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Modelling transdisciplinary pedagogy: A method for collaborative curriculum design

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Modelling transdisciplinary pedagogy: A method for collaborative curriculum design

Abstract

This article explores a transdisciplinary, collaborative, curriculum design project to promote institutional belonging as a driver of student engagement, and to equip graduates with the fluency to work across disciplines. It demonstrates a facilitated method, to construct learning outcomes that break with typical subject-based knowledge and associated hierarchies of expertise. After considering a small number of precedents, the authors use curriculum models to inform a design specification. Following the formation of a multidisciplinary design team, a development tool (Lego® Serious Play®) was selected for a design workshop. A qualitative analysis of the workshop transcript was then used to inform the learning outcomes for a common module to be taken by all first-year undergraduates. Finally, the article considers how the process provided a framework for collaborative design that has been implemented in further projects, and led to the creation of a growing community of practice. The project provides insights for others embarking on collaborative curriculum design initiatives, especially where transdisciplinary learning is an objective.

Practitioner Notes

1. Transdisciplinary design teams are best formed through voluntary participation, through expressions of interest, rather than with leaders representing their disciplines.
2. An appropriate creative design thinking workshop should be delivered to facilitate the bracketing of disciplinary knowledge and associated hierarchies.
3. The resulting transcript from the workshop should be analysed interpretatively to maximise its qualitative potential for determining curriculum learning outcomes or content.
4. Participants in the workshop should be encouraged to form a community of practice in order to harness the ongoing potential of new, transdisciplinary approaches.

Keywords

Transdisciplinary pedagogy, collaboration, curriculum design, common curricula, Lego® Serious Play®

Introduction

This article demonstrates the potential of a facilitated, creative thinking method to transcend discipline-based approaches in a collaborative curriculum design project. The aims of the institution-wide project address two key questions circulating in higher education today: how to promote institutional belonging as a driver of student engagement; and how to equip graduates with the fluency to work across disciplines in a globalised, uncertain world. A first step in designing a learning experience that promotes thinking across disciplines is to find a process that allows the members of a design team to experience and model such thinking themselves. In the following account, we describe how a self-selected group of curriculum designers used a creative thinking method to construct learning outcomes that break with typical subject-based knowledge and its associated hierarchies of expertise. We argue that our chosen process also contributed to the sense of belonging of staff: it created a lasting and expanding community of practice outside of the disciplines, which subsequently influenced learning activities.

We start by describing the institutional aims of the design project which would eventually lead to the creation of a university-wide module. Then we outline our research into some existing initiatives in common curricula. Given the absence of suitable precedents, we explore models of the curriculum to inform our specification, before describing our use of the development tool we selected (Lego® Serious Play®) for a workshop to support the collaborative design of such a module. The recordings of that workshop were transcribed, and we undertook a detailed qualitative analysis of the proceedings using a framework analysis technique. Here, we summarise some key findings from that analysis, showing how a distillation of the ideas informed first, the student attributes we wanted learners to acquire, and subsequently, the learning outcomes of the module. And we argue that our method – as well as the outcomes it produced – offers an example of a design process for transdisciplinary pedagogy. Finally, we reflect on how the process has provided a framework for collaborative design that we have returned to for further projects, one that we believe could work for others embarking on collaborative curriculum design projects, especially those where fluency across disciplines is a driver.

Research has demonstrated that a key factor in student engagement is the promotion of awareness of institutional identity and a sense of belonging (Thomas, 2012). To this end, in 2014, Regent's University London decided to provide its students with a shared experience promoting cross-university collaboration and learning. The project was led by the Head of Academic and Educational Development and a fixed-term secondment (the authors). Given the highly international mix of the student body, we decided that one key focus would be an exploration of cultural diversity, to equip students with an awareness of intercultural issues and enable them to make the most of their time in higher education.

The other key driver of the project – enhancing students' ability to zoom out from disciplinary knowledge and make connections across disciplines (Chorh Chuan, 2017) – is part of a wider context to prepare students for what some term the "fourth industrial revolution" (Schwab, 2017). Universities need to address the increasing demand from employers for graduates' key personal skills, attributes and attitudes that are not always sufficiently integrated into disciplinary programs. Davies (2009) maintained that the boundaries graduates are expected to cross *outside* higher education should encourage curriculum planners to consider how learners are socialised about boundary crossing while *in* school. To deliver this aim of making connections across subjects we needed a curriculum design process that minimised the effects of disciplinary and departmental

silos. As writing on common curriculum initiatives tends to focus on examples from within specific disciplines (Blair, 2012), desk research was undertaken to determine whether there were existing initiatives in interdisciplinary common curricula.

Precedents in common curricula

Liberal arts courses encourage students to think across disciplines, engaging with a broader knowledge of the world. Although such an education also offers the opportunity to study specific areas of interest, it often includes modules to develop skills to integrate disciplines and solve problems using different approaches. This model aligned with the educational ambition of encouraging students to work alongside learners from different disciplines, with an emphasis on the thinking process rather than knowledge acquisition. What was less relevant for us was the breadth of subject-specific modules covered in a liberal arts course that might last up to four years, understood as an "organic holistic project" (Scott, 2002, p. 73). A different model is described by Adams (2011), a course for all first-year students at Fairleigh Dickinson University, USA, which brought together academics and professionals from around the world to explore international issues via online discussions. While the ambitions of that course resonated, our brief required a model for on-campus learning. The example of the London School of Economics (LSE) offers further insight into how an institution-wide module might work across different programs. Their compulsory undergraduate module is designed to broaden students' engagement with social scientific analysis and generate a collective understanding of institutional purpose. The module draws students from different disciplines such as economics, international relations, history, sociology, and anthropology (London School of Economics and Political Science, n.d.). While the LSE module offers a clear structure for supporting institutional and cultural change, it remains a module designed principally to induct students into interdisciplinary thinking within social sciences. Thus, with no suitable precedent to emulate or adapt, and no disciplinary canon to start from, we turned to broad models of the curriculum to help us identify the domains of what would become the learning outcomes for the module.

Conceptualising the curriculum

Curriculum scholars propose various taxonomies of approaches to the curriculum. Kelly (2009) is close to the consensus view in identifying three: curriculum as content and education as transmission; curriculum as product and education as instrumental; and curriculum as process and education as development. The content model of the curriculum did not suit our proposed module due to the aspiration of student learning outside of any subject-based canon. The concept of the curriculum as a product provoked more debate. Although many curriculum theorists are critical of a social utilitarian perspective on curriculum (Apple, 2009; Kelly, 2009), the "knowledge specification" that society contracts with higher education, with its industry-inspired expectations of inputs and outputs, cannot be ignored (Light et al., 2009, p. 1). Responding to this imperative, we considered whether the module could have a focus on skills. Due to the breadth of disciplines, however, we were not able to identify a common set of skills that would work across all subjects, preferring to leave these to other parts of the programs. Realising that a focus on our subject specialisms would limit our thinking, we needed to move more towards an integrating view of discipline thinking. Stember (1991) has articulated a spectrum of disciplinary integration which ranges from intradisciplinary (remaining within the discipline) at one end, to transdisciplinarity (beyond disciplinary perspectives) at the other. Three decades on from Stember's work, there is still much debate on what transdisciplinary pedagogy might be (Hugill and Smith, 2013; Fam et al., 2018). Our objective was to achieve *at least* a level of integrated thinking closer to interdisciplinary

approaches. But we now believe the outputs of our project come closer to achieving a fully transdisciplinary pedagogy in both its design process and in the realisation of the actual module as well as the student projects that emerge from it. Having excluded both content and subject-based competencies, our focus turned to the development of attributes.

To view curriculum as process and education as development is to espouse Dewey's view expressed in his 1897 pedagogic creed that "the process and the goal of education are one and the same thing" (pp. 77-80). A focus on principle and process leads to aims being defined not as quantities of knowledge (content model) or behavioural performance (instrumentalist model), but as intellectual development and cognitive functioning (Kelly, 2009). This informed our brief to encourage students to develop as cognitively and affectively-able humans, lifelong learners, reflective practitioners, and ethically-aware global citizens.

Forming the transdisciplinary design team

Having determined a focus for the new module on education as development, we needed a team to deliver it and a process for its design. Rather than forming a group of key subject leaders or specialists reflecting the diverse disciplines of the University, we put out an open call for volunteers. The resulting group of fourteen included one student and thirteen staff members. The academics came from the fields of international relations, philosophy, business ethics, leadership and management, design management, acting, intercultural studies, architectural history, and education. They were joined by professional services staff in the areas of project management, student administration, learning resources and learning technology. We believe forming the group in this way was key to the eventual outcomes. While the academics and professional staff had all been recruited to the University mainly based on their subject expertise, they were recruited to the working group based on a perceived shared interest in a specific educational proposition. McGregor (2017, p. 8) describes transdisciplinary learners as a "community of learners working for a common cause" who blur disciplinary boundaries and value each other's knowledge and perspectives. In combination with the thinking tool, we describe in the next section, this shared purpose created the conditions in which contributions to the design process from individuals often went beyond their discipline-based expertise.

Fanghanel (2007, p. 198) describes the positioning of academics towards institutional policy as being mediated through four filters: an experiential filter based on professional background; an epistemic filter based on how knowledge is framed and often highly influenced by the subject discipline; an ideological filter based on views about society and the role of education; and a pragmatic filter framed by individual and collective contexts in the higher education sector. Many curriculum design processes prioritise contributions based on epistemic or experiential positioning, placing a high value on subject knowledge and reputation in the field. Pragmatic positions also inform design, but ideological ones tend to be less overtly incorporated. In our case, because the group was formed through expressions of interest in an educational proposition with no dominant discipline base, ideological positioning exerted a much stronger influence, leading to a values-based curriculum, as we demonstrate in the later analysis section. The group met over a period of several months, and for the most part engaged in the more conventional type of minuted verbal exchanges, typical of curriculum design projects. But the part of the process we want to share as the most innovative, and the most generative of new and transdisciplinary thinking, is the use of the Lego® Serious Play® method (LSP). There exists now a wealth of creative thinking tools, such as initiatives across the Design Factory Global Network of innovation hubs, initiatives that derive in some way

from a design thinking approach. For the specific type of modelling we were seeking, the incorporation of serious play was what attracted us to LSP in particular.

Lego® Serious Play® workshop

LSP is a facilitated thinking, communication, problem-solving and design technique that can be used by individuals and teams. It draws on Piaget's (1936) theory of constructivism to explain how we build structures of knowledge through our own experience. Seymour Papert, a colleague of Piaget's, sought to widen the theory of constructivism and create a learning environment that was more conducive to his theory. He called this "constructionism" and argued if we hold knowledge as structures based on our interaction with the world, then we can create knowledge faster and better when we are engaged in constructing a product or something external to ourselves whether it be a sandcastle, machine, computer, or book (Papert & Harel, 1991; Kristiansen & Rasmussen, 2014). Such activity involves "thinking with the hands", mobilising senses as opposed to speaking which almost always dominates academic meetings. This echoes Nigel Cross's proposition that design solutions emerge from the hands as much as from the minds (1982). Seen by itself, this process is a novelty, and fosters what Brown (2009, p. 18) in his explanation of hallmarks of play calls "improvisational potential", being open to serendipity as "we stumble on new behaviours, thoughts, strategies". In our experience, part of the creative unlocking that emerges from the use of a serious play technique is giving permission to participants to contribute outside the authority that comes from their subject expertise.

LSP facilitates such permission in its inclusive, participatory potential for challenging the group's assumptions and revealing new thinking for the project. Kristiansen and Rasmussen (2014) argue that in most idea-generating meetings, 20 percent of people in the room often talk 80 percent of the time. When academics are accustomed to working in hierarchical systems, it can be challenging to adapt to more distributed leadership models for sharing ideas. The method offers the opportunity for all members to actively participate, its systematic structure replacing the usual hierarchies based on position within the organisational structure. We have explored the shared leadership experience of this project within a volume about delivering educational change (Allinson & Mahon, 2020).

The LSP workshop enabled participants to develop their initial thinking individually and in silence, without the need to verbalise or defend their thinking. Importantly for our project, it created a space where staff accustomed to positioning themselves as disciplinary experts could work in a more interdisciplinary way and construct new knowledge about our aspirations for students. For the group to model the zooming out from individual disciplines that we were seeking for the students, we required a method not constrained by the usual conventions of disciplinary thinking. LSP allowed participants to voluntarily "bracket" – as Husserl (1982) calls it – their subject expertise, to effectively set aside what they thought they knew and focus on the task with fresh thinking. We believe this bracketing creates an important condition for transdisciplinary learning, defined by Nicolescu (1997, p. 3) as "that which is at once *between* the disciplines, *across* different disciplines, and *beyond* all discipline". And in the preface to his edited collection, *Transdisciplinary Higher Education*, Gibbs (2017, p. v) asks why we need to be transdisciplinary. For him, being transdisciplinary requires "a disjunction from the disciplinary, for multi or interdisciplinary, approaches", a reclaiming of essential Being "stripped of limits set by professions, disciplines". We contend that LSP facilitated such a disjunction from disciplines, both by allowing the bracketing of subject knowledge and by dissolving some of their associated hierarchies.

One of the authors who is trained in LSP facilitation led a two-hour workshop for the working group. A short icebreaker engaged with the more ludic aspects of using Lego to show participants that a playful attitude is intrinsic to the creativity of the method. Each participant then worked individually and in silence to build a model of a student with the attributes and attitudes we were seeking following successful engagement with the proposed module. Then each participant explained their model to the group, with others asking questions better to understand their thinking, and to enable the construction of a shared model, comprising all the metaphors and associated student qualities, either by physically connecting all the components or, more usually, by a partial dismantling and reassembling. This stage was key to dissolving disciplinary boundaries, requiring mutual understanding, and negotiating consensus. And its stages closely resemble Müller et al.'s (2005) approach to transdisciplinary learning. Their model consists of creative, descriptive, and normative steps. First, each participant contributes their own purpose, concepts, knowledge, and interpretations of the world. Second, informed by their internal perspectives, each participant poses actions, which have a series of expected and unexpected effects. Third, these actions and consequences are observed and described by each participant, leading to a convergence of viewpoints, and inspiring the creation of new knowledge, ideas, and concepts. In our use of LSP, the normative step was then followed by a further, interpretative one.

From transcript analysis to learning outcomes

We filmed the session for the purpose of transcribing the discussion, including individual descriptions of models, questions, and negotiations around the construction of shared models. One of the authors (KM), undertook a detailed analysis of the 8,000-word transcript using an adapted version of framework analysis (Ritchie & Spencer, 1994). Embarking on the familiarisation stage of analysis, we noticed both the richness of ideas generated, and the sometimes evocative use of language. Quickly, we realised that the ideas generated by the participants could be grouped into three broad thematic areas. These were framing personal and cultural values, intercultural awareness, and self-directed and co-creation of knowledge. And although we did not start from a basis of a-priori coding, we were able easily to map these themes onto the University's institutional values. These were equality, mutual respect, honesty and inclusion, internationalism, diversity, public benefit, citizenship, sustainability, employability, and entrepreneurship, maximising the individual's potential. Given our aim of promoting a sense of belonging among students, this alignment of themes to institutional values was important. In the following three sections we map and interpret the themes arising from the transcript in more detail before offering a final evaluation and reflection.

Framing personal and cultural values

Values in this context were understood by the group as guiding principles, broad, abstract motivations that influence attitudes and shape how we act in the world. This aligns with McGregor's call for higher education to inculcate a "more sophisticated value system" (2017, p. 5). Rather than being a transmission of the University's values, top-down, one participant noted that our common values should also be inclusive of those that learners bring. Research on values has shown they are often interconnected across a range of major issues, including race, human rights, community welfare and sustainability. They can correspond to the well-being of others as opposed to self-enhancement or openness to change as opposed to conservative beliefs of order or resistance to change (Holmes et al., 2011). During the workshop, discussions moved across these dimensions, with participants expressing their own positions through the model-making process and negotiating with others. Intrinsic values, for instance, were addressed at certain points through sustainability

both in terms of environmental awareness and ethical purpose. A professional services staff member from learning resources thought it was important that: "The student who will have finished the module will have a good grounding of sustainability, including gender, ethnicity, the planet"; whilst an expert in architectural history suggested that: "Industry practice and employability is really important but it's also important […] to see it in a broader ethical framework of the world we live in." In subsequent working group meetings, unpacking institutional values not only became a way of framing possible module content but also a process of reconsidering relationships between learners and the wider University community. Regarding learning activities, this prompted the group to develop various possibilities. These included how ethical dilemmas might be explored through role-playing scenarios, debates, and discussion around freedom of speech; and student-led presentations and performances on the responsibilities of citizenship.

Intercultural awareness and relevance in the world

Considering the international diversity of the University's community it was unsurprising that issues around culture and identity were soon raised in discussions prompted by LSP. This focus is built upon how values might be further framed by intercultural education, a field of increasing relevance as the world becomes ever more globalised, responding to economic, technological, demographic and peace imperatives (Perry & Southwell, 2011). Such connectivity corresponds to the idea that transdisciplinary learning not only promotes interactions between disciplines but also with the larger society, beyond the university (McGregor, 2017, p. 3). Participants mentioned the need to collaborate across disciplines and the limitations of thinking in silos. Another participant described his model which included towers representing different disciplinary schools with bridges connecting them. Dialogue in the workshop ranged from how to foster student understandings of self-identity to promoting engagement with others. For some participants, such as this lecturer in international relations the foundation or physical base of each model was a way to express this, "a solid base which a common module ought to give […] whether it's a sense of belonging or security in your learning at a particular place, something like that".

Another participant, an academic in world theatres, linked the idea of the base to personal development: "So it's about the idea of education going into a person rather than a curriculum or program. But at the very end, it's about knowing your foothold and what you stand on and where you're from." This is close to what Brufee (as cited in McGregor, 2017, p. 5) refers to as "foundational knowledge" as something students never entirely outgrow, but also, as Nicolescu points out, is always in formation, what he calls "in vivo knowledge" (as cited in McGregor, 2017, p. 6). Both foundational knowledge and in-vivo knowledge are characteristics of transdisciplinarity. But the academic teaching international relations academic also referred to more relational aspects of learning, arguing that "It is between all the different things you can learn but also with the outside world as the person grows […] so it's both within the self and the outside world. This represents some continuity that we never stop learning in a way."

Another participant, from the leadership field, extended this idea to the context of the family: "I also wanted to make a connection to both what they bring back to the home to the family and what comes from the home and what influences who they are." Building on the concept of self-awareness, participants commented on the importance of spaces and voids in the models to allow for new understandings of difference to take hold and be accepted. There was early consensus about wanting students to be able to adapt to a changing world with increasing diversity. Our student participant described this: "I'm having a little hole here to represent openness, and the see-through stuff is awareness, letting things come in, but the hole is leaving space and opportunity for when people

come in, they can accept people and ideas". Branching out from the individual, physical connectors appeared in the forms of ladders, platforms, and plants. Several members identified the need for students to push past the unknown, whether that was at a cultural, personal, or disciplinary level:

> *All these little things sticking out … are connections that students begin to develop within the diversity of themselves and the student body. The diversity of all the different things they can learn because if we have all the different schools, there's going to be languages, arts, social sciences, psychology, ethics*. (Tutor in liberal arts)

The permission to play afforded by the LSP method sometimes led to digressions or even flippant contributions with the potential to undermine the credibility of the process. But – as this exchange shows – even those moments produced ideas worthy of analysis:

- *Philosopher*: It's symmetrical. I've got two people upfront. It could be regarded as a crucifix or a cross but what would that say about your assumptions? It could be a variety of other things. The colours are chosen to be West German colours and Belgium. Clearly, it's both a man and a woman here.
- *Design Management specialist*: How do you know that?
- *Leadership expert*: Because she's bowing!
- *Design Management specialist*: Oh of course I missed that [laughter]
- *Philosopher*: I say "she" but that might be an assumption too. She appears to be wearing make-up.
- *Architectural Historian*: I liked what you said about assumptions. Can the module help students to think twice before making such assumptions?
- *Design Management specialist*: To take it further they're coming to a very western viewpoint and maybe you're challenging their assumption of what the west means.

This exchange, though peppered with ironic or even sarcastic comments, nonetheless reveals how the method enables the surfacing of intersectional identities around religion, nationality, gender, and culture. In later working group meetings, the group considered appropriate forms of pedagogy and content to address these issues, aware that intercultural interaction does not always result in intercultural learning. As tolerance and cultural relativism can be understood as fundamental principles of intercultural education, and to mitigate any assumptions about the relative cultural capital of the expert teachers, the team decided to adopt a more facilitative approach to the design and delivery of learning activities. Facilitation aligns well with a constructivist, developmental model of the curriculum providing students with opportunities to build on what they know, as opposed to a transmission-based, teacher-centred approach.

Self-directed learning and co-creation of knowledge

As constructivism shifts the focus from knowledge as a product to knowing as a process, learning becomes something that is socially situated, building our understanding in relation to those we learn and live with. Self-directed learning can be understood as individuals taking the lead in "diagnosing their learning needs, formulating learning goals, identifying human and material resources for

learning, choosing and implementing appropriate strategies and evaluating learning outcomes" (Knowles, 1975, p. 18). Dewey believed such participation and self-direction by students were critical for active learning that could lead to problem-solving education (Ultanir, 2012). But this learning is as much collective as it is individual. As McGregor (2017, p. 3) argues: "Transdisciplinary pedagogy helps students to co-create, co-disseminate and co-use transdisciplinary knowledge, which emerges from the iterative interactions between disciplines and the rest of the world".

This educational philosophy was observed in certain features of the models, with participants wanting students to be "more curious about themselves, about each other and what they want to do and help support it and discover it" (tutor in business and management). A design management lecturer spoke about how the module might become a scaffold for students to "climb things and find out what's there" with the ability to "spring off" and connect to new ideas. Interest in developing appreciation around learning for learning's sake was expressed in one model by a figure climbing halfway up the frame, with members commenting on the importance of the module as "process rather than destination". One participant used her model to describe how important it is that learners' perspectives change. Stahl et al. (2011, p. 497) argue that iterative learning happens when the activity allows learners to change their perspectives, knowledge, or values through appreciating other people's different positions. The circularity and interrelational nature of this process for students might also be understood not simply as linear and iterative but as what Morin, in his study of complexity, describes as recursive thinking, a dynamic and generative feedback loop (1982). An appropriate focus on learning as a process and collective learning would equip the student with the critical tools to continue their learning journey in the wider world, including dealing with the unexpected so they can, as one Management participant put it, "continuously build, move and climb". To enable students to capture and reflect on their learning journeys we introduced reflective journals as part of the formative and summative assessment in the module. This was in part to address what Derry and Fischer (2005) propose as an essential "mindset" for transdisciplinary education: an ability for learners to monitor their own thinking.

The analysis of the qualitative data from the transcript analysed in the above three sections describing those three broad thematic areas allowed the working group to distil the themes, attributes, and attitudes into what became the module's three learning outcomes:

- Demonstrate increased self-awareness of their values and actions and consider their impact on others and the environment.
- Engage openly and respectfully with diverse perspectives and show an awareness of culture and identity.
- Reflect on current learning and appraise the resources available to them to inform future individual development needs.

The determination of these three learning outcomes, all in the affective domain and transferable skills category, gave us a solid basis to complete the formal design of the module, which – in keeping with the focus on our international and diverse disciplinary community – was given the title Global Perspectives. In deciding this module name, we wanted to capture both senses of the adjective "global"–international but also holistic and well-rounded.

The validated module incorporated a flexible framework for learning activities, enabling an agile and co-created response to both student interests, and current events. The whole cohort came together once every two weeks for a lead event, identified as a high-impact activity, often involving

external guests in interactive formats such as live polling, round tables, simulations, and forum theatre. These were followed by small, mixed discipline facilitated group discussions involving up to 15 students. These sessions typically involved experiential learning activities, such as debates, familiarisation and preparation for simulations, and collaborative mind mapping activities, including the use of LSP. The themes and learning activities evolved from being facilitator-led at the start to being more student-led as the module progressed. An example of a staff-designed topic used early in the module centred on the Black Lives Matter (BLM) movement. Students watched a TV performance by UK dance troupe Diversity and were asked how it dramatizes racial issues, and why they thought it generated over 20,000 viewer complaints. Then they read an article about BLM about prominent racing driver Lewis Hamilton and considered whether celebrities should use their platforms to voice political views. Subsequent group discussions combined perspectives from disciplines including politics, media, performance, law, and business. Later sessions gave students more agency to determine their outputs for themselves. The lead event introducing the topic of the climate emergency, linked to the COP26 conference, was co-led by a governmental adviser on climate issues, a circular economy trainer and one student with a particular interest in the subject. In the small-group session, students worked in teams to devise practical initiatives. This included one group that proposed a Meatless Mondays campaign for the University, arguing not just for its environmental contribution, but also for its physical and mental health benefits. Those students also wrote about their projects in their formative and summative reflective learning journals.

In the weeks alternating with the lead events, the facilitators met as a whole team to review progress, and co-design future activities. Students responded to these themes and activities in weekly learning journals and received feedback on their entries to be revised into final, summative assessment submissions. The small groups provided supporting workshops in reflective thinking and writing skills. The new module, common to all 12 undergraduate programs offered at the University, is still running six years later with cohorts of up to 400 students at a time. The Quality Assurance Agency, in its *Higher Education Review* of the University, highlighted the module as an aspect of good practice in curriculum design, enabling student development and achievement, "encouraging reflection on individual development needs and engagement with diverse perspectives" (2016, p. 18). Module evaluations show a constant increase in overall student satisfaction from 4.2/6.0 in the first cohort, to 5.4/6.0 in the most recent, where 6.0 is the maximum possible. Student representatives on the University's Senate have proposed that Global Perspectives be followed up by a subsequent common module.

Evaluation, reflection, and future application

In our evaluation of the curriculum development process, we adopted as a whole, and of the qualitative analysis findings, we observed two positive features that we think can contribute to transdisciplinary curriculum design practice. With respect to our aim to break from disciplinary silos, we noticed in the analysis of the transcripts, that participants contributed some attributes that could be constructed as relating to their subject specialisms, but others that clearly lay outside disciplinary thinking. For instance, a specialist in design management advocated a focus on environmental sustainability; and an expert in leadership and management promoted community relations and public benefit. Both these attributes were subsequently reflected in agreed learning outcomes which integrated "the perspectives of multiple disciplines in order to connect new knowledge and deeper understanding to real-life experiences" (Greenwich Public Schools, cited in MacGregor, 2017, p. 7). This suggests our method of design gave permission to participants not to revert to the authority of their specialisations or any disciplinary canon.

Another strength we discovered in following the iterative process we have described was similar to what Smith et al. (2009, p. 3) call the "double hermeneutic" in qualitative analysis, in which participants offer an individual interpretation which is then further interpreted by the researchers. In our process, participants explained their individual models to the group and then engaged in a collective interpretation as they built their shared models. Then, in the framework analysis stage, we added our own level of interpretation, which was then integrated by the whole group into the agreed learning outcomes. In contrast to more usual processes of curriculum design, where contributors often remain in their silos, this method supported integration as well as circular, generative thinking in a way that was recursive and more genuinely transdisciplinary (Morin, 1982). Of course, we need to consider what Drake (2010) refers to as the situated role of the researcher/author, and what McNiff – writing about action research – refers to as "an enquiry by the self into the self, with others acting as co-researchers and critical learning partners" (2013, p. 23). Our research took place in an institution and on a small scale. We acknowledge that our closeness has the potential to compromise our ability to engage critically with the data (Drake, 2010). We were involved in the context (rather than detached observers) and interested in improving a practical situation: how to design collaboratively in multidisciplinary teams. The experience became part of an emergent, iterative process, whereby the design method used in this project was evaluated and deployed again in subsequent projects. Our process integrated different ways of knowing, both individually and collectively (Reason & Bradbury, 2006). Reflecting now on the ethos of the project, we see that our approach has been informed by some of the values of action research, as described by McNiff:

> *Action researchers believe that all people are equal and should enjoy the same rights and entitlements. They are able to exercise their capacity for creativity of mind to create their own identities and allow other people to create theirs. They try to find ways of accommodating different values and perspectives, which can be difficult when values differ. They try to find ways of living together in spite of possible differences and see things from the other's perspective; this involves recognising and suspending their own preconceptions* (2013, p. 27-28).

This position statement not only captures our aims with the design process but informs what we hoped for in the student experience of the module.

The design process we have described comprised four principal stages. These were the formation of a multidisciplinary design team, the use of a design thinking tool (LSP), and a framework analysis of the resulting transcript, which then provided the attributes to inform the module learning outcomes. This is illustrated in Figure 1.

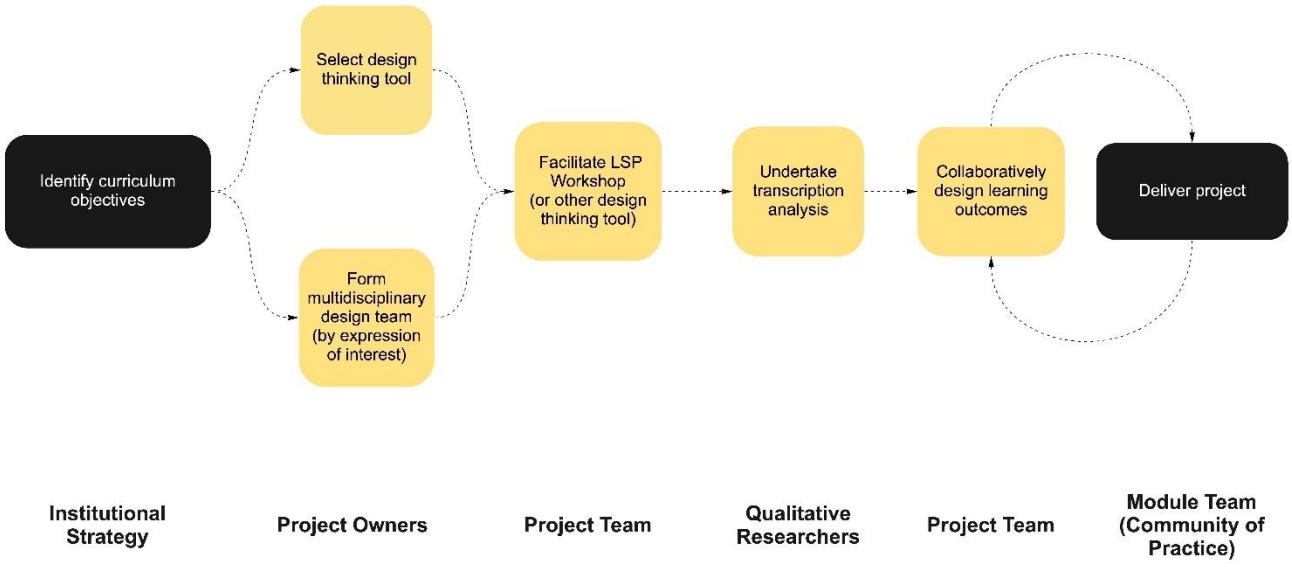

Figure 1:
Collaborative transdisciplinary design process

Each stage was integrated through the work and consensus of a project group that successfully oversaw the new module's validation and delivery. The project enabled students, academics, and professional services staff to work creatively and collaboratively, bracketing their different disciplines, roles, and levels of seniority. On reflection, this development process required the working group to model a similar journey, outside our habitual practices, to the one we subsequently advocated for our students in the module. It is a development process grounded in the ethos of transdisciplinary pedagogy, helping students to collaboratively produce transdisciplinary knowledge (McGregor, 2017). This shift toward a more co-created model of the curriculum was evidenced once the module was running by students increasingly taking on responsibility for the design of the module content. For example, students on the module now reach a consensus about the real-world challenge or wicked problem (Interaction Design Foundation, 2020) they want to focus on for their final whole cohort, collective project. These have sometimes been university, campus-based projects such as replacing the sale of bottled water with fountains for refilling or organising a card games club as a means for students to come together without screen devices. Other projects have an external focus such as supporting the education of girls in developing countries or, in one case, building schools, where one student created a charity in her home country to further this initiative. Where multiple proposals are put forward a decision on which ones to support has been typically made by a panel of external experts often including alumni. The impact of the module on student thinking and working is most powerfully evidenced in comparing their initial ideas for projects in the third week with the ones finally agreed upon by the whole group at the end of the term. While early ideas tend to be either based on personal interests (sports, leisure) or discipline-specific projects (branding, fashion), the collaborative ones proposed as final projects tend to be

much more transdisciplinary. Students from different degree programs bring their knowledge and skills together to respond to whatever the challenge is.

Another impact of the project has been the development of the role of academics as teachers. Our experiment in curriculum design which deconstructs the concept of the teacher as a subject expert in favour of the teacher as a facilitator can provide a model for a greater focus on what is often called transferable skills. This responds to the need for students to accept adaptability as a given in the future world of life and work as desired by many graduate employers. Academics in the working group, as well as those who later taught on the module, did initially experience some disorientation from the voluntary relinquishing of their usual recourse to subject expertise. However, this was mitigated through facilitation development training, and the legacy of a collaborative and reflective approach to the module's design and delivery constitutes a positive shift in transdisciplinary working for the University. The creative and egalitarian ethos of the initial design clearly translated into the teaching group behaviour. While the new module was assigned a leader, that role is one of coordination and facilitation rather than of ownership of content or delivery methods. The team – with a varying membership of over 40 teaching members over five years – has become a community of practice. Moreover, the facilitative approach to student learning has spread beyond the module, with an increasing focus on both instrumental and process-orientated learning activities and a concomitant reduction in the role of transmission-based learning. This is in keeping with the aims of the University's institutional learning and teaching strategy. Indeed, the developmental process we have described here, including the use of LSP workshops, has more recently been utilised for the design of a new set of pedagogic principles for the University. The collaborative working of the module team has influenced subsequent curriculum initiatives, with a far greater emphasis on co-created learning outcomes and delivery teams.

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