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Using Design Thinking to Create Sustainable Communities

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Abstract

This innovative practice paper discusses an example of a participatory design-led sustainability project. Using a Design Thinking approach to problem solving, the project brought together university staff and students and a Council around a local sustainability challenge. Design Thinking was applied as an interdisciplinary methodology with the objective to equip students with sustainability skills and competences, resulting in a replicable method for responding to local sustainability challenges. By empowering diverse participants to contribute equally and freely, our application of Design Thinking created positive spillover effects on students and staff sense of community. The focus of the Challenge was on the discovery and co-creation of ideas to solve a problem related to local public transport. The driving principle of the Challenge was that participants, also public transport users, could bring their own lived experience to the Challenge and therefore could co-create and put forward potential solutions with the support of a local Council, and sustainability and Design Thinking experts on campus. In the process of doing so, participants framed and reframed the challenge from different angles and perspectives, opening a co-creation dialogue about community needs on and off campus, and their role in contributing to sustainability locally.

Keywords: Design Thinking, Sustainability, Community, Campus, Curriculum, Co-Creation

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1. Introduction

Over the past few years, the Higher Education (HE) sector has experienced increasing pressure to embed sustainability into the curriculum (Department for Education, 2021). Following the most recent Conference of the Parties (COP) meetings, and the need to take actions to tackle the climate crisis, climate education represents one of the key pillars of modern university education strategies. More often than ever, students are encouraged to create partnership and collaborate with external stakeholders across the sector to share their (degree specific) knowledge and ideas, extend and amplify existing practices and initiatives to be prepared to tackle the global challenges facing humanity.

In what follows, we provide an example of a more holistic approach to sustainability in HE, using Design Thinking as a problem solving methodology, which we called the Warwick Sustainability Challenge (WSUsC). The Challenge brought together the teaching and learning provision (curriculum), with the values and ways of working and studying on campus and engaged participants with local people and partners (community). We define this as the 3Cs (i.e., curriculum, campus, and community) approach to co-creation and sustainability education. The approach suggests sustainability should not only be something to learn, but also something to experience (Mogren et al., 2019), that is, students take what they learn about sustainability on campus. The process helps the students to engage with and co-create potential solutions to real-life problems, and/or providing students with opportunities to work on projects that help the transition to sustainability or to transform the environment where they study and live (see e.g., McMillin and Dyball, 2009; Hart et al., 2021; and Holst, 2023). To this end, Design Thinking and its related mindset and competencies (encapsulating empathy, optimism, iteration, making, creative confidence, learning from failure, tolerance towards ambiguity, IDEO.org, 2023) offered a methodology for exploring and experimenting with the 3Cs approach.

We adopted the definition of Design Thinking as "...the application of design practice and its related competencies beyond the context of design for and with those without design backgrounds" (Chon and Sim, 2019, p. 189). The methodology offers a range of tools, is malleable (Nerantzi et al., 2023) and aligned to values of sustainability in terms of its human centred focus, and usefulness for solving complex, wicked problems (Buchanan, 1992) such as sustainability issues. It is also positioned as a social technology (Liedtka, 2018), a blend of tools and insights applied to a work process, helping people using it counteract their biases and assumptions. Liedtka (ibid) argues that Design Thinking changes the way people engage in an innovation process. It emphasises "...engagement, dialogue, and learning" (Liedtka, ibid, p. 79), and, more specifically, learning in action thanks to its iterative and experimental nature. Partaking in the Design Thinking process not only allows to move through the tumultuous innovation journey with more confidence, but it also changes the participants of the process, in their ways of understanding the problem, and their commitment to solving it, thus co-creating with and not just for the intended recipients. It also allows to take a more system view of the problem and solution, shifting the mindset from thinking to build, to building to think (Brown, 2008; 2009). Furthermore, it also speaks to the increased student demand for more participatory approaches where diverse students can partake in engaged learning (Healey et al., 2014). Previous applications of Design Thinking to institution wide challenges (Kelestyn and Freeman, 2021; Reid and Kelestyn, 2022), showed evidence of success in terms of participants' learning, sense of community and belonging, and subsequent drive to participate in further co-creation, presenting opportunities for new and exciting areas of student engagement innovation and research (Dunne, 2016; Grau and Rockett, 2022).

In this project, we define our community as all individuals closely located (but not necessarily living in) in the area of Coventry, and sharing similar values and common affinity (Bauman, 2013). The 'local' is fundamental in the 3Cs approach to sustainability. The local aspect of the challenge serves to address the holistic approach to sustainability in HE, where we see participation of the local on and off campus communities. By local on campus community, we mean staff and students working and studying at the University of Warwick, who may not be located in Coventry, but being a part of the Warwick University community can share similar values and social norms with people living locally. By local off campus community, we mean citizens in the local area either represented by the Council members or the local public engaging in the insights gathering activities run by the participants of the Challenge as part of the Design Thinking process (see also Section 2.1). Being a part of a campus university, Warwick students and staff can sometimes feel disconnected from the communities off campus and may struggle to identify as local. As part of the WSUsC and testing of the 3Cs approach, we wanted to increase this sense of belonging to communities on and off campus.

Regardless of participant's proximity (geographically or culturally) to the local off campus community, Design Thinking served as a powerful tool to look at their experiences, new or existing, from a different angle, inviting to share, learn from and build on diverse knowledge and experiences from others, all contained within the Challenge. This allowed us to improve the sense of equal participation and contribution to the project. This is significant because Design Thinking applied with (and not just for) the community has the potential to create transformative innovations, whilst also recognising that those innovations are only a part of a solution to a wicked emergent problem, helping to avoid simplistic singular solutions to multifaceted problems. This, in turn, provided abundant learning opportunities for all participants of the Challenge, and especially the students.

Design Thinking served as a method to test a more holistic approach to sustainability in HE and community building by:

- Bringing the 3Cs together to tackle a challenge as a collective.
- Exploring the challenge from the empathy point of view, testing assumptions and deeply seated perceptions of the problem.
- Upskilling all participants of the process in sustainability, whilst allowing them to apply their knowledge and experiences.

The recent COVID-19 pandemic showed that the world is changing, and new skills and competences are needed to tackle the unknown and unpredictable future. Education might play an important role in equipping people with relevant skills to live together in ways that contribute to sustainable development. This can happen by creating new opportunities for learners to question their own lifestyles, and the systems and structures that promote those lifestyles. It can also happen through promoting innovative sustainable models and practices. However, at present, these methods/techniques are not as widely used as they can or should be to achieve these objectives.

With its people-centred approach, Design Thinking can be a powerful tool to foster innovation and change; whilst its participatory and co-creation nature might help nurture more sustainable communities. The innovative practice described in this paper focuses on the role of Design Thinking as a methodology and a mindset to explore a sustainability challenge more broadly and deeply; and as a community suggests focused actions to tackle the challenge, enhancing key skills to transform the world (e.g., systems thinking, future thinking, and cross-disciplinary competencies). More specifically, the methodological innovation is in the joint holding of the Challenge space by the staff, students, and the local Council, with students facilitating the process, and the ways in which cognitive diversity is maximised to ensure a sense of equal participation and co-creation of ideas. With reference to the <u>Double Diamond framework</u> (Design Council, 2005), we provide an example of a participatory design approach of problem-reframing and problem-solving, with the potential for the suggested solutions to be prototyped - tested - iterated and ultimately implemented by the Council, as responsible for local transportation services (Figure 1).

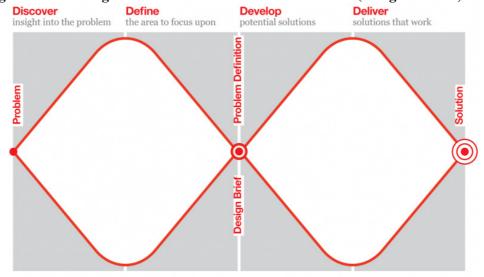


Figure 1: The Design Council Double Diamond framework (Design Council, 2005)

The rest of the paper is structured as follows. Section 2 describes in detail the Challenge and the methodology used in our exploration of the 3Cs approach to sustainability. This is followed by an in-depth analysis of the impact of the Challenge on participants. Section 3 explores the ripple effects of the Challenge on institutional developments, and Section 4 presents some concluding remarks.

2. The Challenge

In this section we present the specificities of the methodology used in the Challenge and provide some evidence of its impact on participants.

In June 2022, the University of Warwick, with the support of the Warwick International Higher Education Academy (WIHEA) launched its first institutional sustainability challenge: the Warwick Sustainability Challenge (WSUsC). The Challenge was designed and co-created with the local Council and engaged around 70 cross-Faculty members of staff (academic and professional services staff) and students across all levels of study to work together in teams of 6 to define and ideate possible solutions to a sustainability challenge related to transport.

The Challenge was focused on the scarce use of public transport in Coventry. As many other local authorities, Coventry City Council (CCC) is working hard to reduce its carbon footprint. Although emissions have drastically fallen by 48% since 2000, more needs to be done to achieve net zero, with the transport sector accounting for a third of the overall carbon emissions in Coventry (CCC, 2023). For this reason, the Council was looking for solutions to incentivise the young adult population to use public transport more frequently.

2.1. Methodology

Design Thinking played a significant role in the running of the Challenge itself, with Design Thinking at the core of all activities, as well as the design of the experience of being involved in the Challenge (especially its related online components). Where Design Thinking played a lesser role was in participant recruitment, following the more standard university communications channels and word of mouth. Anecdotal evidence suggests that Design Thinking has been considered as one of the main factors for attracting participants to previous co-creation workshops based on elements of Design Thinking. In the case of the WSUsC, sustainability was the more attractive factor.

With two academic staff members with expertise and experience on Design Thinking and sustainability, and with the support of stakeholders such as the local Council, regional engagement teams within the University, local entrepreneurs and alumni in sustainability focused careers, a diverse project team was established to work together to identify the scope of the Challenge. The project team also included two Design Thinking and sustainability trained student project officers (undergraduate student entrepreneur completing a degree in Global Sustainable Development, and a postgraduate student freelance facilitator completing a degree in Humanitarian Engineering), and a team of student coaches, a mix of undergraduate and postgraduate students from across the University who completed innovation and Design Thinking modules. Students were involved across all stages of project management, from the scoping of the Challenge, promoting it to the wider Warwick community, to delivering and disseminating the outcomes of the Challenge.

In all, 12 teams participated in the Challenge, 8 of which submitted their final entries to be considered by a panel of judges to present their ideas in the final showcase event.

Challenge teams had a maximum of 6 participants. Students and staff from across the University and all levels of study were invited to participate via various channels (e.g., newsletters, social media, team contacts, Heads of Department Forum, etc.). There were two routes to join the Challenge, either as a self-formed team representing a Department, Society, and/or degree; or as a wild card, as an individual to be allocated into a team based on disciplinary diversity. The Challenge ran for two weeks and was delivered online using Microsoft Teams. The only exception was the final showcase event. With a handful of speakers and guests joining online, it was a predominantly face-to-face celebratory event.

Once the teams were allocated and finalised, participants were asked to attend two workshops to introduce them to Design Thinking, focusing on the discovery and definition of the challenge, and developing their collaboration and creative thinking skills whilst unpacking assumptions, personal experiences, knowledge and expertise related to the challenge. Building on the 3Cs approach, the workshops were designed to facilitate a collaborative approach to solving a challenge, and coached participants to help explore it in a new to them way using the Design Thinking methodology, whilst drawing on their disciplinary knowledge and the curriculum, their experiences and interactions on campus (which also included working with students and staff they never met before), and their engagement with the off campus community (through their own insights gathering by engaging the public, and interacting with the project stakeholders, such as the Council).

The first one was a 3-hour introductory workshop, where participants were provided with the basics of Design Thinking for problem solving. Alongside the Double Diamond framework, we adopted the Stanford d.School, otherwise also known as the Hasso Plattner Institute of Design (2023) 5-stage Design Thinking process visualisation (Figure 2).

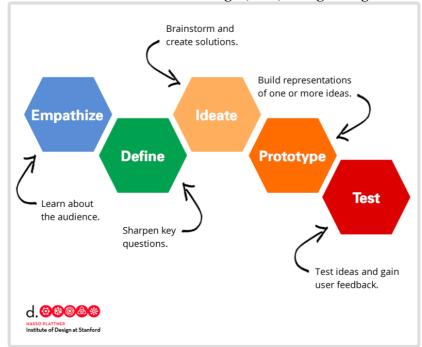


Figure 2: The Hasso Plattner Institute of Design (2023) 5-stage Design Thinking process

The first two key stages were covered here (i.e., Empathise and Define), where after an introduction to the Challenge from the Council, teams were asked to think about the challenge based on their initial assumptions, existing knowledge, and experiences of local public transport. At this stage, participants did not work in their allocated and finalised teams, but instead were randomly allocated into teams to ensure the Challenge maximised the diverse and interdisciplinary thinking and storytelling.

The second workshop was to frame and reframe the problem. In this 3-hour workshop, participants focused on the Define and Ideate stages (Figure 2) of Design Thinking. By returning to their allocated and finalised departmental or wild card Challenge teams, participants were asked to begin framing a problem using insights from the introductory workshop. This allowed the teams to sharpen the key questions they wanted to address as part of the Challenge. Throughout the two workshops, participants were supported by the members of the project team. Student project officers facilitated the workshops, and student coaches moved between breakout spaces to guide teams through the Design Thinking activities, ensuring the right pace of activities, and making the most of the time and support. In between and after the workshops, the project team provided prompts as well as engaging, easy to follow Design Thinking activities to help teams maintain the positive momentum. These included ideation and creativity exercises such as Crazy 8s and Lightening Demos (Knapp et al. 2016), and SCAMPER (Eberle, 1996). This was important because participants would normally be invited for short workshops (of no more than a few hours), and the WSUsC required a longer commitment. Due to the Challenge taking place at the end of the academic year, one of the busiest times, and predominantly online, it carried significant opportunity costs of participating for staff and students. Despite this, participants positively engaged with the prompts, which extended the learning about and the trying out of Design Thinking tools as part of the process. This was also a response to the demand for more practical insights about Design Thinking, indicated by the participants in the feedback form completed after attending the first and second workshops.

Two drop-in sessions were also arranged. One with sustainability focused alumni and local entrepreneurs to help participants get expert feedback; and one with the Challenge team to answer any submission and other logistics queries. At this stage of the Challenge, teams continued to investigate the problem/s generated in the previous stages, and to ideate the best possible solution/s to further refine and submit them at the end of the Challenge. Some teams conducted insights gathering (e.g., interviews and surveys) by engaging members of the public and bus users in the local area of Coventry to better understand a range of very different barriers to the use of buses. Teams zoomed in on the needs of a range of various user groups (e.g., disabled, women on late bus journeys, provision of real time information to increase use and confidence in the service, and design of bus shelters as public information points).

After the two workshops and drop-in sessions delivered across a week, the Challenge lasted for another week, with participants working asynchronously (with the help of the prompts and activities) and seeking support via the dedicated Microsoft Teams space. At the end of the second week, 8 teams submitted their entries in the form of a poster or a presentation, and a video summarising their proposed solution/s, which

were judged by a panel of experts (academics and practitioners from Warwick and other Universities, and the local Council), and disseminated in the final showcase, where shortlisted teams presented their ideas, winners were decided, and participants were awarded prizes and commendations.

2.2. What did we learn?

This section focuses on the evaluation of the Challenge and the overall innovation of the project and related applications of Design Thinking within the 3Cs approach.

At the end of each workshop, we collected survey data to gather information on how participants perceived the experience with the methodology. Ethical approval to conduct this analysis designed on the principles in BERA (2018) was provided by the University of Warwick, reference BSREC 98/19-20 AM03. Results are summarised below and in Table 1.

In all, most participants stated that they were satisfied with both workshops (\geq 75%) as well as found the student facilitators and coaches helpful during the workshops (\geq 88%). In addition, the workshops facilitated participation and engagement. The workshops received high ratings from participants, on a scale from 1 = not at all satisfied, to 5 = very satisfied, showing positive impact on those who decided to participate in the Challenge.

Table 1: Feedback on Workshop Experience

On a scale of 1-5 stars, how would you rate	Workshop 1 (satisfaction)	Workshop 1 (rating average)	Workshop 2 (satisfaction)	Workshop 2 (rating average)
this workshop overall?	75.0%	4.30	94.1%	4.35
the ability to participate during the workshop?	70.0%	4.20	94.1%	4.59
the ability to participate during breakouts?	95.0%	4.70	94.1%	4.71
the facilitators and coaches' support during the workshop?	100.0%	4.80	88.2%	4.53
No. of participants	20	20	17	17

Notes: *% of satisfaction refers to the number of participants who rated the experience 4 and 5 stars, on total number of those who took part in the survey.

Questionnaire data was also collected at the end of the Challenge to gain information on the overall Challenge experience, the impact of the methodology, and learning outcomes. Tables 2 and 3 summarise these findings.

Table 2: Feedback on the Warwick Sustainability Challenge (WSUsC) Experience

	Challenge (satisfaction)*	Challenge (rating average)
Within WSUsC, did you feel your views and ideas are heard? Not at all = 1; to a great extent = 5	76.5%	4.13
More generally, at the University, do you feel your views and ideas are heard? Not at all = 1; to a great extent = 5	70.0%	4.00
Do you think there is value to the University or student experience in having student driven approaches such as the WSUsC? Yes/No	100.0%**	N/A
Has the WSUsC had any impact on how you feel as part of the Warwick community? Yes/No	88.2%**	N/A
No. of participants	17	17

Notes: *% of satisfaction refers to the number of participants who rated the experience 4 and 5 stars, on total participants in the survey; **% represents the number of participants who answered 'yes' on total number of those who took part in the survey. WSUsC = Warwick Sustainability Challenge.

General feedback on the Challenge confirmed that participants had a positive experience. Although most felt that their views and ideas were generally heard within the institution, the Challenge enhanced these feelings (70% vs 76.5%). All agreed that there was value for the institution to have initiatives like the WSUsC, and almost 88.2% of participants stated that the Challenge enhanced their sense of belonging to the local community, suggesting that Design Thinking and the 3Cs approach might be a novel and impactful way for on campus communities to work with local (off campus) communities on solving other wicked problems.

In terms of learning outcomes (see Table 3), participants stated that the Challenge contributed to developing and/or improving their sustainability skills and changed their ability to (aligned to the reported and relevant EU and UN Sustainability skill/competence in brackets):

- 1) evaluate a complex problem like sustainability with a diverse and global mindset (system thinking and anticipatory/exploratory competency);
- 2) reflect on their own actions and how they relate to the world around them (**problem framing and self-awareness competency**);
- 3) work with and learn from others (collaborative competency);
- 4) develop innovative ideas which could be implemented at the local level and further afield (system thinking and strategic competency); and
- 5) reflect on their personal values and how they align with a complex problem like sustainability (valuing sustainability competency).

Table 3: Summary of Learning Outcomes

On a scale of 1-5 (1 = not at all; 5 = to a great extent), please let us know your opinion on the following statements. I think that the WSUsC	% on Total*	Total
has changed my ability to evaluate a complex problem like sustainability with a diverse and global mindset.	66.7%	15
has changed my ability to reflect on my own actions and how they relate to the world around me.	66.7%	15
has changed my ability to work with and learn from others	71.4%	14
has changed my ability to develop innovative ideas which could be implemented at the local level and further afield	80.0%	15
has changed my ability to reflect on my personal values and how they align with a complex problem like sustainability	66.7%	15

Notes: *% refers to the number of participants who agreed with the statement (i.e., chose 4 and 5) somewhat or to a greater extent, on total number of those who took part in the survey.

Most of the questions included in the survey, offered participants an opportunity to reflect on the answers provided and add an explanation. Looking at the qualitative data we were able to identify some patterns, which are summarised and supported by anonymous participant quotes in what follows.

Participants explained that the student-driven approach of the Challenge provided an opportunity for them to **learn at their own pace**, a very important aspect of effective learning.

"It's important to give students the opportunity to be able to make a project and present it to a panel because this will give us real world experience. It helps us to put together information that we gathered as well, all transferable skills."

"It's a great opportunity to learn the way that Warwick approaches to sustainability. I realize that it is very difficult to make radical and greater change in institution like Warwick's size. But I am glad that lots of the ideas generated from the participant are evaluated and possibly implemented in reality."

"I was able to bring my personal point of view, and because of that, I learned a lot in the whole project, not only the awareness of environmental protection, but also the ability of teamwork and independent innovation has been improved."

Many mentioned the **application of material learned** at university to real life situations; and others suggested that the methodology helped them to gain a **better understanding of the problem**, **collaborate** with others and **listen** to different people affected by the same problem, but having different perspectives on the matter.

"This challenge was designed for the whole team to collaborate equally to improve one's ideas and eventually come up with the best possible plan to put forward. Additionally, the mental process before working on a project of this intensity, knowing how to obtain the perfect mindset is key. I was also enlightened by the crucial factor of creativity and how much of an advantage it can be to just let logic go for a second and play around with ideas."

"...I didn't know much about Warwick's sustainability action prior joining the challenge. The challenge definitely helped me to learn more about this."

Overall, the challenge increased participants' **teamwork**, **communication skills**, and **awareness of environmental/sustainability issues**, and made students and staff feel a part of their institutional and wider local **community**. Finally, some mentioned the value of presenting their suggested solutions to a panel of experts, enhancing their **employability skills** and increasing their **networks**.

"As an international student,...sustainability challenge is really a valuable experience for me to gain some employability experience for my CV"

"Participating...makes me feel a part of the university, since I can potentially make impacts to influence the university and students."

"In the past, when I have an idea, I normally don't know how to present the idea to others. During the challenge, I learned the mind map making to organize my idea, and know the story-methodology to present my thinking."

Aside from this, we have also traced a few vignettes of further impact on project participants. In one case, a staff participant was able to transition into an academic role:

"Participating in the WSUsC has had an extremely positive impact on me. I have gained confidence in my sustainability knowledge and the application of this to my life and work. This has allowed me to apply for an academic position (I was previously in an admin role) and the contacts I made during the challenge are now part of my network. The new techniques have really helped me to understand better ways to influence decisions and to support colleagues and learners to achieve the end goals."

We have also seen evidence of impact beyond our initial expectations on the student facilitators and project officers in terms of their development and career trajectory:

"The WSUsC supported my development as a design thinker and facilitator. I have been able to secure a number of co-creation roles, including my own small consulting portfolio as an independent facilitator.

It also helped me learn about the power of public engagement and I am now working on a children's book that links the Design Thinking mindset to joy and creativity."

The outcomes of the Challenge allowed the project team to continue the dialogue and partnership with the local Council as well as with local Schools interested in sustainability who were invited to the final showcase. Examples of submissions include presentations, posters, and short videos explaining the suggested ideas for increasing the use of public transport in Coventry.

3. The Challenge and its developments

The 3Cs approach and the interdisciplinary nature of the Design Thinking methodology, as well as the impact on participants, demonstrated the WSUsC as an impactful and inclusive methodology. As the first of its kind internally, the Challenge became an example of excellence in the 2023 Institutional Teaching and Learning Review under the Sustainability theme, with colleagues across the University, and in particular Student Opportunity, now looking to replicate the Challenge and embed elements of the methodology to engage students with sustainability focused co-curricular activities.

The methodology has been adopted and tested to tackle the challenge of on-campus waste. Delivered in September 2022, it made some significant changes to the way Estates engage with the student body and implement institutional change:

"...Many of the ideas have been taken forward and are being discussed at various levels if not already being rolled out for trials. This project has very much helped push forward a number of changes to the University to tackle waste and improve sustainability across the campus." Sustainability Champion, Estates.

This is especially significant to ensuring that teams that do not traditionally interact and co-create with the student body, have now a novel way to bring different parts of the University community together and tackle problems that impact all who live and study on campus, once again drawing on the significance of the 3Cs approach. The WSUsC opened up real sustainability challenges to students and teams who would not normally access such conversations and related interventions to tackle them. Such deep and wide actualisation and empowerment of participants to sustain community focused dialogue was crucial (Mogren et al., 2019; Lotti and Barile, *forthcoming*) and became significant much sooner than expected after the inception of the Challenge, only after two iterations, reconfirming the accessibility and timeliness of exploring sustainability challenges as a community, on and off campus, using Design Thinking.

Another development is the embedding of the WSUsC into the Warwick Award and Core Skills framework. Sustainability is one of the Core Skills and the WSUsC offers a unique opportunity to develop an interesting co-curricular student offering in this area that can also count towards the Warwick Award. The staff and students involved in the Challenge have trained a team of Skills Developers in September 2023 to ensure

scalability and accessibility of the Challenge for all students. The learning from the Challenge have also resulted in further WIHEA funding for a project that trained staff from 6 universities in the UK on the use of Design Thinking for student engagement.

4. Concluding remarks

In this paper we discuss an application of Design Thinking to a sustainability challenge, engaging university staff, students and a local Council in addressing the need of a local community to adopt more sustainable uses of public transport, that is the Warwick Sustainability Challenge (WSUsC).

The WSUsC is now a tested and replicable participatory and design-led innovation methodology rooted in the 3Cs approach to sustainability education. As a way to embed sustainability into the student learning experience, it encouraged us to think about the kind of curricular, extra and co-curricular activities that can support and improve learning in this area. It extended our understanding of what's possible in terms of building communities on and off a university campus, conceptualising and putting to test the notion of the 3Cs approach to co-creation and sustainability education. For students, the WSUsC provided opportunities to apply their (degree specific) knowledge to real life problems, acquiring and developing future-proof skills. For staff and stakeholders, it reinvigorated partnerships, and enhanced institutional thinking about innovation in education and co-creation. As Grabill et al. (2022, p. 8) said: "If we believe that we can and should design the next iteration of higher education, then we also must believe that we are the authors of our institutions". With the WSUsC, we extend this statement by demonstrating the power of Design Thinking for education for sustainable development and co-creating sustainable communities.

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