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Introducing Strategic Design in Education (SDxE): an approach to navigating complexity and ambiguity at the micro, meso and macro layers of Higher Education Institutions

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ABSTRACT

Members of the Higher Education (HE) community have embodied the spirit of designers by identifying needs and creatively responding with speed, agility and ingenuity as a direct response to the COVID-19 pandemic. While these rapid changes were required at the time of the pandemic, the lack of an innovation structure in HEIs (Higher Education Institutions) has become evident. We argue it is necessary to implement an innovation structure in a HEI which can be used to guide all types of innovation, to ensure they are *desirable*, *viable*, *feasible* and *suitable* from the perspective of all stakeholders. This article builds on the ARRIVE innovation process and uses Vaughn et al.'s Principles for Designing Progress to develop the concept of Strategic Design in Education (SDxE). Through embracing the SDxE approach, the HE community has the potential to not only get comfortable in the complexity and ambiguity which will inevitably result in the HEI sector for decades to come, but have an opportunity to shape it into something more desirable. We propose that SDxE offers an actionable scaffold for Human-Centered innovation, one that holds the potential to affect change, improve collaboration and produce more successful outcomes across the micro, meso and macro layers of HEIs.

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1. Introduction

Over the last decades, HEIs have been responding vigorously to change in order to evolve and become more relevant. Since John Biggs' (1999) seminal research into the quality of teaching, HE has seen an explosion of pedagogical research into problem-based learning (Dickie & Jay, 2010), flipped classroom approaches (Abeysekera & Dawson, 2015), blended learning (George-Walker & Keeffe, 2010) and since COVID-19 especially, an influx of research into effective remote teaching and use of learning technologies

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(Bolumole, 2020; O'Neill et al., 2021; Pham & Ho, 2020; Yang, 2020). Many innovations which have occurred within teaching and learning have possessed a design element at their core. Instructional Design and Learning Design, Curriculum Design and Universal Design for Learning are examples of how design has been fused with literature and practice from another discipline to strengthen it. But are there more effective and appropriate approaches available that can help tackle some of the more complex, fundamental challenges the sector will face over the coming years?

COVID-19 has forced immense change upon staff and students at the Micro, Meso and Macro layers of our institutions, how they operate, and how they interact with one another. COVID-19 required rapid changes rather than strategically planned or designed adaptations. We argue that the concept of Strategic Design in Education (SDxE) put forward in this article offers a timely, powerful and necessary new form of design which can help the micro, meso and macro members of the HE community forge wholesale, strategic change, by encouraging effective cross-disciplinary collaboration, empathy building, creative thinking and experimentation. We take our lead from Terry Hore and Leo West (1984), who noted that it is not enough to simply point to the areas in HE which need to undergo strategic change. Real change can only occur when it is scaffolded correctly, involves all relevant members of the HE community and reaches the appropriate decision makers.

Firstly, we will provide more detail into the micro, meso and macro layers of HE, focusing on the actors innovating at each layer. Secondly, we will describe how applying the ARRIVE design innovation framework (Devitt et al., 2017) to a number of innovation projects contributed to the development of the SDxE concept – a potentially valuable scaffold to enable innovation and change in HE. Finally, we will provide a working definition and corresponding principles for the concept of SDxE with the intention of this definition being used by innovators within HEIs to help guide their process.

2. Innovating at the macro, meso and micro layers of Higher Education

Like all large organisations, HEIs are highly complex systems, consisting of an array of touchpoints, processes, procedures, and policies (Gohari et al., 2019; Hoq & Akter, 2012), and are home to a diverse community of students, administrators, faculty, partners and leaders. The need to understand the construction of the HE community was Sharon Fraser's (2019) focus. Fraser's work illuminated not only the existence of layers within the HEI, but also the type of people who motivate change within these layers. We suggest that by contextualising Fraser's work using the Micro, Meso and Macro framework of the HE community (Rose et al. [2019a], Aizawa and Rose [2019]; Dysthe and Engelsen [2011]; Englund [2018]) we are provided with an insight into its structure. To simplify these layers, we suggest that the micro-level is the level of teaching and learning, comprised of individuals and their interactions with other individuals (e.g., student and staff interactions). The meso-level can be seen as the socio-cultural structure which exists in the HEI, made up of faculties and their interactions with one another, and the community which results within the institution. The macro-level encapsulates the other two layers and consists of the HEI's strategy, its governance, policies and culture (Zentel et al., 2004).

The first type of person Fraser (2019, p. 1381) describes is the ‘innovative deliverer’ and through innovating in the delivery of their teaching and interactions, they work at the micro-layer of the community. The second type of innovator Fraser describes is the ‘implementer of innovations’; the person who is responsible for ‘taking other people’s ideas, adapting and implementing them’ (Fraser, 2019, p. 1381). We might see this person as working in the meso, faculty/departmental-layer. Finally, at the macro-layer, the ‘innovative policy maker’ is in a ‘position of formal leadership’ (Fraser, 2019, p. 1382) and has the potential to impact policy in the HEI. The complex challenges which HEIs face can be found in what Nita Cherry terms the ‘white spaces’ of this structure (Cherry, 2005, p. 319), straddling disciplines and departments, making accountability challenging. Cherry believes that within these white spaces there arises a specific type of ‘juicy opportunit[y] and wicked problem’ (Cherry, 2005, p. 319), a concept borrowed from Rittel and Webber (1973) and adapted to a design context by Richard Buchanan (1992). Here, Cherry signals the potential of Design to address the varying aspects of the challenges. Having set out the framework through which we can conceptualise the HE community, we will now present a Design project undertaken by the authors, which spanned the three layers of the HEI community, structuring our discussion around the ARRIVE framework for innovation which was used by the team.

3. Action research through the ARRIVE framework

In 2018, Vaugh et al. undertook an action research project using a Design Thinking approach to assist the Maynooth University Access Programme (MAP) explore areas of improvement within their department. The resulting project, which focused on creating an improved Access programme for students from underrepresented groups (Vaugh et al., 2018), was deemed highly successful, leading to a greatly improved experience for student participants, substantial cost reductions and reduced administration stress on staff. The success and impact of the project also led to it becoming a strategically important priority area for Maynooth University. In 2019, the project won the Maynooth University Presidents Award for Service Innovation (Maynooth University, 2019). Based on the impact of this work, the fluidness with which the project progressed and the quality of student and staff collaboration and alignment, the project team recognised that this way of working could offer a valuable approach for tackling the myriad of challenges facing the HEI and the wider education system.

While this project used a typical Design Thinking approach, the project team, who were experts in Design Thinking, recognised limitations of the process that would prevent it from being adopted more widely in HE settings. These limitations ranged from vagueness of language, to lack of strategic focus, and a neglect of important areas such as upfront analysis, reframing of challenges and rigorous validation and execution of solutions. These limitations, combined with the learnings from numerous projects that followed, led to members of the team co-developing a new framework for innovation called *ARRIVE* (Devitt et al., 2017, p. 1). The ARRIVE framework (Figure 1) was developed to ensure that appropriate focus and effort was distributed across the innovation process, particularly in understanding and defining the right challenges to be tackled. This is a crucial

step at the beginning of any change-based project: ensuring the problem being faced is fully understood before solutions are considered (Wedell-Wedellsborg, 2017).

Constructed from the stages of *Audit*, *Research*, *Reframe*, *Ideate*, *Validate* and *Execute*, ARRIVE offers an instructive, strategic approach to design. The ARRIVE framework is unique, as it facilitates strategic development, collaboration and creativity in a structured manner. This structured nature allows for the development of informed human insights into the challenge being tackled in balance with the needs of the organisation. Each stage of the ARRIVE framework is outlined below and placed within an HE context. A brief explanation of a key tool or exercise is provided for each phase, as well as an explanation of how each phase may benefit the micro, meso and micro levels of an HEI.

3.1. Audit phase

As Devitt et al. (2017) explain, ‘a design innovation project starts with an acknowledgement that innovation opportunities always occur within a context that has multiple actors, structural complexities and legacy momentum.’ To begin uncovering these innovation opportunities, an *Audit* is necessary. This phase allows the team to discover important information about the challenge area through more traditional desk-based research approaches and workshopping activity. Research might include reviews of related literature, department and institutional reports, speaking with experts and looking at broader related trends and initiatives from both the HE context and adjacent fields.

All of this activity allows the project team to take a broader, macro view of the situation as they search to situate a challenge in context. A key success component of this phase is stakeholder workshopping. Collaborative exercises are used to bring a diverse group of stakeholders together to draw from their individual and collective wisdom and to identify, prioritise and align around an area of focus. One exercise that we have found invaluable across a diverse range of projects is *Forces of Progress* (Figure 2). This workshop exercise centres around turning the problematic present into an improved future, by understanding the ‘push of a situation’ and the ‘pull of new ideas,’ in conjunction with forces that hinder change, such as ‘habits of the present’ and our ‘anxiety of the new solution’ (Klement, 2018). In a workshop setting, a diverse group of stakeholders (department / faculty staff, students, project teams etc.) are provided with a relevant scenario. In the past we have used scenarios such as *Students*

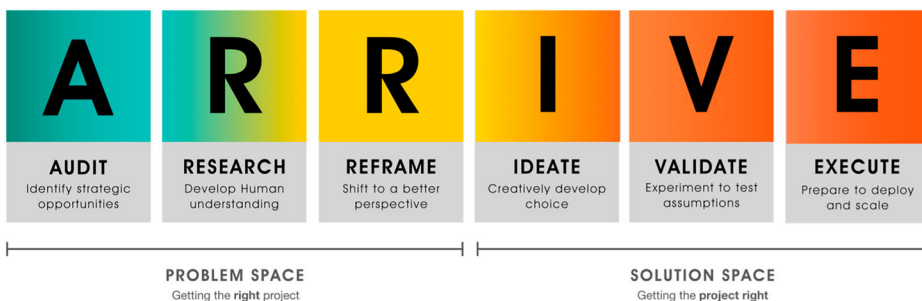


Figure 1. The ARRIVE framework (Devitt et al., 2017).

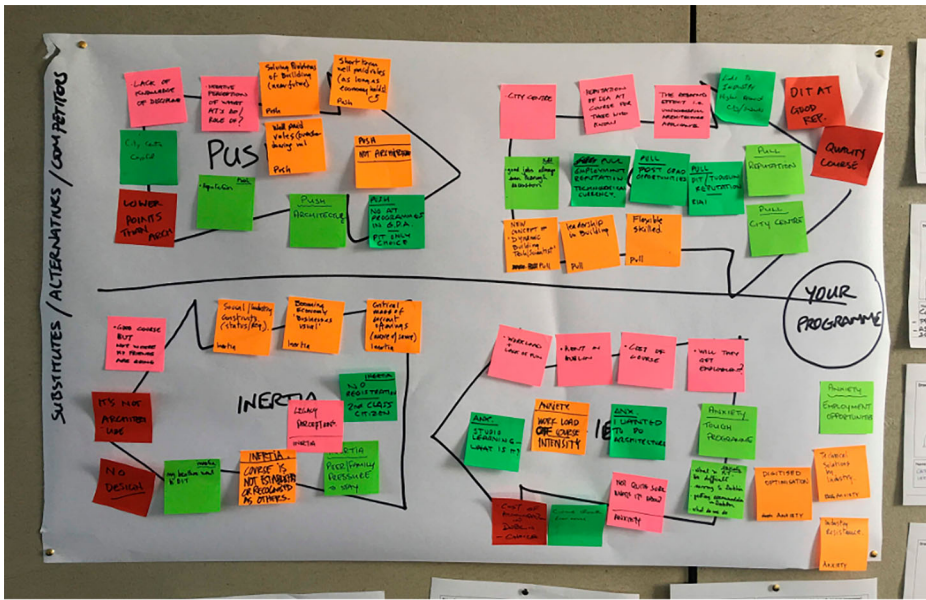


Figure 2. Typical Forces of Progress exercise.

deciding to go to third level, Organisation change post COVID-19 and Undergraduate students progressing to postgraduate level as scenarios to work on. The stakeholders are each asked to capture their opinions on sticky-notes of what is pushing an individual away from the current situation, pulling them towards something new, causing inertia and creating anxiety about change. Following this, participants are given a number of dot stickers. They are then asked to read all views and place a sticker on the ones that resonate with them the most. On completion, a heatmap of votes points to areas that the collective agree represents the key areas of challenge and subsequent opportunity for improvement and change.

Macro-Level benefits: The *Audit* phase encourages institution stakeholders to pay attention to strategic issues relating to the challenge area, which may not normally be front of mind. Involving leadership in this phase builds their understanding of a wide variety of opinions and they get to see what the larger group identify as important.

Meso-Level benefits: From an operations point of view, the *Audit* phase allows mid-level department and faculty staff to obtain a more rounded view of the challenge and provides enriched information to improve decision making.

Micro-Level benefits: Workshopping activities such as *Forces of Progress* create a level playing field, where everybody from students to senior management can share opinions and have them considered without judgement. Opinions that may not normally be heard now have equal opportunity to be prioritised and acted upon.

3.2. Research phase

The *Research* phase allows the now more informed project team to dig deeper into the challenge and areas of opportunity that were ranked and prioritised in the *Audit* phase. These areas now become the starting point for deeper investigation, where the

key users and other stakeholders are identified, and through research, the team search deeply for hidden nuggets of understanding and new insights that can be leveraged to create a distinctive, innovative offering. The *Research* referred to in this phase is design research, defined by Archer (1981) as a ‘systematic inquiry whose goal is knowledge of, or in, the embodiment of configuration, composition, structure, purpose, value, and meaning in man-made things and systems.’

Design research typically involves the use of methods to obtain a rich understanding of the needs, goals and pain points through activities such as semi-structured interviews, ethnographic inquiry and cultural probes. One tool that offers a valuable insight into a challenge area is *Experience Mapping*. Experience Mapping (Figure 3) is commonly used in design research to map the activities, thoughts, feelings and touchpoints as a stakeholder completes a task. According to Marquez et al. (2015), Experience Mapping is a tool that helps service providers understand the steps required to perform a given task. The mapping process can provide valuable insight into what it is like to walk in the user’s footsteps, highlighting subtle experience highs and lows.

Design research tools such as Experience Maps dismantle the ‘empathy delusion’ prevalent in many sectors (Tenzer & Murray, 2019) including HE, where we assume we understand what students and staff want and need, and the problems they face (Figure 3).

Macro-Level benefits: Very often, HEI leadership does not understand the subtleties of the human experiences across various activities and functions within the institution. Design research, including various mapping exercises, makes challenges more visible, communicable and therefore actionable for busy institution leaders.

Meso-Level benefits: The *Research* phase allows the research team and decision makers to deeply understand the stakeholders in the system and identify patterns of similar pain points, unarticulated needs and goals. This provides clear focus for

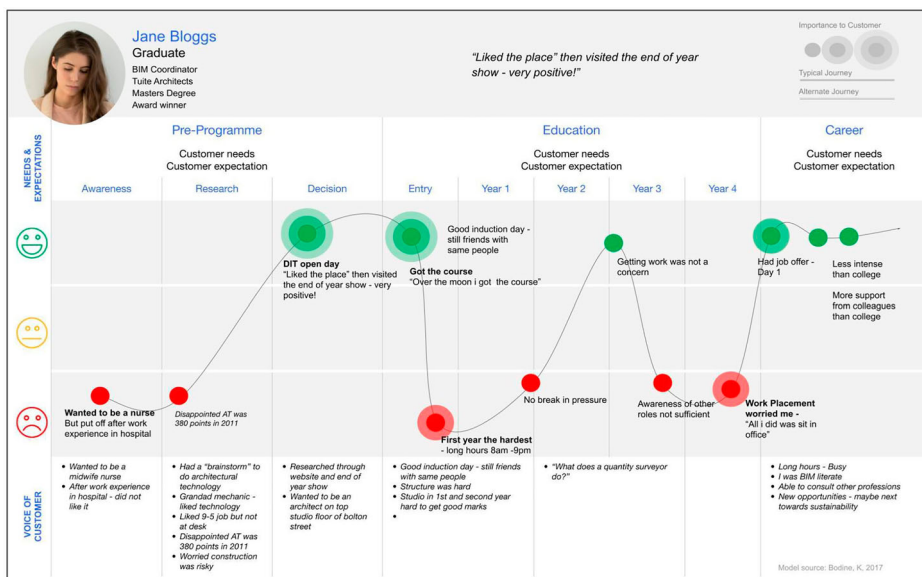


Figure 3. An example Experience Map of a student completing their degree.

improvement initiatives. The process also aids in the building of deeper empathy between the stakeholders.

Micro-Level benefits: Design research is concerned with developing rich understanding through empathy and conversation with stakeholders. While this can be viewed as simply an act of gathering data, more often it acts to demonstrate the team's desire to understand the participants' perspective in order to make change and improve.

3.3. Reframe phase

The rich qualitative insight obtained from the *Research* phase makes it possible to identify a concise set of stakeholder needs and insight into the challenges. From a design perspective, an insight 'reveal[s] behaviours or phenomena and point to solutions or ideas. And because insights are grounded in human needs, desires and behaviour they lead to ideas that create value in people's lives' (Stafford, 2021). The *Reframe* is an important transition point in the ARRIVE process. At this stage, the project team will have developed a new perspective, or worldview informed by the deeper understanding and insights learned from research (Devitt et al., 2017). These new understandings and insights allow the team to creatively envision a future that will deliver significantly improved experiences for the stakeholders. At this point we find it useful to synthesise the key information into a tool called *Challenge Narratives* (Figure 4). This succinct document merges a persona and what Alan Cooper (2004) describes as a precise description of a user and what they wish to accomplish, with several 'How Might We' statements. These thought-provoking statements are derived from identified insights and framed as actionable questions. The *Challenge Narratives* provide the team with a new framing for the challenge to be tackled. Additionally, when information is presented

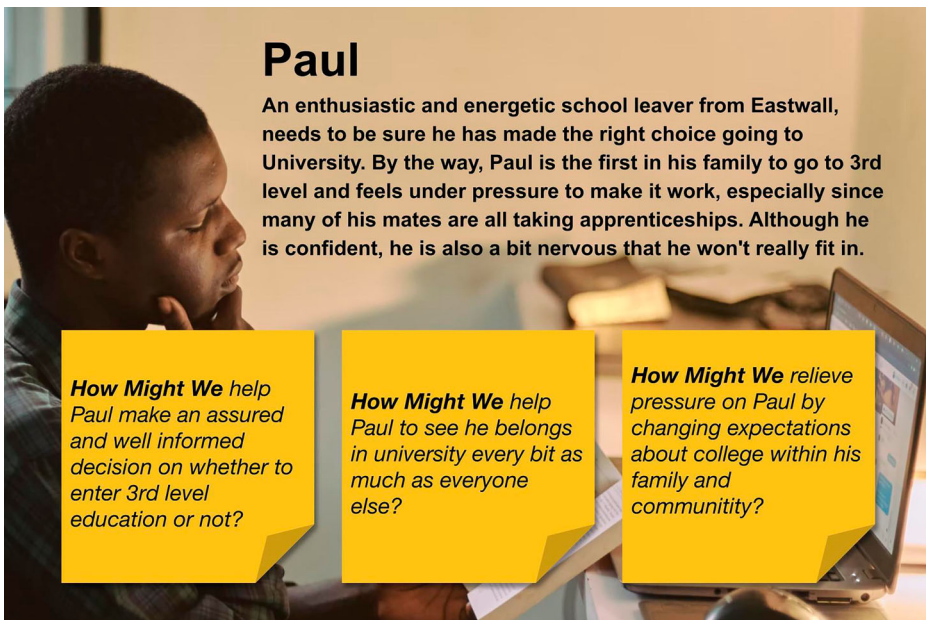


Figure 4. An example Challenge Narrative developed as part of a student transition project.

in this way, it is succinct enough to be shared with a wider group of people who might be involved in the subsequent *Ideation* phase of the project.

Macro-Level benefits: As with the *Research* phase, the *Reframe* phase allows complex stakeholder information to be communicated and more easily understood by institution leadership, with the intention of informing decision making and building empathy and alignment.

Meso-Level benefits: The reframing of the research into insights and actionable challenge statements requires the project team to reflect deeply on research findings to develop and articulate the insight. This process can have a powerful and long-lasting impact. We have seen this learning not just applied to ongoing projects, but subsequent projects and daily operational decision making.

Micro-Level benefits: As the *Reframe* phase is built on deep understanding of stakeholder needs, involves deep reflection of what was observed, and is captured in a rich and succinct challenge statement, there is an increased likelihood that the learning will be applied in some form, even outside of the current project to serve the end user.

3.4. Ideate phase

The *Ideate* phase marks the transition from the ‘Problem Space’ into the ‘Solution Space’ (von Thienen et al., 2017). Here, a diverse team are brought together to explore possible creative solutions to answer the ‘How Might We’ questions set out in the challenge narrative. One tool used in this phase is *Group Brainstorming*. The goal of *Group Brainstorming* is to devise ‘strategically outlined concepts together with identified assumptions behind their case for success’ (Devitt et al., 2017, p. 12).

The team are encouraged to diverge in this phase and explore many ideas, with the multidisciplinary of the group aiding the quality, quantity and diversity of those ideas. In a typical ideation workshop, the participants will be encouraged to draw from all the ideas, and through a process of filtering, evaluating and fleshing out

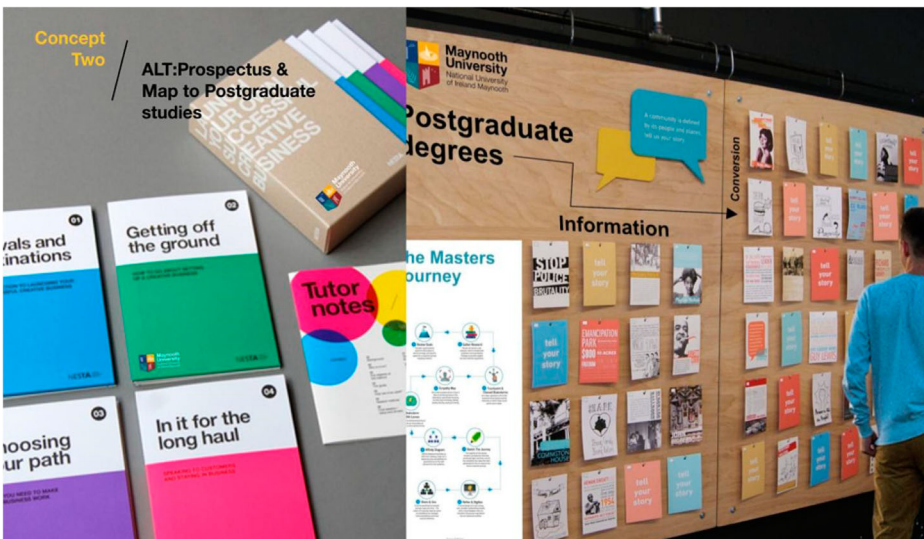


Figure 5. An example concept for a new postgraduate information initiative.

(Devitt et al., 2017, p. 12), identify two or three ideas which show promise. These ideas are then evolved into more detailed concepts (Figure 5). A concept describes the essence of the proposal, with the objective of determining the core value proposition for the intended user. The outcome of the *Ideation* phase is a presentation of a number of these fleshed out concepts, from which the group or decision maker could explore the positives of each idea.

Macro-Level benefits: From our experience there is often a dearth of ideas brought to the leadership in HE, providing them with little choice as to what to support. By bringing a selection of low fidelity concepts, they can now explore the positives of each idea, make combinations and feel more engaged in the development process.

Meso-Level benefits: The ideation phase works best when there are representatives from all aspects of the project. This co-creation approach allows for better ideas and a higher chance of ‘buy-in’ from those who the initiative is being designed for.

Micro-Level benefits: Similarly, involving the end users in the process of ideation encourages a deeper connection with the project outcome and builds stronger relationships, understanding and trust between participants.

3.5. Validate phase

Concepts created during the *Ideate* phase may offer interesting and even exciting directions, but they are still only ideas, and many assumptions still exist such as whether they will appeal to end users (desirability), if they can be implemented (feasibility) and if they make financial / business sense for the institution (viability). The purpose of the *Validate* phase is to identify these major assumptions and design lightweight, creative experiments to test and validate them. This is a highly creative and extremely important phase, where the



Figure 6. A low fidelity validation prototype for a postgraduate recruitment tool.

project team must find ways to quickly create learning experiments and prototypes at low cost (Figure 6).

Macro-Level benefits: Validation experiments are valuable to leadership as they reduce the burden of making correct, often expensive and risky decisions.

Meso-Level benefits: Validation experiments act to de-risk decision making, but they also empower staff to take control and productively work towards bringing their innovations into existence, giving staff a sense of progress.

Micro-Level benefits: Experimentation is another activity that provides an opportunity to build important dialogue and collaborate closely with end users to learn and iterate the project into existence. This phase helps to build trust and demonstrate institutional action.

3.6. Execute phase

The last step in the ARRIVE framework involves preparing to *Execute* the project. This stage of this process is about preparing the final refined concept to be deployed and ensuring the ‘strategic alignment of the project with the organisation’ (Devitt et al., 2017, p. 12). If the previous phases of the ARRIVE process have been completed sufficiently, key assumptions will have been prototyped and tested, and the concept will have been evolved and iterated based on the learnings. There are many approaches available that can help a team prepare to *Execute*, with tools such as business modelling (Osterwalder & Pigneur, 2010) particularly useful to ensure key components such as revenue streams, channels of communication and cost structures of the initiative are in place. As HE is predominantly based on service delivery, one tool that we find particularly useful is the *Service Blueprint*. Service Blueprints allow all members of the organisation to visualise an entire service and its underlying support processes, providing common ground from which critical points of customer contact, physical evidence, and other key functional and emotional experience clues can be orchestrated (Bitner et al., 2008). Service Blueprints can be used to map an existing service, but they are also useful in capturing an improved service prior to execution. Figure 7 shows a sample section of Service Blueprint for a new HE postgraduate programme. There are various sections that can be included in a Blueprint, but the following elements would typically be included:

- (1) **Stages of the journey:** The steps the user takes as part of the service delivery process.
- (2) **Physical Evidence:** Tangible elements connected to each stage that may influence the user’s perceptions of the service, e.g., staff uniforms, application forms, websites.
- (3) **User actions:** What the user is doing during the service delivery process.
- (4) **Front Stage:** What users see and who they interact with.
- (5) **Back Stage:** The employee actions that users do not see but make the service possible.
- (6) **Support Processes:** Activities carried out by non-contact employees, whose actions are required for the service to be delivered.

Macro-Level benefits: At this stage of the process, leadership should feel more comfortable that the project has been explored thoroughly, that it is well validated and that there is a strong, well-planned strategy in place to execute the project.

iteratively navigate towards desirable, viable, feasible and suitable outcomes. Being tolerant to ambiguity is a critical quality of the SD process, as cultivating a psychological acceptance towards uncertainty offers space to explore infinite possibilities (McDonnell, 2015). This is particularly valuable in HE, where traditional orthodoxies and conservatism often act as the key barrier to change (Bentley et al., 2013; Lane, 2007; Weiler, 2006). It is well understood that many find states of ambiguity uncomfortable (McDonnell, 2015; Mohammed et al., 2006), but tolerance of ambiguity can be developed through design practice and education (De Jong & Özcan, 2016). SD provides participants with a framework that creates a workflow broad enough to allow for ambiguous conditions to emerge, but structured enough to provide safety and reassurance that a successful endpoint will be reached. With practice, ambiguity becomes more tolerable resulting in greater openness to new ideas and new ways of seeing situations.

When we look at the challenges at the Micro, Meso and Macro layers of HEI, it is easy to become paralysed by the complexity (Holt, 2007). SD provides effective tools and approaches for prioritising where to apply focus and energy. It allows a team to find solutions within the complex, networked and dynamic nature of contemporary problems (Dorst, 2015). SD has also been seen to develop mindsets valuable to innovation (Yeager et al., 2016). Scholars in the field of SD and HE, such as Burkhardt (2009) and Vaugh et al. (2020) have identified important innovation mindsets that are not only important when seeking to introduce innovation and change in HE, but may also be developed through the practice of SD. We see this as a real opportunity to embed a productive and transformative mindset across HEIs.

4.1. Introducing Strategic Design in Education (SDxE)

While there is increasing evidence that SD delivers value to organisations trying to innovate and to societies trying to make change happen (Liedtka, 2018), HE has been slow to embrace the approach. To assist with its adoption, a more nuanced focus on Education is necessary to tailor SD to the unique structures, ways of working, constraints and demands of HEIs. To this end, we propose the concept of *Strategic Design in Education* (SDxE) as a means of describing the use of SD in education contexts. To explain the qualities of a SDxE approach, we draw on Vaugh et al.'s (2020) Principles for Designing Progress and expand on them to place them in the context of HE (Table 1).

While further work is required to comprehensively define SDxE, these principles provide us an opportunity to propose a working definition of SDxE as follows:

Strategic Design in Education (SDxE) is a human-centred approach to innovation and change across the micro, meso and macro levels of the education environment. SDxE draws on the tools, mindsets and practices of Design, to enable diverse teams to better identify opportunities for improvement, reimagine how challenges are approached, create stakeholder alignment, experiment and deliver creative, validated solutions and initiatives that enhance experiences and add value to the institution and its diverse community.

In the same way the concept of SDxE evolved from the iterative use of SD to help tackle challenges facing HE, it is expected that this definition of SDxE will evolve over time, as the authors of this paper, and its readers, utilise it to innovate within their institutions. We hope that the contributions of this paper, as summarised in Figure 8, can be used to help

Table 1. Adaption of Vaugh et al.’s (2020) Principles for SDxE.

Vaugh et al.’s Design Principles	Expanded Principles for SDxE
Centre on people’s needs and goals	SDxE encourages and facilitates individuals and teams within HEIs to centre on people’s needs and goals, and the resulting empathy and understanding helps guide better decision-making to create more meaningful outcomes.
Be curious and open to find the patterns	SDxE encourages and facilitates curiosity and openness to allow teams within a HEI to discover patterns, identify unmet needs and collect and connect them to develop real insight.
Intellectual humility is the force for change	SDxE encourages and facilitates intellectual humility amongst HEI staff in order to help challenge biases, question norms and create an openness to new ideas.
Co-create for greater impact	SDxE encourages and facilitates co-creation and the coming together of diverse mindsets across the HEI in order to help tackle complex challenges facing the HEIs.
Innovation happens at the boundary of disciplines	SDxE encourages and facilitates collaboration and exploration across silos of the HEI to assist in the discovery of innovative solutions.
Build to think and learn by doing	SDxE encourages and facilitates HEI individuals and teams to make abstract ideas tangible, iterate and experiment to unlock powerful thinking, learning and team alignment.
It’s OK not to know. Get comfortable in the ambiguity	SDxE encourages and facilitates HEI individuals and teams to get comfortable in ambiguity, discourages jumping to solutions too quickly and leads to more informed understanding, points-of-view and ideas.
Communicate creatively to inspire action	SDxE encourages and facilitates simple, empathetic and creative communication in order to build a shared vision and inspire action.

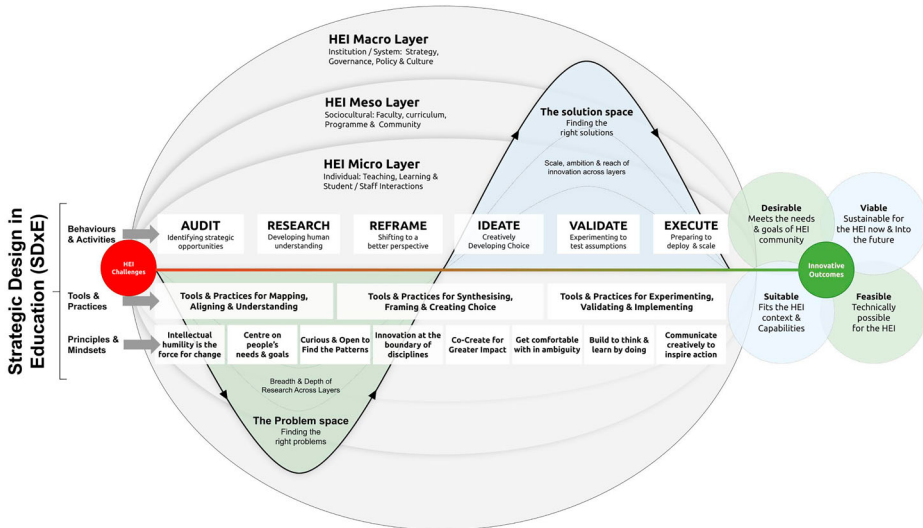


Figure 8. The layers of SDxE.

HEIs navigate the complexities and ambiguities which will inevitably result in the HEI sector for decades to come, by creating *viable, desirable, suitable, and feasible* innovations.

5. Conclusion

As a result of the COVID-19 pandemic, many members of the HEI community have already embodied the spirit of designers by identifying needs and creatively responding with speed, agility and ingenuity. Through embracing a SDxE approach, we argue that

this community has the potential to not only get comfortable in the complexity and ambiguity which will inevitably result in the HEI sector for decades to come, but have an opportunity to shape it into something more desirable. When such a structure is developed and stakeholders begin to conceptualise complexity, change, ambiguity and possibility differently, only then will it be possible to begin the process of changing and even transforming the HE system. We propose that SDxE offers an actionable scaffold for innovation, one that holds the potential to affect change, improve collaboration and produce more successful outcomes at the micro, meso and macro layers of an institution.

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