

Teaching Design Thinking in a research-intensive university at a time of rapid change

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Abstract

In this paper we present a snapshot of the theories, intentions, practices and outcomes produced by a teaching and learning collaboration. This is located geographically and culturally at the University of Warwick, and temporally across the period 2020-2021 marked by the global pandemic. The case study illustrates how a designerly, flexible, open, collaborative approach to learning design allowed for effective adaptation to changing circumstances. This was more effective through being formulated as an ethical approach to Design Thinking, shared by teachers, students, the host department, and collaborators (including two VR companies, a physical theatre company, and a design researcher from South Africa). By developing a humanitarian, ethical, and philosophically grounded Design Thinking, and using it for founding principles, the teaching team were able to adapt and learn, making the most of what was possible. We explore this method in depth, focussing upon how a reflective appreciation of modes of knowledge, and the use of visualisations helps us to cope with the complexity of what we are doing together, before, during, and after the period of disruption.

Keywords

design thinking, design education, signature pedagogies, design ethics, philosophy of design

Introduction: our aims for this case study

In this case study we will explore how our approach to designing and implementing courses allows us to achieve the goals of our students, our discipline[s], and the communities with whom we work. This is a transformative pedagogy, engaging across a complex institution and beyond.

We teach and research an inclusive, participatory, developmental, responsive, creative and ethically-based Design Thinking (to be defined below). We also use this version of Design Thinking to design and implement our teaching.

Our suite of for-credit interdisciplinary modules is based at the University of Warwick, a research-intensive university in the English Midlands. In this context, our pedagogic practices are often radical and innovative. Amongst Warwick's highly academic traditional disciplines, they stand out as unusual. This does not result from a desire to be different. Our approach is the result of a systematic and creative student-centric design process, with the aim of creating a sustainable basis upon which we can grow Design and Innovation education across the whole institution.

This case study describes teaching and learning in this specific context, with some challenges that are more rooted in our institutional context, and others that are more generally applicable. Some of our solutions to these challenges will transfer easily to other contexts. By describing both our teaching practices and the challenges they address, it should aid the reader in reflecting on their own challenges and adopting/adapting similar solutions where appropriate.

We describe our approach, as it works in normal circumstances. We argue that it allows us to identify and respond quickly and effectively to the changing needs of our students. It allows us to make the most of the opportunities that we (teachers and students) find in the world (and students are continually encouraged to define their own design challenges). We are highly flexible and responsive (to an extent that is seen as risky in our institutional context), but use this flexibility to create sustainable, enduring, positive, transformations in people, communities and the institution. We then consider the challenges, and opportunities, created by the pandemic of 2020-21, and how our approach adapted to circumstances that could have been extremely disruptive.

The task of creating this account of our work is itself an important designerly-reflective aspect of our approach. We continually engage with communities of practice (including the Design Research Society's Design Education SIG), and acknowledge the great contribution made our many friends and collaborators.

Context

Founded in 1965, mainly on a single campus on the edge of Coventry, a post-industrial city in the English West Midlands. Warwick is a member of the Russell Group of research-intensive institutions, ranked between 8 and 10 in national tables, and 61 in the QS global table. However, Warwick does not have a design school, although aspects of design education and research exist in a fragmented pattern across some disciplines (business, engineering, theatre, education).

We recruit students from most disciplines. In 2020-21 this included: Economics; Liberal Arts; Sociology; Law; Theatre Studies; Physics; Global Sustainable Development; Computer Science; Mathematics; Applied Linguistics; Chemistry; Film and Television Studies; Physics; Life Sciences; Business; Philosophy; Engineering; Cultural Policy and Media Studies.

Our students tend to come from academic-oriented disciplines, often looking to add a practical element to their studies. They are academic high achievers, skilled at passing exams and other conventional forms of academic assessment. Their degree programmes are usually highly specialised, with teaching practices honed to fit with the needs and cultures of each academic discipline. We combine academic knowledge and practical skills, with the aim of growing a capability for developing solutions to social, economic, and environmental challenges.

Table 1. Our modules at the University of Warwick

Title	Level	Department	Number of students
Introduction to Design Thinking Theory and Practice	Undergraduate, 2 nd years to finalists.	Based in IATL, available to students from any department.	30
Design Thinking for Social Impact	Masters level.	Based in IATL, available to students from any department.	15
Design Thinking for Social Impact (intensive version)	Masters level.	Engineering, for the MSc Humanitarian Engineering.	15
Innovation 101	Undergraduate, 3 rd year and Masters level.	Chemistry	50
Designing Change (foundations) – starting in 2022.	Undergraduate 2 nd year.	Liberal Arts, available to students from any Arts Faculty department.	30
Designing Change (advanced) – starting in 2023.	Undergraduate finalists.	Liberal Arts, available to students from any Arts Faculty department.	30

We (the module convenors) are:

Dr Bo Kelestyn: from Ukraine, educated in England; PhD in Digital Innovation and Design Thinking; Innovation Consultant; Senior Fellow of the Higher Education Academy and Fellow of Enterprise Educators UK; Director of Student Experience and Progression for the Chemistry Department;

Dr Robert O’Toole: from Coventry, England (the city in which the University is based); Warwick philosophy graduate; software designer and developer; academic technologist; PhD in Design Thinking and Higher Education; National Teaching Fellow; Director of Student Experience and Progression for the Arts Faculty.

These biographical details are important. Neither of us has followed a straightforward academic pathway. We are deeply engaged in change projects across the whole University, covering topics including curriculum design and review, wellbeing, and interdisciplinarity. And we are interdisciplinary by default, joining-up the fragments of design education and research across the University, so as to develop capabilities to meet global challenges and emerging student interests.

What we are aiming to achieve within our teaching

The term “design thinking” has a long and diverse history of use across many fields. There are valid criticisms of some of its more recent incarnations (see especially: Tonkinwise, 2011; Kimbell, 2011; Iskander, 2018). O’Toole (2015, p.62) argues that the popularisation of Design Thinking marks an important “designerly turn” in many fields, and this is something to be welcomed, steered in the right direction, and built-upon.

Within our teaching, we introduce, compare and contrast many strands, including:

1. Research into how designers work (and associated research into creative practice). Richard Buchanan's "Wicked Problems in Design Thinking" (1992) is a good starting point for this, making the claim that designing deploys specially powerful capabilities. The works of Lawson (2007), Cross (2006, 2011) and Dorst (2015) are important here. A research-informed ability to design is an essential foundation for our students.
2. The three dimensions of design identified by Norman (2005) – behavioural, visceral, and emotional. The aesthetic aspect of Design Thinking is included, in response to the claim that Design Thinking has lost this important aspect (Tonkinwise, 2011).
3. Attempts to create new, systematic approaches to designing, including the design patterns approach proposed by Christopher Alexander (1978).
4. The IDEO brand of Design Thinking (Brown, 2009, as a set of tools, techniques, ideas, and attitudes that are packaged to be adopted by businesses and social enterprises. This includes an appreciation of multidisciplinary teams (Kelley, 2005), and IDEO's use of anthropology (Fulton Suri, 2005).
5. Critical responses to Design Thinking and innovation practices (Kimbell, 2011), including critical anthropologies of designing and innovation (Suchman, 2011), feminist critiques (Prochner and Marchand, 2018; Baker, 2018), and de-colonising design (Tunstall, 2013).

The precise nature and identity of Design Thinking is contested. We explicitly state that the Design Thinking we teach is our own synthesis, our view of what it should be. We take the best from all of these strands, practicing the kind of "generous thinking" that Kathleen Fitzpatrick (2019) argues is essential for the future of universities. There is a critical edge to this, in which we consider some forms of Design Thinking practice as problematic. But this is done positively and with care. Jonathan Chapman has characterised some of these practices as:

"...the fast-tracked mode of "design thinking" that has you attend workshops and play designer for the day, where well-meaning gangs of adults giddily exfoliate several bricks of sticky notes in the name of innovation." (Chapman, 2021: 17)

We are critical of this as a form of "innovation theatre", in which looking and feeling innovative is performed but not substantiated (Blank, 2019). Merely playing the game of innovation may reproduce power structures and inequalities (Iskander, 2018). That would undermine the ethical basis for our teaching and our view of Design Thinking.

The goal of Design Thinking (for us) is to take the methods and concepts used by professional designers, and bring them to communities, so as to enhance, accelerate and sustain the process of innovation (Brown, 2011) for the collective good. This may be characterised as a two way movement or exchange: taking designers out of their studios (their comfort zone) and into the world; bringing the public into the studio and the world of the designer. We add to this the emphasis on virtue-led designing, and practices that reveal, explore, and define the shared virtues towards which we design. In turn, this transforms how designers work and who they are. Design Thinking should grow an independent and locally appropriate design capability amongst the people with whom we work. We aim for our students to become "designerly change agents", going out into the world to develop these capabilities amongst communities.

In 2021 the postgraduate module included a session led by Keneilwe Munyai of the University of Cape Town. With rich examples from her own work with communities across Africa, Munyai explained the difference between designers “designing-for” communities, solving problems for them, and “designing-with” them, developing their own locally-appropriate design capabilities, challenges and solutions (see Munyai, 2019). This was well received by the students, who were deep into the transition from a fast problem-solving mindset (the mindset of already academically successful specialists) to the slower, more inclusive and collaborative, developmental approach required for designerly change agents. Through the Humanitarian Engineering MSc at Warwick, we have seen how this fits with a definition of “humanitarian” guiding a new approach to design and innovation:

“Humanitarian principles...include respect for culture and customs; build on local capacities, participation, do no harm, build resilience (or ‘build back better’), accountability and dignity.” (Newby, 2021)

This is a version of Design Thinking aligned with Natasha Iskander’s proposed anti-Design Thinking approach:

“Residents in the area continue to engage in the design process, not as providers of feedback to designers but as lay designers themselves. They help shape both the physical elements of the solution and the social and economic projects that they support.” (Iskander, 2018)

Our Design Thinking is thus an ethical and humanitarian Design Thinking, and our approach to teaching it strives to fit with that ethos. Next, we will consider our methods, how they are aligned to this ethos, and how they equipped us (and our students) well for adapting to the pandemic.

Methods

We use the same approaches for teaching, designing teaching, design practice, and research. The coherence and consistency of this is important. Key steps include:

1. make explicit the full range of our teaching goals, challenges, practices, and ideas, as a series of interconnected design choices, and the theories upon which we base our choices – this includes being clear about how we view our own roles and goals, and how it fits with the wider context and other actors in our network (especially students);
2. share this widely, as visualisations and narratives, with our extended network, including staff, students, and collaborators beyond the institution (academics, industry partners);
3. critically interrogate the assumptions and informational inputs that shape our choices within the teaching team and with members of our extended network;
4. creatively design and make changes, and review the impacts of those changes in relation to our goals and virtues, and those of our students, taking into account a broad range of qualitative and multisensory inputs;
5. refine and share this approach to learning design and implementation.

We are thus actively engaged in the three forms of design research defined by Christopher Frayling (following Herbert Read):

1. research for design – we are engaged in a continuous kind of action research to design learning better, experimenting with teaching methods, refining what we do based on the evidence we observe, and in building theory so as to guide future designing;
2. research into design – reflectively researching our own design methods, informed by work with colleagues, and scholarly work from the design research community;
3. research through design – learning about the world in which, and for which, we are designing, including the University, the communities it serves, and the “bigger picture” beyond that.

These are the same practices we want to see our students undertaking.

There is, however, a danger that we fail to separate out and focus sufficiently on each type of research. We find that our reflective processes do not neatly follow the pattern of reflection-in-action and later reflection-on-action described by Schön (1987), but are closer to the messier reality identified by Eraut (1995) in his critique of Schön. Our knowledge processes are a pragmatic synthesis of the forms of knowledge described by Peter Goodyear (2021), derived from Ancient Greek philosophy:

- *epistêmê* – abstract, conceptual, generalizations;
- *téchnê* – practical know-how;
- *phronesis* – wisdom underpinned by morality;
- *mêtis* – tactical, adaptive, context-sensitive.

This latter form of knowledge-practice, *mêtis*, has an important role in designing. In *Educating the Reflective Practitioner* (1987), Schön describes how the architect explores a design challenge and its context by making a series of moves, in a “conversation” with things, so as to tease out and follow lines of possibility. In “Wicked Problems in Design Thinking”, Richard Buchanan writes that:

“The inventiveness of the designer lies in a natural or cultivated and artful ability to return to those placements and apply them to a new situation, discovering aspects of the situation that affect the final design.” (Buchanan, 1992: p.13)

Buchanan argues that this hard-to-formulate way of acting-thinking gives designers the edge in addressing even the most difficult “wicked problems”. In our approach, we balance that with *phronesis*, guiding choices through reflection on ethical consequences, with input from *téchnê*, and forming and applying theories to assist us, that is to say, *epistêmê*.

This translates into a fluid, responsive, continually growing approach to teaching and learning in which we, and our students, are continually evolving, both as we learn and as the context in which we operate changes. The teaching team meets each week to choose activities and resources, although in many instances we change our plan during workshops, in response to the students. Each workshop begins with a “reflective jam” session, in which students ask questions, share examples, and reflect. This is essential for our methods. The jam changes the agenda, for immediate action, and for follow-up work. By embracing learning design as a fluid and under-determined process of emergence, we believe that we are being more honest about how learning and how designing actually works. As Goodyear, Carvalho and Yeoman state:

“Student activity at learn-time is also emergent, in that it is influenced but not determined by the epistemic, physical and social situation. Rather, the activity emerges from processes of co-configuration, in which students customise what has been designed and set in place for them: selecting from, adding to, re-interpreting and otherwise modifying what has been proposed.” (Goodyear et al., 2021, p.448)

In our teaching, the design-as-implemented and experienced is “co-configured”, while our design-as-intended only acts as a guide, not to be adhered to rigidly.

This even goes as far as a co-configured approach to assessment. The design challenges that we use as a focus for each module change, reflecting current events, the interests of our students, opportunities that arise, and what we learn through continual research process. In 2019-20 work aligned with projects and emerging technologies for immersive experiences. In 2020-21 the pandemic had a significant influence, raising fresh challenges and opportunities. 21-22 will see a focus on the environment and the concept of eco-parks. The module and what we learn from it will change. Our accumulating experience and wisdom will grow. Each year, this expands the range and finesses the precision of our repertoire of design options. This case study is a snapshot of this ongoing story.

This could be overwhelming in its complexity, for us and our students. We might easily fail to grasp, for example, how practical choices (*téchnê*) might conflict with our virtues (*phronesis*). To deal with this possibility, we have evolved an approach to designing and design research that gives us a simple, easy to work with, visualisation. This is especially essential when engaging in design dialogue with others in our network. Making things visual, shareable, and easily modified is a classic Design Thinking move. Doing this in a way that is open to our colleagues and students aligns with our open, collaborative, capability-growing ethos.

When designing (or interrogating our design decisions), we work on multiple levels, moving between observations, inferences, choices, and following through consequences at each of these levels:

- a well understood, usable, ethically-based, set of **virtues** defining good designing – if we see these virtues amongst our students, and in our own work, we are succeeding;
- we are developing a clear, actionable and achievable set of **goals** towards which our form of design education aims;
- to meet these goals, we select/create and adapt a set of teaching and learning **strategies** (equivalent to high-level design patterns);
- to implement those strategies we have a large repertoire of **activities**, some from the design and innovation canon, and some that we have ourselves invented;
- and to enable activities, we select tools, spaces, and features from the physical and digital **platforms** available to us – and with our links across the institution, are developing new facilities (including new physical spaces and technology services).

Note how the four forms of knowledge described by Goodyear work in this. *Téchnê* and *epistêmê* are there, as one would expect in a University. But we have ensured this is underpinned by virtue-led *phronesis*. And all the time this is done in a way that is adaptive to the emerging challenges and opportunities we find: *mètis*.

We visualise this in a framework relating the various levels, so that, for example, we can relate choices of technology to our goals and virtues.

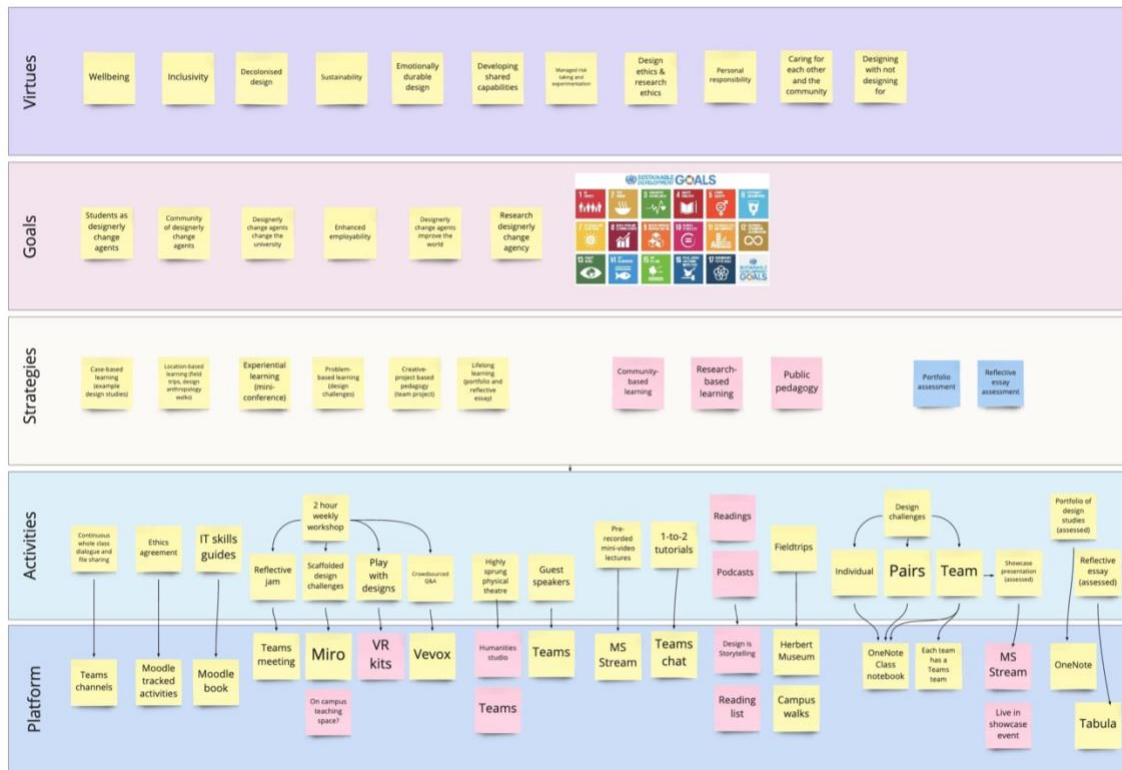


Figure 1: Design for Social Impact module, using the full-stack learning design method.

Pre-pandemic design and implementation

How then do we prompt, guide, support, and assess our students in becoming “designerly change agents”, adopting the approach to Design Thinking described above? At the strategy level (middle layer in Image 1), we use a broad range of pedagogic strategies.

Notable features include:

- A emphasis on lifelong-learning, with the students situating Design Thinking in relation to their previous experiences and their future ambitions (this is included in the reflective essay).
- The students complete a series of “design studies” in a portfolio, in response to “design challenges” – the challenges vary greatly, starting with describing a broad range of existing designs, through to proposing new designs for real people in real communities in the UK and abroad. This combines elements of problem-based and case-based learning, with creative projects and location-based learning.
- Our location-based learning includes “design anthropology walks” and a visit to a museum.
- Engaging with the public is an essential aspect of what we do – public pedagogy (where the students learn from engaging with the public) and community-based learning (students learn in communities) are unusual in our academic context, but essential for achieving our goals.

Note how our move towards location-based learning (taking the students out of the University) and public pedagogy (students learning from and with the public) mirrors the movements at the heart of Design Thinking: taking the designer out of the studio and bringing the public into design.

As described above, we fit a lot into our allotted 2 hours a week of face-to-face activities. In most weeks, these start with a “reflective jam” discussion. This breaks-up the conventional hierarchical structure of the university classroom, making learning more open, flexible, and permeable (thus more aligned with our version of Design Thinking). Pre-pandemic, this would occur with the students on chairs in a circle at one end of a long flat floor classroom. We then move to the other half of the room for mini-lectures (15 minutes maximum) and small-group activities. We enrich this with artefacts, encouraging students to bring in interesting objects, as well as using music, stories, and technologies (we have access to VR headsets and media production kit). We do find at first the students are not so keen to contribute. Sharing their design studies with each other in the reflective jam is encouraged, but is not the most popular activity. Students can also be slow to adopt team-working practices. To get over these blockages, we use two very successful activities:

- Highly Sprung Performance physical theatre session – 2 hours of experimenting with physical movement, risk, and reflection, led by facilitators Mark and Sarah Worth, who are experienced at designing performances with the public. Our students tell us that this is an important and transformative experience, setting up the rest of the module perfectly.
- Lo-fi social networking – we create a large wall display of our personal personas, revealing interesting facts and interests, and join them up with a mass of lines to show the density of our connections and similarities amongst the diversity. Students are encouraged to use this approach with the public.

To begin with we focus on building a capability for apprehending, describing, and analysing existing designs. Following the *Mechanisms and Conditions Framework* proposed by Jenny L. Davis (2020), we develop the students’ capabilities for understanding their designed worlds, often beginning with mundane everyday features (their own desk, familiar apps, cafes), and growing in complexity and controversy (thinking about the design of software platforms, technology systems such as VR, teaching and learning facilities and activities, and organisations). In other words, turning the ordinary into extraordinary. We want them to see design as both an everyday ubiquitous activity, and an ontologically foundational basis for the power of humanity. See the work of Anne-Marie Willis (2006) on “ontological designing” for a philosophical exploration of these two sides of design.

The aim is for the students to get good at unpicking “how things afford” between the complexities of artefacts and systems, and human intention and experience (as Davis says) – analysing the relationship and gaps between “design-as-implemented” and “design-as-experienced” (O’Toole, 2015), and then theorising and researching the “design-as-intended” – the reasoning, cultural assumptions, cognitive biases, power structures and economic interests that form designs. Davis writes that:

“Demarcating the conditions under which technical systems request, demand, encourage, discourage, refuse, and allow not only identifies the politics and values in technical systems but also lays the groundwork for intentional (re) design.” (Davis, 2020: p.20)

In the second half of the module, having built-up confidence, we want the students to see themselves as capable designerly change agents, and to be more ambitious in their aims. The design challenges grow in difficulty, scope and wickedness. They require analysis, synthesis, abductive and creative reasoning, combined flexibly and fluidly (Ball and Christensen, 2019, p.38-39). Special attention is paid to being aware of and avoiding becoming “fixated” on solutions too early, but at the same time not getting over-distracted by possibilities and details – an essential aspect of design capability (Crilly and Firth, 2019). We try to do less direct input, telling the students to treat us more like consultants and coaches than teachers. A different kind of relationship is needed to ease the students through the process of becoming designerly change agents with effective powers of independent judgement.

Four design challenges are set over the length of the module. Each challenge is deliberately broad and vague, requiring the students to develop their own more detailed and more personal brief by interacting with the subject of the challenge and *actually talking with real people* – perhaps quite a novel idea for our institution and therefore sometimes an intimidating experience for our students. The restrictions encountered in 2020-21 pushed this social aspect into the digital space (more on this below). This added an exciting new dimension, allowing us to think more clearly about the contrast between online and physical spaces and interaction. We did have to be mindful of the same ethical considerations of carrying out user insights gathering and often discussed this with the students.

The initial challenges are focussed on looking at aspects of the world and how it is designed now. We begin with the students simply looking at, thinking about, and interrogating, their own study practices. Initially they focus on their own desks and equipment. We encourage them to think about this in multiple ways: behavioural, visceral, emotional (Norman, 2005), social, natural, and philosophical – interrogating the values embedded in the design. Right from the outset, we introduce the role of storytelling. In the second challenge we usually focus on a social space and “design anthropology” (Gunn *et al.*, 2013). We usually practice this first, in small groups, walking around campus and the City of Coventry. In 2021 access to social spaces was limited. However, the act of remembering and reconstructing known social spaces imaginatively proved to be a good way to get the students to focus on mood, emotion and detail in relation to each other. Working within constraints reshaped the exercise. Storytelling is also essential to this. We use Ellen Lupton’s book *Design Is Storytelling* (2007), which has proved to be popular and effective.

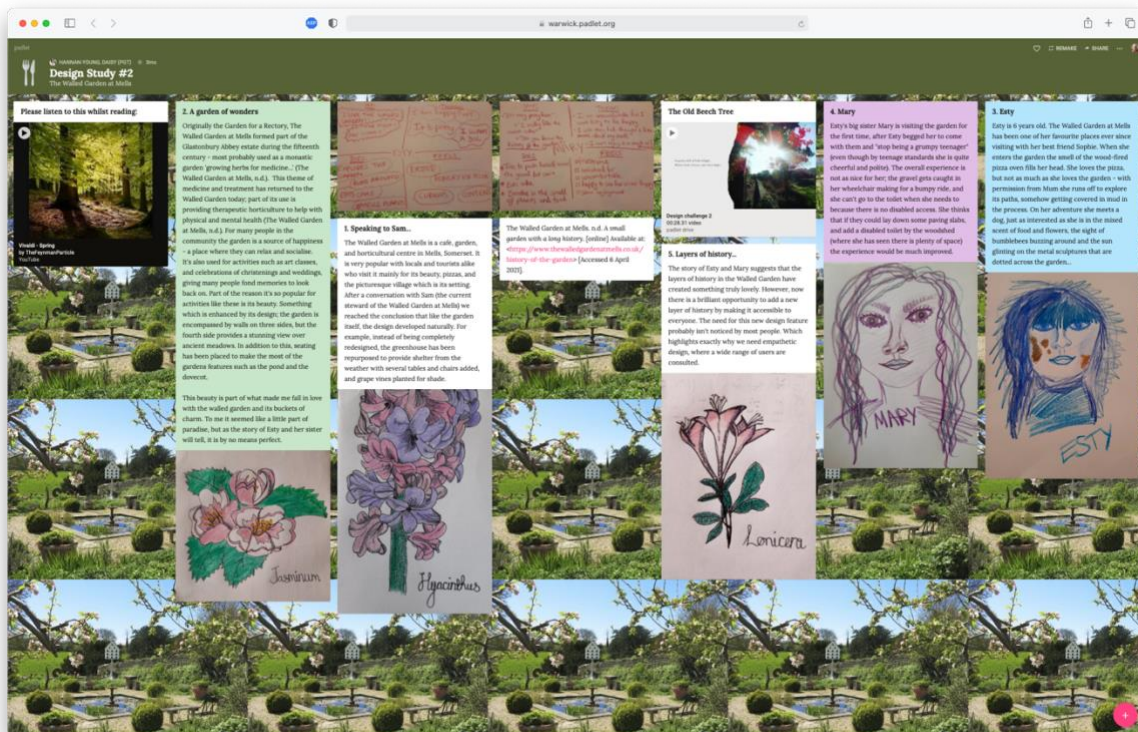


Figure 2. In this study of a café and garden, Centre for Cultural Policy and Media Studies postgraduate student Daisy Hannah-Young used Padlet to create a study with mood and detail inter-related nicely. Students are free to choose a medium that works for their study, and to reflect on their choices (in the reflective essay). This examples includes audio.

In the third challenge the students focussed on apps, now expanding their Design Thinking to consider the trade-off between making an app compelling and making it addictive, with reference to behavioural science (Kahneman, 2013; Thaler and Sunstein, 2008) and a critical perspective on the tech industry's "evil by design" (Nodder, 2013). Under normal circumstances, we then venture out into the wilds, with a study completed in pairs looking at a social space – cafés and museums are especially good for this. We introduce ideas and practices from design anthropology (Gunn, Otto and Smith, 2013). Field trips are used to take the students out of the classroom and for the teachers to model good practice in observing and interacting with people in social places. This has been the one part of our approach that we have not been able to replace with fully online alternatives, although some small experiments with virtual reality and 3D visualisation are showing potential.

Finally, the fourth challenge is a group project, with more of a creative aspect. Again, the brief for this is under-specified. For the undergraduates in 2021 we simply told them to create design ideas for future learning spaces in the University to enable more immersive learning, and to describe activities that could run in them. The under-specified nature of the challenge may be a little painful for the students to begin with, but we anticipate this and prepare them for these initial encounters with the threshold concepts they encounter. They are more used to being asked questions that have a definitive answer. However, we find that by this point in the module, they are used to working in this way, and easily accept the challenge.

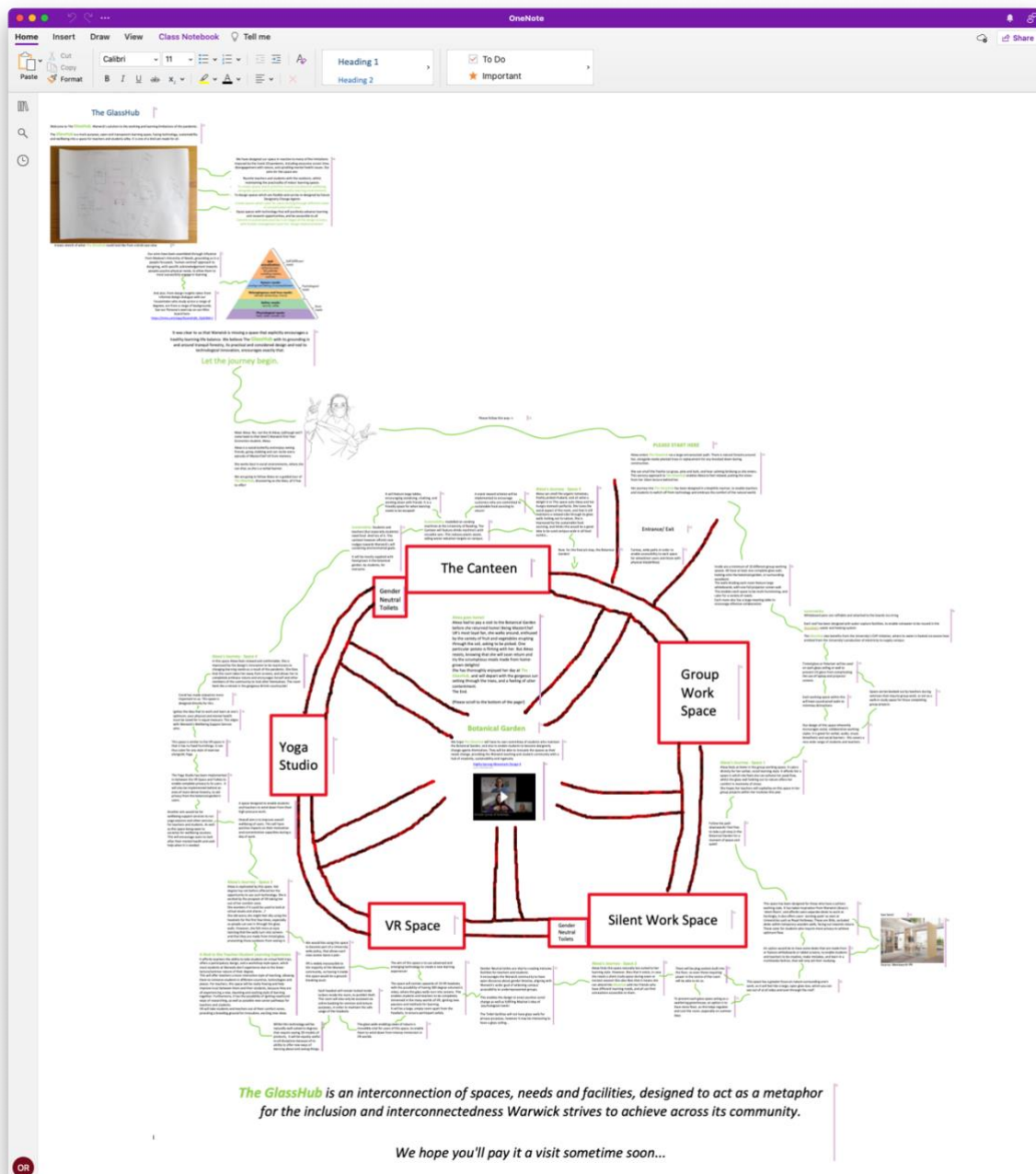


Figure 3. In this study, final year undergraduate student Lucy Chamberlain presents her group's response to the challenge of designing a future learning space for interdisciplinarity. Each student presents their own personal view of the group response. These individual presentations vary greatly.

We also run a mini-conference, open to the rest of the university and the public, incorporating sessions by Warwick alumni. In February 2020 (just in time to be face-to-face) this was led by VR experience and consultancy company Limina Immersive, with input from VR development company Metro Boulet Dodo. The conference focusses on practical, ethical and professional aspects, with the aim of connecting content from the module with real-world examples. Catherine Allen of Limina is a Warwick alumna. She is in many ways the personification of the designerly change agent, and in the conference tells stories and describes methods that

illustrate Design Thinking in action. To hear this from a Warwick graduate is especially powerful. The openness of the conference allows the students to practice their developing capabilities in public, with feedback from professionals.

To accompany the design studies, each student writes a reflective essay. This is the narrative glue through which they tell their own story of becoming a design thinker, including challenges, dissonances and in-completed threads. They are encouraged to be critical and creative in this. It does not have to be a perfect story – again countering the urge to be *the* experts. The highly personal nature of these essays is essential. In their feedback the students tell us that they value this highly – we show that they matter.

Emergency adaptations?

The pandemic of 2020, a global humanitarian disaster. could have been a disaster for our teaching. We averted that possibility by already having a robust, flexible, responsive design approach, tools, materials and ethos in place (as described above).

By the start of that year we had already adopted a blend of online and on-campus locations for teaching. The forced move online was not a major problem. The team-working platform Microsoft Teams was already an essential tool for us in creating our learning/designing community, and sustaining a continual sense of connectivity with our students. We use all aspects of Teams, especially team channels for group work, document sharing and collaboration, project management, one-to-one chat (for scheduled and impromptu tutorials), and synchronous meetings (including breakout activities). For us, organising our workshops to run online was straightforward. But would we be able to cope with the lack of physical proximity?

Perhaps one of the biggest impacts of the pandemic in 2020 has been in making us be more detailed and analytical when documenting our designs for learning – we cannot rely so easily on the immediacy and flexibility enabled by physical co-presence. With this, comes an greater need for empathy – already essential to Design Thinking. Preparation is more important than ever – not to set teaching in concrete, as that would be contrary to our flexible and responsive approach, but rather to put ourselves in a position to respond more surely and flexibly as needs emerge. The constraints imposed by the digital space on interpersonal communications (O’Toole, 2020) mean that we need to be clearer, signpost what we are doing, especially the different modes of thought and action we choose to engage in. These challenges and adaptations are especially significant in relation to the aspects of our collaborations that Goodyear calls *mètis* – the kind of tricky, explorative, tentative, edging our way through problems and improvising that is essential to our classroom practice. Team teaching that is responsive and flexible depends on this. Could we adapt to the limitations of the online environment?

The answer is: we are getting there. We have had a year and a half of intensive experimentation and learning. We have increased the boldness of our verbal and non-verbal expressions when teaching online, and seen this also happening amongst our students (some more than others). The various platform features have been exploited more effectively (emojis, chat etc.). But perhaps most significantly, we have moved away from just speaking to each other’s video streams, to more time collaborating on rich media documents. The Miro

collaborative whiteboard system has made a big contribution. Using Miro we can set up virtual whiteboards with a series of frames containing resources and exercises, and work through them in a structured *and* adaptive way, giving the students coordinated agency and a rich canvas upon which to develop their ideas (see the video demonstration by O’Toole, 2021).

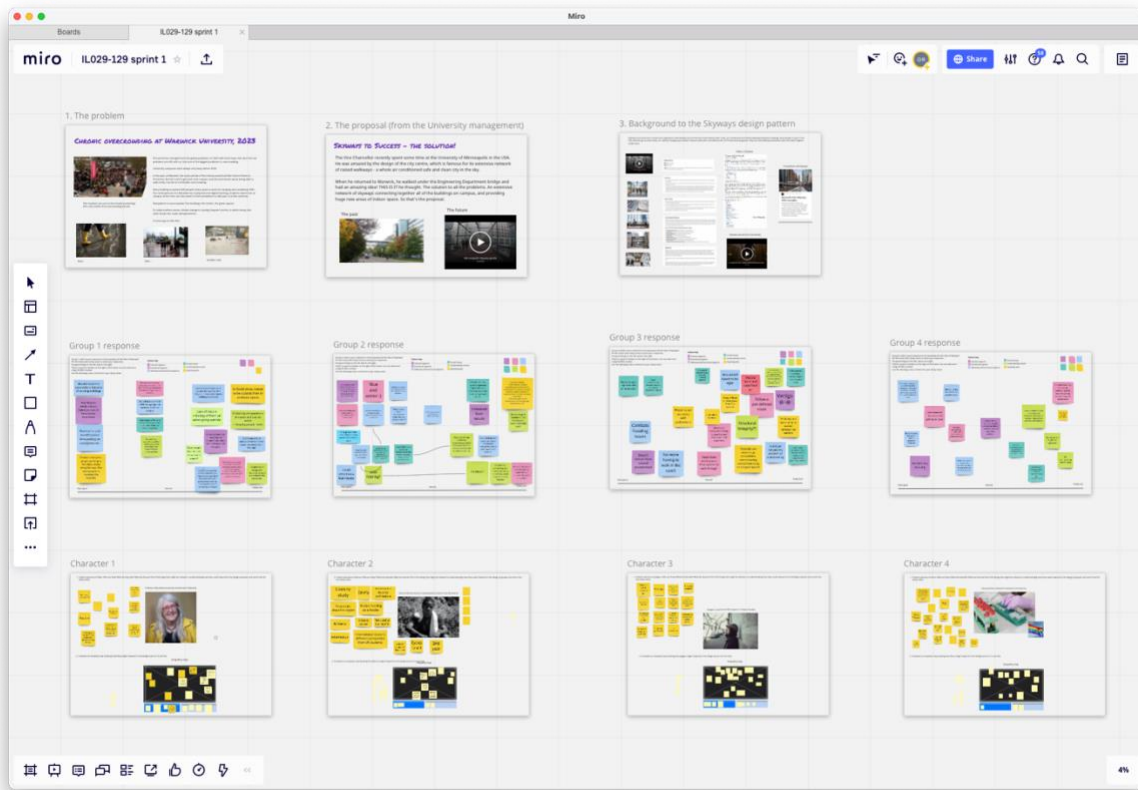


Figure 4. Screenshot showing the structure of a design sprint in Miro. The design challenge and a proposal are given in the first row, with detail including videos and web pages. The students initial response in breakout groups is in the second row. The groups then worked on personas and empathy maps in a second workshop, shown in the third row (how might, for example, Mary Beard respond to the proposed design?).

To some extent the virtual whiteboard also gives a sense of spatial organisation otherwise missing from the videoconference. We are able to set up frames for each group of students and see them working in breakout rooms. As Dave White has argued, the digital is often a “non-place”, but pedagogy inherently involves placemaking and the use of spatial forms (White, 2021). We can recreate the physical classroom as a place in digital space using these techniques. Perhaps the most impressive example of this was the way in which Highly Sprung Performance adapted their physical theatre workshop to work online, with each student in their own space interacting physically and intensively over Teams, with great coordination and emotional impact – thus demonstrating how we can design inclusively, with empathy, making the most of constraints and affordances through *mètis* to create sophisticated and effective experiences for learning.

Concluding remarks

Although we have not been able to straightforwardly replicate all of the features of our pre-pandemic design online, our approach to learning design, based on our ethical humanitarian Design Thinking, has allowed us to make the most of the design challenges we have faced. We have not yet fully addressed remaining challenges (location based learning, public pedagogy), however, we have grown our collective design capabilities, learning all the time, sharing that learning, and preparing for further innovation. Our designerly methods have worked well and allowed us to adapt fluidly to the needs of our students and the rapidly changing situation. It is a journey of continuous growth, with as expected fresh challenges and opportunities emerging all the time. In the next year we will build upon what we have learned, refining our approach and investigating new ways to visualise and co-design practice. For example, the Activity-Centred Analysis and Design (ACAD) framework (Goodyear *et al.*, 2021) is a good candidate, as a flexible, easily manipulated, wireframe canvas for designing learning events that are designed to be redesigned in action. We will be experimenting with this in 2021-2022. We also recognise the growing complexity and breadth of the discipline, and how this is challenging for students from non-design disciplines. Mapping this knowledge base and identifying “threshold concepts” (Meyer & Land, 2012) with which students struggle, will also be an important development. There are, as always with designing, many new challenges emerging and new possibilities for enhancing our practice.

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