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Designing the future of healthcare together: prototyping a hospital co-design space

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ABSTRACT
This paper contextualises the emergence and continuing development of the Design for Health and Wellbeing (DHW) Lab, a collaboration between a university and a hospital in Auckland, New Zealand. The DHW Lab was established with the vision of creating a design space in which designers, students, patients and hospital staff could work together to identify and address contemporary healthcare issues in innovative ways. In this paper, we explain how the continuing development of the space reflects the design principles it espouses, and how this is embedding design principles and practices into a healthcare organisation. In particular, we will show how the users of the space contribute to the evolution of its physical appearance, its values and its performance as they come to identify and make sense of the challenges, possibilities and potential of the DHW Lab initiative.

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Introduction
Experience-based design can positively contribute to the healthcare experiences of patients and their families (Tsianakas et al. 2012). What this growing area of research has highlighted is a broader shift in healthcare innovation, which is increasingly about designing with patients and not simply for them (Sanders and Stappers 2014). In this new paradigm, there is a focus on understanding the perspectives and needs of patients by including them in the design process (ibid). While there have been many recent attempts to theorise co-design methodologies within a healthcare context, there has been relatively little attention paid to the role of co-design spaces (Sanders and Westerlund 2011) in facilitating this shift.

In this paper, we present a case study of a design lab situated within a busy inner-city hospital. The Design for Health and Wellbeing (DHW) Lab (www.dhwl.com), a collaboration between the Auckland District Health Board (Auckland DHB) and AUT’s Faculty of Design and Creative Technologies, is a co-design (and co-designed) studio within Auckland City Hospital. It has been established with the vision of introducing the principles and methods of experience-based co-design into a healthcare environment. Its first year
(2013–2014) of operation has raised a number of challenges and questions. These include: what is the role of the DHW Lab space in augmenting co-design processes more broadly within the hospital? In what ways does the lab space provide the scaffolding around which a patient-centred co-design experience might be built? To what extent is the DHW Lab space a prototype of co-design processes within a healthcare organisation? How might the DHW Lab environment support authentic learning experiences for university students? In this paper, we consider these questions by exploring how the lab space has evolved through the projects undertaken within it. First, we contextualise the DHW Lab in theory before exploring how the space works in practice. The DHW Lab, began as a design-led initiative that was speculative and exploratory, with an emphasis on doing and making, experimenting and reflecting (organically and often informally) using collaborative processes, rather than taking an advanced planning/business case approach. Consequently, the scope of this paper aims to provide a more reflective account of the establishment of the initiative, rather than validate the outcomes, and their potential impact on the host organisation’s performance supported by empirical evidence.

**The social lab movement**

The public sector has in recent decades embraced a growing number of initiatives that aim to address complex societal needs and challenges through ‘innovation’. Many of these initiatives take the form of a ‘social lab’ – a collaborative platform committed to the growth of social innovation through inquiry, analysis and rapid experimentation. The issues to which these social labs attend are often extremely ambitious. Some, like SociaLab based in Chile, look at ways of alleviating poverty, while others, such as those affiliated with the organisation Reos, focus on global food sustainability, climate change, community resilience and state collapse (Hassan 2014, 15). ‘Living Labs’, a variation of this movement in social innovation, emerged in Europe around 2005 and refer to a network of small public–private partnerships which are characterised by user-involvement and real-life experimentation (Almirall and Wareham 2008).

These, too, are fundamentally collaborative spaces that often attempt to deal with what Buchanan (1992) calls ‘Wicked Problems’. The participatory framework in the resolution of these problems can be likened to the orientation of co-design practices in which a variety of skill sets and expertise – of both designers and end-users – become integrated into a ‘knowledge ecosystem’. In their study of the cultural production of innovation within the industry of design consultancy, for example, economic geographers Sunley et al. (2008) show how ‘design innovation involves a complex blending of many different forms of knowledge, [and therefore] requires us to understand a set of connections between sites and domains’ (2008, 678).

**Co-design and co-design space**

Since the 1970s, attempts to include future users and other stakeholders in the design process have given rise to a number of approaches commonly referred to as co-creation or co-design (Sanders and Stappers 2008). Today there are a great number of ways of practising and thinking about these approaches. While it is not our aim to describe them in depth here, we should note that we are in agreement with Sanders and Stappers (2008, 6) who
see co-creation as that which refers to ‘any act of collective creativity, i.e. creativity that is shared by two or more people’, and co-design as ‘the creativity of designers and people not trained in design working together in the design development process’. This latter definition is particularly relevant to the activities of the DHW Lab, which aims to draw in those with little or no experience in design (e.g. patients, families and hospital staff), and provide the tools and environment necessary for them to collaborate and to make meaningful contributions to the design process.

This understanding of design as a collaborative process – that is, as an approach that engages with stakeholders and end-users to meet their needs – is by no means new. What is relatively new, however, is that it is increasingly linked to social innovation efforts. Indeed, some have even gone so far as to suggest that policy-makers and politicians are beginning to see co-creation and co-design as necessary to innovative solutions (Voorberg, Bekkers, and Tummers 2014). As sites dedicated to addressing ‘Wicked Problems’ through collective problem solving, social labs are becoming central to this shift, and their emphasis on rapid prototyping not only helps demonstrate the viability of their solutions, but also helps facilitate collaboration. Murray, Caulier-Grice and Mulgan (2010), for example, recognise the social significance of refining and testing ideas through prototyping, noting that ‘it’s through iteration, and trial and error, that coalitions gather strength (for example, linking users to professionals) and conflicts are resolved (including battles with entrenched interests)’ (Murray, Caulier-Grice, and Mulgan 2010, 12).

Prototypes are not only evolving objects, or objects-to-be; they have much wider social significance, projecting into the public sphere a set of ideas, methods, and processes which link matters of practicality to the abstract, helping create, shape and manage social links (Rosental 2005). They take many different forms and are an important means of bringing ideas into the world (Sanders 2013). Sanders and Westerlund (2011) have theorised the concept of co-design space, which can itself be viewed as a kind of prototype that helps facilitate and improve creative input from stakeholders who may not think of themselves as designers. As Sanders and Westerlund note, a number of difficulties arise in situations where design experts and non-experts work together. These include spending too much time on an early idea instead of exploring a variety of other possibilities, and getting non-experts to engage in ideation when they feel that their knowledge in the area is insufficient.

Similarly, some participants in co-design may simply feel they are not ‘creative types’. Sanders and Westerlund (2011) advance the view that these difficulties can, to a large extent, be overcome by the space in which the co-design processes and methodologies take place, since it can provide a ‘scaffolding’ that supports participants’ creative expression and input. The authors outline three aspects of design space in their formulation of the co-design space concept. These are (a) the experienced physical space, (b) the current work and (c) the future situation of use. In this paper, we will draw on these three aspects in order to understand the significance and potential of the co-design space inside Auckland City Hospital, and how it is evolving over time.

**Co-designing the DHW Lab**

We propose that prototyping refers not only to evolving design outputs, but also to the space in which they are made, which may itself be only the most recent iteration of an ongoing co-design process that includes multiple stakeholders. In October 2012, for
instance, the Auckland DHB and AUT’s Faculty of Design and Creative Technologies signed a Memorandum of Understanding (MoU). The MoU set out how the two organisations might collaborate on health projects, based on an understanding that AUT recognised an opportunity to develop and apply its design research and teaching activity in the health and social sector, and that the Auckland DHB was interested in innovative solutions to population health, and service planning and delivery issues. A period of ‘due-diligence’ was then undertaken, during which each organisation interacted and developed an understanding about the activities, resources and capabilities of the other. This period confirmed that both organisations would likely benefit, in principle, from a design lab. At this time it was felt that the two organisations had limited capacity and resource, and were yet to develop the necessary processes to fully realise the potential benefits of a collaboration, but there was likely to be value in continuing to explore what a design-led opportunity would look like. Consequently, the opportunity for the Auckland DHB to collaborate with AUT to develop a ‘DHW Research Lab’ was confirmed, building on the Auckland DHB–AUT relationship established by the MoU.

The initial aims of the lab included establishing and developing a community of interdisciplinary design-led research for developing products, services, systems and experiences for the improved health and well-being of our population. At this time, there was little explicit understanding around what was required, whether a physical location was needed and what form this might take. Therefore, the initial approach aimed to collaboratively develop a culture and purpose, build relationships (both internally and externally) and emphasised being open-minded about potential outcomes and opportunities with the view that this experimental/prototyping approach would ultimately result in useful learning opportunities. It was expected that further developing the Auckland DHB–AUT relationship would stimulate opportunities for both parties, and significantly enhance patient, family and community experiences over time. Auckland DHB staff would have further opportunities to learn by having access to design-led expertise, while the university would have access to meaningful, real-life design problems for its academic staff and students. The healthcare sector would both benefit from and attract creative expertise and talent to solve service planning and delivery issues. Staff and patients at the hospital would benefit from design’s ‘human-centred’ approaches and focus on end-user experience.

The development of the proposed lab required a multi-pronged approach with both immediate and longer term goals (over a 12-month period). These fell into two general categories: (1) the development of a research proposal to present to the Auckland DHB/AUT Senior Management Teams asking for commitment; (2) development and initiation of several small design-led research projects. A working group with representatives from the two organisations was established to pursue these initial goals. Over a several-month period the group, comprised of people from a range of disciplinary and professional backgrounds, met and established a framework for the implementation of a lab as a virtual network. Several themes were explored around a key research question: how can design contribute to improved health and well-being?

**Occupying space**

Auckland City Hospital (ACH) is centrally located in Auckland (population approx. 1.5 million), New Zealand. The hospital has 700 beds, employs approximately 4-5000 staff at
the ACH site alone and offers quaternary care services to the entire country. The number of entry movements each week is estimated at 60,000. After signing the MoU, the two organisations set about determining how the collaboration would work. Included in this was the requirement of a physical space that would bring patients, families, students, staff and the community together to improve healthcare experiences through design-led activities. We have identified three more or less distinct phases of the physical lab development. The first was phase was identifying an area (designated for future expansion) near the main public area, which, though not obviously directly accessible to the public, was close to the ‘heart’ of the hospital (see Figure 1). The space had a concrete floor and unpainted walls, no air conditioning, power, lights or data cabling. This space was chosen to host a number of early workshops, using the industrial feel of the place to spark creative potential. All furnishings were borrowed, often in a state of disrepair, but were sufficient to facilitate workshops between Auckland DHB and AUT staff, as well as students. An example of a tangible output from this early phase was a mock-up of a Hybrid OR room in early 2014, with theatre nursing, cardiology nursing and anaesthesia technicians. Through these full-scale, low fidelity, prototyping exercises, one person observed: ‘The [Hybrid OR] room is enormous. Even playing out both scenarios there is 6–7 m (length) of unused space (with generous allowances of the current setup) at the foot of the bed. It would be fair to say that we can shrink quite a bit without compromise’. Consequently, the footprint of the OR room was reduced with the exercise as a useful reminder of the value of full-scale prototyping facilities and the potential for how the space could be used.

The second phase was to make the area fit for a project team to use more routinely, so the area was fitted out with lighting, walls were painted and the floor was cleaned. As the fit-out budget was limited, all furnishings were designed and made ‘in house’ using 3D workshops at AUT. Because space in the hospital is at a premium, it was important that the use of the spaces was to be ‘temporary’, so the fit-out had to be designed such that it could be very rapidly packed down. This situation also meant that it could support and enable the prototyping of the space as projects develop, since it allowed the space to easily change.

Figure 1. The DHW Lab in 2012 (left) and in 2015 (right).
with use, and encouraged reflection on how it operates. This has helped the space evolve over time. During this phase, the floor space and wall areas were well utilised to progress public spaces project work. However, no space existed for students studying via the design lab, no separation existed for different projects and it was still unfit for patients and families. There was limited postgraduate research activity with students spending the majority of their time at the university. The third (and current phase) saw the development of a more formal space, installation of wifi, computers and related infrastructure, and a formal launch event (recognition and validation of the initiative by the two organisations). During this time we have grown a postgraduate cohort of students with individual spaces to work/design, and have employed a small team of more permanent design staff. Throughout this period a range of design led student and staff projects were initiated, including the design of a baby bath for a Neonatal Intensive Care Unit; an interactive picture book to help better communicate a children's journey through the orthopaedic department; a design-led exploration and development of new wayfinding solutions for a children's outpatient department; wayfinding for the adult emergency department and public spaces; development of universal translator cards; and the redesign of hospital family waiting rooms (Figure 2). The space now allows for the three purposes of the lab to effectively co-exist: student learning, research and design consulting. Each has room to tell their story and progress the DHW Lab further.

Central to this space and its ability to foster collaboration within the hospital is the DHW Lab culture. Designers, students, researchers and the DHW Lab directors have regular sessions to develop the lab culture to reinforce its core values (see Figure 3). These participatory sessions build on the early planning meetings between representatives from Auckland DHB and AUT which sought to highlight key opportunities, issues, questions and a shared vision. Early on in its development, the directors, researchers and other key stakeholders envisaged a working environment defined by equality, interdisciplinarity, empathy and the capacity to demonstrate possibility. The regular workshops engage the users of the space (designers, students, researchers, staff) to address and resolve problems through openness, honesty and equality. The participants, sitting around a table with a large pad and pens at hand, identify primary issues and make suggestions for the improvement of the working environment: how to resolve administrative issues from the space between two different organisations and to access resources necessary for efficient work. In this sense, the aim of the sessions is to provide an opportunity for its users to be actively and equally involved in the design and continued development of the physical space (as well as the agenda it embodies) to address the issues most important to them. These issues ranged from administrative problems to more complex organisation and project management challenges (for example, installing wifi, lights, computer access, furniture, hospital access, lab use and booking, noise, purchasing of materials, project recognition, implementation barriers, continuity and recruitment of students and staff, balance between learning and organisational objectives, establishing priority and project selection). Ultimately, these sessions help ensure that the space reflects and enables the kind of culture necessary to promote greater interdisciplinary collaboration and innovative practice. Through these sessions, and a diverse stakeholder group, the different needs of the space are explored to reflect the users and the activities. For example, how the complementary needs for an ideal postgraduate learning environment and a public-facing co-design workshop space were explored, as well as what environmental requirement were unique to each situation. In a similar way to the visual documentation of specific projects and programmes of work on the walls of the space, developments of how we work (or suggested
Figure 2. Examples of staff and student work; Adult emergency department wayfinding, including digital animations showing the AED pathway in different languages with wait time display that supports the messages outlined by the journey map by explaining details such as how many patients in ED are suffering from life threatening injuries; Public Space wayfinding; designing family waiting areas; Navigating through healthcare-appointment letter and wayfinding (Eden Short).

When you come out you walk straight into other people’s grief and it is hard because you want to give them privacy but you are right there.

-Family member
changes to this) are documented and communicated to those that come into the space (or visit the web site) for sharing, transparency, and to encourage ongoing dialogue with the diverse range of stakeholders and collaborators. In addition, the openness and temporary nature of the physical space (the furnishings and projects/prototypes in development) are
used to encourage (both physically and metaphorically) ongoing experimentation and development in projects, culture and collaboration (Figure 4).

**The agency of the DHW Lab prototype**

In a previous paper (Bill, Reay, and Collier 2015), we argued that the DHW Lab acts like a ‘Trojan Horse’ (Macdonald 2013). We found this to be a useful metaphor when thinking about the way it has seemed to penetrate an institutional context often characterised by hierarchies of clinical expertise and bureaucracy (Foucault 2007). Now operating inside the hospital, the DHW Lab communicates co-design methodologies while advancing its vision of the future of health, drawing attention not only to what is, but to what could be. In this sense, the DHW Lab, as a ‘provocative’ prototype, is in a unique position to point to the ‘taken-for-grantedness’ of day-to-day practice in the hospital, and to critique the status quo by challenging industry conceptions from the inside (Boer, Donovan, and Buur 2013). While there is an existing performance improvement team in the hospital that delivers improvements in healthcare service across the wider organisation, they too have experienced difficulties when implementing change strategies. The Auckland DHB is under increasing demands to look for better and more cost-effective patient-centred healthcare. From a patient perspective, patients may view the objectives of the organisation as focused on drivers such as safety and financial management, with a patient experience that may feel disconnected, unclear and otherwise unsupported. Reconsidering the way things are done and thought about within the hospital means getting stakeholders excited about the prospect of change, encouraging them to share creative insights and inviting them to meaningfully contribute to the design process. This vision of collaborative, future-oriented design is facilitated by the physical qualities of the lab itself, a co-design space that is open, dynamic

**Figure 4.** A prototype of the space in early 2014 showing how working areas are separated by light and flexible ‘X’ frame dividers.
and experimental, a space that changes according to the needs of its users. The DHW Lab must cater to a range of needs while encouraging and supporting user-involvement, experimentation and discussion.

The materials that constitute the lab’s makeshift interior are low-cost, light and flexible, creating a semi-permanent space that helps provide a sense of both mobility and change. Pinned to the lab’s walls and strung up on its semi-permanent dividers are artefacts that exhibit the variety and depth of lab’s projects, both in progress and those completed (as a public archive). There are sketches, 3D diagrams and photographs as well as a selection of healthcare products designed by AUT students. Trestle tables and workshop spaces display various prototypes showing the many phases through which project ideas are developed, tested and reiterated before they are applied. As the visitor walks through they are exposed not only to the lab’s physical outputs, but also to design-led research methodologies in general, and to a whole range of different conceptual developments along the way. The DHW Lab prototype has helped build a network of professional relationships and contributed to a conversation around a ‘culture of care’.

There are a number of design and health-led collaborations between universities and healthcare organisations internationally, many of which have advanced and established programmes relative to the DHW Lab initiative. In the UK, for example, are the Lab4Living (http://www.lab4living.org.uk) a collaboration between the Art and Design and Health and Social Care Research Centers at Sheffield Hallam University. The Helen Hamlyn Centre for Design and the Royal College of Arts, London (http://www.rca.ac.uk/research-innovation/helen-hamlyn-centre) has three research labs (Age and Ability, Healthcare Research & Work and City Research), as well co-supporting the Helix Centre (http://www.helixcentre.com) with Imperial College London. The Helix centre (Healthcare Innovation Exchange) has offices in St Mary’s Hospital London, and design studio on the St Mary’s Hospital site. Others include Cornell University’s Health Design Innovations Lab (http://hdil.human.cornell.edu), the Health Design Lab (Emily Carr University of Art + Design, Canada) (http://research.ecuad.ca/healthdesignlab), the Center for Design in Health (http://cdh.design.umn.edu) at the University of Minnesota, the Innovation and Design Lab at the University of Santa Cruz (http://artsresearch.ucsc.edu/idl) and the Experio Lab (Sweden) (http://experiolab.com).

Figure 5. A workshop with members from the Grafton community in early 2015 for the Public Transport work stream.
These initiatives appear to share a common focus on creative, patient-centred partnerships to propose strategies and solutions that enable and empower people of all ages and abilities to live with dignity and fulfilment. The teams are made up of a wide range of practitioners, clinicians, designers, students and the people who use healthcare services. In contrast the DHW Lab consists of a much smaller team and fewer senior academics and is in a start-up phase. The other labs and centres are not usually characterised by a physical space within the healthcare organisation they are working with, and when they are these are often a standard room used for ‘post it note’ co-design sessions (Figure 5).

**The student voice**

One of the important goals of the initiative was to enhance learning experiences for students by providing them with real-world opportunities and contexts (Newmann, Marks, and Gamoran 1996). One of the measures of success for both organisations is having students engaged in design-led healthcare projects through the DHW Lab. During 2014, a small number of undergraduate and postgraduate projects were initially conceived from the Product Design department at AUT. While these projects were not able to be easily run from the proposed lab space, they helped provide examples of the type of work students might undertake from the DHW Lab when it was properly established, as well as to have live projects to help gather information on student needs for research in a healthcare context (Figure 6).

The recent 2014/2015 university summer break was the first opportunity to test how the DHW Lab might operate as a prototype of a co-design space. Following on from the initial student projects, the DHW Lab (as a functional prototype space) was able to host a 10-week summer internship programme. The summer student intern programme drew on the skill sets of graduates working across a range of disciplines – e.g. health informatics, graphic and spatial design, computer science, management, health sciences – to work on three main projects related to the use of information technology in the hospital. This provided...
an opportunity to test the lab space and the underlying assumptions as to how it would function as a collaborative interdisciplinary environment, with a diverse range of people working on real-world health projects. Their involvement would also help inform some of the space requirements using it as a temporary location for their practice.

The interns were surveyed using an anonymous questionnaire (both qualitative open-ended and quantitative questions) about their experience of working in the space. The aim of this survey was to explore how authentic learning experiences in the lab might be enhanced, and questions sought feedback on the relevance of projects and how they were perceived by the students to contribute to the organisation’s objectives as well as the students learning objectives, professional development, the general lab environment and culture, collaboration opportunities, preparedness, etc. and what worked well or could be improved. Feedback from the students’ time at the DHW Lab indicates that the space was seen as central to facilitating engagement within the hospital between students and health professionals from a range of backgrounds. The results also indicated that students enjoyed their internships and benefited from having the opportunity to apply their knowledge in real-world situations, but also identified a number of challenges that had mostly to do with hospital protocol and administration (with both organisations AUT/Auckland DHB) (see Figure 7).

While some felt their work had made positive contributions, many were sceptical that their work would contribute to an improved user experience, especially for patients and visitors, because some felt that their work was purely conceptual, or would otherwise take a long time to be implemented. Many were hopeful, however, that the eventual implementation of their work would lead to improvements in the user experience. One respondent said that while their work may not immediately help the hospital and its users, it nevertheless contributed to a conversation around user experience. The interns desired increased visibility for the projects they worked on and those being undertaken by others (both internally and in the wider design community), greater levels of collaboration, shorter ‘quick fire’ projects and increased interaction with patients and visitors. Improved facilities

Figure 7. Perceived benefits and challenges of DHW Lab space from student intern surveys from 2014 to 15.
(i.e. desks, better Wi-Fi, storage and more prototyping equipment) were also desired, along with better administrative support (i.e. project management, misalignment in objectives, differing management styles, access to library resources). Despite some of the challenges, the students reported having a better understanding of how the hospital actually worked, and useful exposure to diverse experiences and work activity. Given opportunities to independently present their work within the space to a range of stakeholders and other hospital staff, the student projects were part of the DHW Labs efforts to present what designers ‘do’, and the skill sets they have, to a broad healthcare audience. The students reported increased confidence in their work, ideas and abilities and an expansion of their design skill sets from working collaboratively with diverse stakeholders and end-users (Figure 8).

Student feedback also indicated that the DHW Lab helped highlight future opportunities for students as designers. From this experience many of them had a much better idea of what they want to do in the future, and that they can better recognise where their particular skills and qualifications can be applied in larger organisations such as the Auckland DHB. Working alongside clinical staff not only strengthened their work, but also made them think about their longer term career aspirations in healthcare. While for some students the experience of working in a hospital opened their eyes to the potential opportunities of future work in health, for others it simply helped reconfirm their determination to work in healthcare. As one student put it, the Lab has ‘helped validate why [I want to work in healthcare] and given me new opportunities and experiences that are helping to direct what area most interests me or where is most needed’ (Figure 9).

**Visitor book**

The DHW Lab prototype has helped build a network of professional relationships and contributed to a conversation around a ‘culture of care’. An unanticipated benefit of the success
of the space is that it is often visited by representatives of large external organisations such as banks and universities who arrange tours through the space. One of the ways we have sought to document the way the space is being received is to invite visitors to anonymously complete a page of our visitor book, to help us better understand how the space is perceived and experienced by visitors, and how we might be able to improve our lab environment for all users. Each page is divided into three sections (arrival at the hospital, through the hospital and the DHW Lab) in order to capture how the visitor’s experience changes as they make their way to the lab; what they see/hear, feel and think. We have found that, for visitors, the feel of the DHW Lab contrasts sharply with the rest of the hospital, and that this represents a positive change (see the visual representation of the visitor’s journey and their comments in Figure 9). These comments help illustrate the emotional agency the space has in conveying the intentions of the DHW Lab, and helps reinforce the importance of the culture to those working and studying in the space. In addition, the recognition (surprise/delight) by many visitors and the contrast of the lab environment with the rest of the hospital helps motivate those associated with the lab to continue to challenge existing norms and to improve healthcare experiences for all users (Figure 10).

**Discussion**

To date, much of the DHW Lab’s activity has been centred around prototyping. The DHW Lab has been as much about prototyping products, a space and a method, relationship and collaboration, as it has been about prototyping a sustainable practice (Binder and Brandt 2008). Inside a more structured organisation, this kind of prototyping helps articulate a shared vision of the future, while challenging the entrenched ways of thinking and doing (Boer, Donovan, and Buur 2013). We view healthcare as very complex, often departmentally and organisationally siloed and continually changing. Hospitals are continually subject to external political and social influence, and are under increasing financial pressures (often exaggerated by population growth). Many employees are focused on the technical and professional tasks associated with saving lives and improving health outcomes, often without system-wide or design-led performance or innovation objectives in mind. We may
have initially falsely perceived some of the initial barriers associated with new innovation initiatives (as outsiders), as there has obviously been individual support and partnership, and acceptance and approval of the DHW Lab initiative among the senior leadership that have continued to support our ongoing presence. However, our host and collaborating organisation may also have held assumptions around innovation and change strategies. It appears likely that these didn’t include embedding a design lab in the hospital, or at least there was not expertise for how to do this.

While it has not been our intention to introduce any new claims about the role of prototyping to describe what is happening around the DHW Lab activity, the continual use of this terminology has been a useful way to help manage expectations and potential risks of the DHW Lab as we become established within the hospital organisation. The value of the DHW Lab initiative is expressed through the space and its activities, which are profoundly visual, expressive and prototypical from start to finish. The lab has an open-door policy,
which means that patients, visitors and hospital staff can come in at their convenience and suggest ideas and design problems (Figure 5). Possible solutions to these are given physical form through rapid prototyping, which is often undertaken in a designated prototyping area where end-users can engage with designers to help explore and visualise design concepts. These techniques, always with and alongside rather than simply for users (Sanders and Stappers 2014), help the hospital envision the potential for change and to explore the feasibility and effectiveness of new design-led approaches and methods. The space itself, full of the artefacts that result from project research and ideation, actively communicates what design can offer to the improvement of healthcare experiences, and signals, visually, how these innovative changes might be undertaken. The transparent documentation and archiving of projects also helps to support ongoing learning after the completion of projects, as well as helping to reinforce and make more accessible some of the terminology of design.

As a transformable and engaging co-design space (Sanders and Westerlund 2011), one of the DHW Lab’s primary objectives is to encourage users with little or no experience in design to positively contribute to the design process. As this paper has attempted to articulate, co-design at the DHW Lab operates on a number of different levels. First, it pertains to every project run through the lab by inviting people without design expertise to participate in the design process. Second, it pertains to the internal development of the internal space, whose users (designers, researchers, students, AUT/Auckland DHB staff, visitors, etc.) are actively involved as collaborators in the overall trajectory of the DHW Lab; how the projects unfold, and what the physical space looks and feels like, as well as the culture and overarching purpose of the initiative.

In this paper, we have indicated that there are multiple layers to the DHW Lab initiative, and we pointed out in our introduction that the space can be seen as one response to broader calls for ‘innovation’ in the public sector. While the DHW Lab is indeed focused on improving healthcare services, systems and products, what makes the initiative distinct is its hybridity and location. By drawing in resources and expertise from a healthcare organisation and a university, the DHW Lab is in a unique position to not only address healthcare
problems in innovative ways, but to explore other areas and possibilities for the integration of health and design expertise, particularly within the context of education. Already we are seeing how student interns are benefiting from an ‘authentic’ teaching and learning environment (Newmann, Marks, and Gamoran 1996). Students are working collaboratively on real-world projects and learning to negotiate project roles with hospital staff and other students from radically different backgrounds. But working inside the hospital also means that design students, with no experience in healthcare, must learn to adjust to new and often emotionally intense environments such as the Emergency Department.

As a research platform, the DHW Lab is in an interesting position to study authentic learning environments in the abstract, but also to develop conceptual and practical frameworks to identify and mitigate ethical issues that might arise from these encounters between health and design. Anecdotally, these encounters have started changing the ways people at Auckland hospital have traditionally thought about and addressed service issues, but how we actually measure the impact of the DHW Lab on the lives of patients, families and staff will be a new direction for research as its scope and capability continues to expand (Hyysalo and Hakkarainen 2014). While there is much potential both in practice and research for a collaborative real-world initiative like the DHW Lab to operate successfully as an authentic learning environment, its success will ultimately be measured by how we collaboratively prototype beyond the start-up phase and establish design as a core to help facilitate a transformation in patient and family healthcare experiences (Figure 11).

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