwards, and the importance of networks and collaborations to do this. And critical to this work are the pedagogies employed to undertake learning in a meaningful way, through authentic, interdisciplinary and participatory ways that open spaces for critical pedagogies and values and identity activities.

In awarding our Impact Lab work the overall 2021 'Global Education' QS Reimagine Education Award[31], Grandy Jury member, Tim Quine (DVC Education, University of Exeter) noted the IL innovation as: 'An elegant approach to developing transdisciplinary skills and outlook in students, while demonstrating each students' potential to make a positive contribution to sustainability in their host communities'.

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