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Editorial: Translational design: Enabling impact in complex, multi-stakeholder research projects through design

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Abstract: Translational research seeks to apply knowledge generated through fundamental research into tangible impact outside academia. Designers are increasingly involved in complex multi-stakeholder, impact-oriented research projects, acting as ‘translators’ across disciplines. Designers draw on the rich history of practice in design research to synthesise, integrate, and bridge disciplinary knowledges into practice outcomes. This editorial introduces the papers of the thematic track ‘Translational Design: Enabling impact in complex, multi-stakeholder research projects through design’ presented at the DRS2024 conference. 12 papers were selected from 44 submissions and classified into three groups: ‘Designers as interpreters, mediators, and facilitators between disciplines,’ ‘The translation of research knowledge into and through artefacts,’ and ‘Translational design in PhD research.’ These papers present descriptions and case studies that help to make explicit the implicit translational roles, tools, and methods of design researchers in academic and multidisciplinary contexts. The track invites researchers to explore an expanding role for practice-based design research as an explicit tool for research translation.

Keywords: translational design, multidisciplinary collaboration, translation, impact

1. Introduction

Translational research leverages insights from fundamental research to develop tangible innovations, solutions, and interventions with a direct impact on individuals, organisations, and the environment. Universities are increasingly striving to enhance research impact within communities (Campillo et al., 2023), and the applied, action-oriented, epistemology of the design field is ideally positioned to support translational research endeavours.



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Design practice can be viewed as inherently translational (Page & John, 2019; Hornbuckle, 2022) as it integrates foundational knowledge and interdisciplinary collaboration to produce designed artefacts, through creative processes. This translational aspect is particularly evident in complex, impact-driven research initiatives, where designers help to facilitate the transformation of dispersed knowledge into tangible outputs such as artefacts, environments, messages, services, and systems (Bertola and Teixeira, 2003). Designers employ frameworks, methods, and creative tools, to aid stakeholders – including users – in navigating complexity to help achieve ‘clarity in the chaos’ (Kolko, 2010). Designers synthesise diverse inputs into a cohesive, seamless whole understandable to diverse users.

Effective research translation and impact-driven research rely on robust communication and collaboration among stakeholders from various disciplines, industries, sectors, organisations, and end-users. Multi-stakeholder collaborations are foundational to translational research, fostering holistic approaches that yield contextually relevant solutions in the world outside the lab. This approach to research translation mirrors what the design research community has highlighted as the collaborative approaches that make for effective contemporary design projects. Design practice is often recruited into research projects with a focus on implementation, creating final artefacts for public dissemination. Yet, given design's expertise in multi-stakeholder collaboration, and the field's practice-based approach to research, designers are well-equipped to facilitate complex research endeavors. Often designers find themselves transitioning into these roles, and increasingly the collaborative potential of design is being recognised in these contexts. Providing this collaborative facilitation can effectively support multidisciplinary teams to developing contextually relevant solutions more effectively than single disciplines alone. The design field is evolving its understanding of practice-based research through these complex practices, and we explore practice-based design research as an emerging partner in effective research translation.

In light of this evolving translational research landscape, there is a growing imperative to define and articulate the role of design practice within the broader discourse of translational research. Despite the implicit understanding of the translational potential of design within the design research community, there is limited explicit discussion of the role of design in translational research. Larger discussions of translational research from other disciplines also seldom acknowledge the possible impact of creative design practice and facilitation. Through this thematic track at the Design Research Society 2024 Conference, we explored the emerging role of design as an enabler of translational research. The papers presented in this track illuminate how design researchers can position themselves as essential actors in translational research activities by sharing case studies of design practice in research contexts. The initial call for papers prompted design scholars to contemplate:

- How does the configuration and culture of the research ecosystem shape the translational role of design?
- Are new methodologies needed for translational design practice?

- How do we move beyond transactional roles to define and lead impactful projects alongside other disciplines?
- And, are existing design tools and methods fit for research contexts?

We initially posited that translational research entails iterative cycles of dialogue, evaluation, refinement, and adaptation to effectively translate research findings into practical outcomes. Designers excel at these processes through iterative prototype development and visualisation, translating complex research into compelling, imaginable, tangible, and accessible formats for diverse audiences. The reflections on translational practice offered by the authors in this track, in response to these questions and ideas, mark the beginning of a conversation aimed at enhancing the design research community's understanding of design's impact in these research contexts. The articles provide insights into the emerging frameworks, tools, and methods to accelerate translational design research.

Out of 44 initial submissions, 31 papers underwent double-blind peer review, and 12 were selected for presentation at the DRS2024 conference in Boston, USA. These papers offer diverse insights into the roles of design in translational research contexts through case studies and reflections. They range from small-scale interdisciplinary collaborations between two researchers to large, multi-stakeholder projects mediated by designers. Importantly, the research projects yield diverse outputs and outcomes, including physical artefacts, knowledge products, and new design frameworks, methods, tools, and workshop formats. The papers are categorised into three thematic groups:

- 'Designers as interpreters, mediators, and facilitators between disciplines,'
- 'The translation of research knowledge into and through artefacts,'
- And, 'Translational design in PhD research.'

Each group, along with its respective papers, is introduced in detail within this editorial.

One paper, *'Translation as an explicit practice in design research,'* cuts across these categories and positions the overall concept of Translational Design Research. In this paper, track chairs Rosie Hornbuckle and Rowan Page reveal several ways in which design in complex research settings may be considered intrinsically a translational activity, and propose that translation has the potential to become an expanded and explicit practice in design research. While most papers in this track detail projects to advance debates on design and translational research, this paper attempts to lay a conceptual and theoretical foundation to support the emergence of new practices and applications of design knowledge. They highlight that design's role in complex multidisciplinary and multistakeholder collaborative research is increasing, allowing the emergence of new practices and applications of design knowledge. This paper compares translation in design to the common understanding of translation across languages. It then goes on to detail design's vital role in convening knowledge and how design approaches can help to address the challenges other disciplines are facing in achieving impacts from their research. Hornbuckle & Page's paper provides a lens for how to understand the translational act in design

research, building a foundation for the larger collective discourse emerging from the papers in the track.

In the following sections, we elaborate on the three themes and the related papers.

2. Designers as interpreters, mediators, and facilitators between disciplines

Across the track, authors focused on the role that designers play as interpreters, mediators, and facilitators in multi-disciplinary projects. These articles highlight the importance of design practices to capture, synthesise, and visualise information. These authors demonstrate how designers translate and transfer knowledge from one disciplinary group to others while helping to form shared understandings. These diverse multi-disciplinary knowledge collections need to be negotiated and trade-offs and contradictions reconciled in order to put knowledge into action. Often the act of designing, whether producing an artefact or co-designing a model, forces these issues of negotiation and bring misunderstanding into the open. As several papers in this theme noted, oftentimes researchers from different disciplines can be using the same words but talking about completely different things. The following papers highlight examples of this in practice, detailing case studies across diverse contexts from health systems to the public sector.

In *'Design for social prescribing: bridging silos for health promotion'* André Nogueira, Reena Shukla, and Mo Sook Park present a case study of 'Design for Social Prescribing.' Through this research project, they explore and demonstrate how the structured use of design can support multidisciplinary collaboration in the early stages of emerging movements by shaping new conditions upon which diverse stakeholders can explore and negotiate ways forward. The paper outlines valuable learnings and highlights the impact of such an approach through describing actions taken by others after their use of advanced design models of connected frameworks and methods. They argue that in situations fraught with high uncertainty, a more open-ended, yet structured and rigorous application of design knowledge can present an alternative pathway to the conventional, linear, hypothesis-driven scientific approaches to framing problems and solutions, which often rely on a high degree of certainty.

Joli Holmes, Matthew Blanco, Todd Linkner, Estefania Ciliotta Chehade, and Paolo Ciuccarelli, in their paper *'Harnessing information visualization as a vehicle for translational design'* argue that the primary outcome of design in translational research contexts is the interpretation and translation of knowledge across disciplinary boundaries. They highlight how design can be used to support decision-making in contexts with multi-disciplinary expertise. Primarily, they demonstrate how information visualisation is a key tool in translating meaning between experts with differing expertise. The authors detail a case study and tool (Process Map) to understand risk developed in collaboration with an Italian financial institution. The authors build on a view of design practice in research settings as 'a fundamentally translational activity' (Page and John, 2019) and demonstrate how visual

communication can add to research in a world that often privileges ‘written words as the predominant vehicle for disseminating research’ (Grocott, 2004).

Through their paper *‘Tapestries of trust: using interdisciplinary design research to weave in multi-stakeholder perspectives in the public sector’* Bhuvana Sekar, Uttishta Sreerama Varanasi, Rūta Šerpytytė, and Viivi Eskelinen explore how design can help to untangle disciplinary perspectives, translate research, and create shared knowledge in complex, multi-stakeholder, contexts. They present a case study exploring trust between public servants and migrants in a public sector project. Through this, the authors demonstrate the value of methodological diversity in translating research and creating interdisciplinary knowledge. Importantly, they emphasise trust as a paramount concept in society and service delivery and argue that translational design can act as a mediator in ongoing discourses of trust, particularly in the emerging context of artificial intelligence.

In *‘Shaping Public Sector Digital Transformation through Design. Translation approaches on training programs as multi-stakeholder ecosystems’* Ilaria Mariani, Giulia D’Aleo, Marzia Mortati, and Francesca Rizzo detail design translation as a tool in multi-stakeholder public service ecosystems within the context of digital transformation projects. They highlight the role of training programs that integrate design thinking and stakeholder engagement across two complex multidisciplinary groups – the ecosystem of training providers and the ecosystem of participants. They highlight the complexity of different groups coming together with diverse perspectives that may adopt the same terminology but assign different meanings to the same concepts. Moreover, these design approaches organically made their way into other processes in diverse ways, highlighting the potential and challenges of design in complex environments. Importantly for this track, these questions of explicit and implicit translation of ideas and methods between design and other disciplines and practices are important questions for design to explore as we continue to develop this field.

Finally, *‘Toward mutual understanding: Constructing the designer-developer collaboration in designing gesture interaction’* by Yijing Yang, Wei Wang, Jun Zhang, Qi Chen, and Le Du highlights that one of the biggest challenges of design-driven research and development in UX is making sure that different roles speak the same language. They describe that designers and developers have difficulty understanding each other's work, even when focused on similar things. They present a case study focused on the specific challenge of designing touch-based gestural interactions, exploring the potential of design models and frameworks to help with interdisciplinary collaboration and translation between disciplines.

3. The translation of research knowledge into and through artefacts

Several papers in the track focus on the challenges of creating tangible artefacts that embody diverse perspectives and integrate a range of inputs from a variety of disciplinary stakeholders. These papers highlight the synthesis, trade-offs, and translations that occur when designers make the necessary decisions to craft the ‘collective research output’

(McKinnon et al.) of an interdisciplinary collaboration. Several authors highlight the value of these designed artefacts to the process of collaboration, not just the output, with artefacts forming boundary objects (Star & Griesemer, 1989) to communicate across disciplinary boundaries.

In *'Research-through-design and chemistry: Reflections on a multi-disciplinary workflow process of UV sensing wearables for sun safety'* Heather McKinnon, Levi Swann, Nathan Boase, Sandra Wiedbrauk, Mehrnoosh Mirzaei, and Samantha Wigman document the design, development, and fabrication of a UV-sensing wearable. The wearable is produced using a 3D printing process and novel diarythene photoswitch material and was developed through a complex multi-disciplinary collaboration with designers, materials scientists, and digital fabrication technicians working across the chemistry lab, design studio and fabrication lab. This case study details the challenges faced in multidisciplinary Research through Design (RtD) projects, detailing a workflow model, prompts for future translational design work, and highlighting the role of design artefacts and making processes as a tool for interdisciplinary collaboration and communication. They state that despite their 'often-stark disciplinary differences in approach and methodology' the contributions of both disciplines were 'fused' within the physical artefacts, forming the 'collective research output' and highlighting the power of design to translate and synthesise research into shared outcomes.

Dong Ding and Sarah Kettley in their paper *'Shifting between boundaries: 'Contextual Examples' as boundary objects in a Jeweller - Visual Artist distributed collaboration'* highlight the prevalence of cross-disciplinary collaborations in craft and design. Collaborations where designers draw from and apply knowledge from outside of their field – often guided by boundary objects. The paper details a case study of a remote collaboration between a UK-based jeweller and a US-based visual artist and introduces 'Contextual Examples' as a novel form of boundary objects. These contextual examples facilitate communication, knowledge flow, and the evolution of cross-disciplinary jewellery in collaborative settings and are explicitly oriented towards creative practice collaborations. By highlighting a collaboration between two creatives, this paper provides a different perspective to the many interdisciplinary collaborations in the track. This creative focus provides a richly detailed articulation of 37 different forms of boundary objects typical of design and creative practice. Through these contextual examples, it becomes explicit how designers use creative practice to respond to and translate ideas into different forms, providing a rich insight into the ways that design negotiates and conveys meaning.

In *'Collaborative translation from and into Practice'* Roger Whitham, David Pérez, Elizabeth Galvin draw on a long-term collaborative project with a museum partner to explore how collaborative design can translate situated knowledge embodied in expert practice. They detail two modalities. Firstly, translating staff members' existing practice into a shared language, prototype and tools. And secondly, translating knowledge into a change in staff's shared behaviours and capabilities. Through these examples, they highlight the potential of collaborative design methods to facilitate impact on practice through translating knowledge between practice and artefacts.

4. Translational design in PhD research

Increasingly practice-based design PhD candidates are embedded within larger multi-disciplinary research projects (Heiss et al., 2023). This brings with it the challenges of integrating diverse interdisciplinary knowledge, working with researchers and other PhD candidates from different research and epistemic backgrounds, and disseminating the findings of PhD design research to diverse audiences. The following articles demonstrate how approaching translation in the context of multidisciplinary doctoral projects opens up new questions and related opportunities concerning building the capacity of emerging design researchers working in impact-oriented universities.

Through *'Three Challenges in Practising Research Through Design in the Context of PhD Design Research.'* Marco C. Rozendaal, Patrizia D'Olivo, Elisa Giaccardi, and Pieter Jan Stappers highlight the power of Research through Design (RtD) methodologies in both Design and Human-Computer Interaction fields. The two fields where these RtD approaches have matured. The authors reflect on two PhD projects that explicitly aim to deliver both social impact, through a design project, and academic knowledge. They highlight the challenges of contributing knowledge while also contributing to design practice. They discuss how they designed products intended for use, but also intended to act as objects of inquiry that enabled effective collaboration with complex stakeholders. These case studies highlight how thinking of design as a translational research activity could hold potential for training the next generation of practice-based design researchers.

In their paper *'Webbing Clothes Moths from pest to opportunity: a reflective case study in interdisciplinary design-biology collaborations'* Chiara Tommencioni Pisapia, Bethan Highley, Miriam Ribul, and Sharon Baurley, Neil C Bruce present a reflection on a collaboration between two PhD candidates from different fields. In this project, a designer and a biochemist both investigate the deconstruction of wool for a circular economy using webbing clothes moth enzymes from different disciplinary perspectives. They highlight the potential of visualisations to support dialogue across discipline-specific contexts and communication with public audiences. The paper presents the translational dimension of early-stage collaboration between design and the sciences. They bring attention to the bi-directional benefit and potential of design to translate and communicate scientific knowledge, and the potential of emerging science to inform and enrich design practice oriented towards the future. Drawing on Hornbuckle's concept of proximity (2022) they highlight the importance of knowledge exchange and building mutual understanding in interdisciplinary research.

Sofia Soledad Duarte Poblete, Laura Anselmi, Valentina Rognoli, in their paper *'Materials designers and the translational approach: a case from a product design company'* argue that materials designers must develop strong translational design skills. The paper details a case study of developing a circular material from waste and highlights the relevance of translational design practice in this complex collaboration in a product design company. They discuss how material design processes are inherently exploratory and interdisciplinary,

at the intersection of multiple approaches. The authors further highlight that the ability to translate in these complex collaborations comes from experiential knowledge, rather than training. The authors suggest future research could help explicitly support the ability of designers to translate in these contexts.

4. Looking Forward

Within the research community as a whole, there is an increasing demand for multidisciplinary research that contributes directly and immediately to a positive impact in the world. The papers presented in this track share several ways design researchers have responded to this challenge, drawing on the fundamental translational and applied nature of design knowledge to support multidisciplinary teams engaged in complex, impact-oriented research. As design scholars expand their footprint in complex research settings, new challenges and opportunities emerge for the research community. This track aims to advance critical debates around the ways the design research community can explicitly tune into the translational capacity of design knowledge in these complex, impact-oriented research contexts. Through a diverse array of case studies and theoretical discussions, the contributions underscore the multifaceted ways that designers act as pivotal intermediaries in the translation of complex research into practical, impactful outcomes. Key themes emerging from these papers rest on the challenge of diverse languages and forms of knowledge and consequently the emerging role of designers as interpreters, mediators, and facilitators; the translation of research knowledge into and through artefacts as boundary objects and as shared outcomes; and translational design in PhD research—demonstrating the broad scope and depth of design's contribution to translational research and exploring new approaches to train future researchers in design and beyond.

The discussions within this track illuminate a potential to further integrate design knowledge and practice into the fabric of translational research, highlighting examples of how designers have adeptly navigated and bridged multidisciplinary divides and reduced related barriers in collaborative, impact-oriented research. Case studies detailed here show the tangible benefits of such a contribution. At the same time, design PhD research contributions highlight the potential benefits translational capabilities can bring to a new generation of design researchers confronting the complexities of modern multidisciplinary research challenges. This track lays a foundation for new questions to emerge, and with them, new approaches to be created within the design field and beyond.

As universities globally continue to seek to be impact-oriented institutions – producing action in the world in addition to the traditional knowledge captured in books and articles – design researchers have a unique opportunity to further research translation. We invite the design research community to continue to articulate and expand upon these Translational Design Research foundations. Collectively we can learn from other design researchers to build a design practice-based approach to supporting complex, multi-stakeholder, impact-oriented research.

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