



Faculty of Design

2022

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### Suggested citation:

Kumar, Pranay Arun and Jones, Peter (2022) Towards Healthcare Sustainability: A developmental design approach. In: Proceedings of Relating Systems Thinking and Design, RSD11, 3-16 Oct 2022, Brighton, United Kingdom. Available at <https://openresearch.ocadu.ca/id/eprint/4544/>

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**Relating Systems Thinking and Design  
2021 Symposium  
University of Brighton, Brighton, UK,  
October 13-16, 2022**

## **Towards Healthcare Sustainability: A developmental design approach**

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We report on systemic design methods and outcomes from a workshop and continuing design development for a research agenda to propose effective waste and environmental strategies in the healthcare industry. The recent interest in systems and expansion of systemic design research has produced new avenues for designers to contribute to complex socio-technical problems in designerly ways. We posit an approach called developmental design, as in developmental evaluation, satisfying the requirements when a longer-term, high-impact design goal is necessary, and typical design outcomes cannot be produced within a normal schedule of design products, as in many strategic design contexts. Developmental design is pursued through learning iterations following an ongoing series of design and evaluation interventions. The goal of the current study was to contribute to managing design for critical sustainability issues within the complexity of healthcare as an industry. Three phases of design research are discussed in this programme. First, a virtual design workshop produced a problematique from the contributions of mixed-expertise designers, using a selected set of tools from the Systemic Design Toolkit. Analysis and design interventions were developed by the authors. A current phase of the study is developing a synthesis map, translating research to a design artefact which projects the complexity of a wicked problem rather than distilling complexities to distinct action points. Thus, the artefact - the synthesis map - serves as a frame of reference for the third phase of research, which is research

on targeted interventions which are contextually and temporally relevant to stakeholders in sustainable healthcare policy.

KEYWORDS: developmental design, sociotechnical systems, healthcare, sustainability

RSD TOPIC(S): Health & Well-Being, Methods & Methodology, Sociotechnical Systems

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## **Presentation context**

Climate change and healthcare are wicked problems that transcend conventional understandings of wicked problems. They are social, cultural, technological, and economic but also temporal in nature. Problems like climate change are spatially and temporally complex, as well as time-bound. Long-term impacts require immediate actions to be trialled and studied for the appropriate directional effects to be carried forward over long periods of time. Conventional scientific research protocol dictates the progression of research from the acquisition of data to the distillation of important results through analysis. The conventional research cycle thus transforms data into evidence-based knowledge, wherein a directed focus only on predetermined or theory-driven outcomes of the research may stifle sufficient problem understanding or discovery of novel patterns. The action that ensues based on highlighted results from these studies can be detrimental to learning from intervention and perhaps result in extended study cycles with disappointing real-world outcomes.

We report on the results from workshops and analyses supported by literature and interviews that promote a long-term agenda toward stronger sustainability in consumer health and institutional healthcare. While these two contexts are widely differing in the volume of material flows, types of waste, hazardous materials, and single-use products, the consumer, patient, clinician, and hospital can be seen within a whole system for the purposes of sustainability transformation. In our case, we refer to sustainability as a holistic triple-bottom line aim, as flourishing (Jones, 2017), an aim that encompasses social, economic and environmental sustainability in healthcare systems. We begin by elaborating on developmental design as a research method within the ambit of systemic design practice and illustrate the method through our project on systemic

interventions in healthcare sustainability. We then reflect on the project and the use of developmental design as a long-term research-through-design agenda.

## **Principles of developmental design**

A design project can be thought of as a performance that produces objects of design (Pedersen, 2007). Design objects are produced by designers with the participants of the project and will evolve over the course of any project. The objects are the result of reflections on the development of the knowledge attained towards and in the process of making the object, thus being outcomes of multiple tacit and explicit knowledge bases and evaluation processes. One of the goals of any design project is to then relate these objects to the public and open dialogue for external input, particularly from those expected to experience and interact with the objects. However, much of the public participation and reflection is towards the improvement of the outcome (i.e. the designed artefact) and deterministic solution finding.

The beginning and end of a designed artefact are open and not limited to the project. Design is considered successful when its outcomes result in user appropriation, and hence the process must be open to appropriation as well (Krippendorff, 2005). This appropriation is reflective in nature, and any change occurring to the context affects the relationship between the artefact and the user. The reflective practice of practitioner fields such as management and design, as described by Schön (2017), suggests that a key action of reflection in and on practice involves the evaluation of the effectiveness of action, echoing the values of developmental evaluation.

Developmental evaluation has developed over the last three decades as a reflective and user-engaged approach to programme evaluation. It focuses on improving the foundations of program evaluation processes toward larger goals (Patton, 1994) rather than towards immediate projects under specific evaluation. The process has been taught and applied as utilisation-focused evaluation and Principles-Focused Evaluation (Patton, 2018). M. Q. Patton has recently translated the approach to global, systemic wicked problems, such as climate change and bioregion restoration, through the planetary-level practices of Blue Marble Evaluation (Patton, 2021).

Design projects are led by practices of inventive exploration, user-driven need-finding, and creative engineering, but not by evaluation practices. We might observe that evaluation practices are not “forward intervening” as design, as we use evaluation to assess the effectiveness of actions or design outcomes. We can make design decisions that follow evaluation findings, but the evaluation does not propose design options or recommendations. Developmental evaluation, as the most interactive approach to evaluation, does not, in theory, advance its own “research agenda” in terms of constructing the outcomes of interest to a community. However, like design practice advocates for most cases, the developmental evaluation explicitly defines and co-creates the principles and definitions of success with participants for program assessment.

Design practices, such as systemic design and organisational design, are expected to advance well-defined options to support the intention of organisational strategy or research agenda. We might therefore examine the strategic practices that mix or exist between methods of design and evaluation to discover adjacent approaches, whether defined or not. We can also adopt evaluation as research to improve the practice itself as if the practice were the object of research *through* design (Jonas, 2007). This cyclic process of reflection about practice (not the content or object) creates a basis for the focus on developmental design as a method of reflection *through* practice as a foundation of assessment of planned practice. Reflection through practice is an important feature of the systemic design that we term developmental design – the design of artefacts as a reflective practice towards the long-term research, development and intervention in complex systems.

Developmental design uses a series of interventions and engaged analyses to advance a continuing agenda that is intended as an attractor to discover and recruit stakeholders, who will be enrolled as contributors over potentially long periods of time. Like developmental evaluation, the long-term nature of complex systems projects requires a staged series of analyses and artefacts that are all aligned toward envisioned future outcomes that must be somewhat structured in order to guide an adaptive approach to progress. It can be seen as a mode of designing within systemic design. The value of this project as a development approach is to promote a design agenda for healthcare

sustainability at the industry level. The developmental approach is intentionally incremental, following the lead from learning from each step to the next towards long-term impact, i.e. from learning in event 1 (systemic design workshop) that drives event 2 (deeper analysis and publication), then event 3 (synthesis map) and so on.

## **Methods**

This study was organised over four phases. The first phase involved a participatory design workshop at RSD10 with design experts in healthcare and sustainability, engaging them with systemic design tools (Jones & Van Ael, 2022) for identifying suitable interventions across the system (conducted during RSD10) (Jones & Arun Kumar, 2021). The workshop used two framing tools (Actors map and Rich context) and an intervention mapping tool (intervention strategy) to co-create a set of 5 models that described an agenda for systemic design research for healthcare sustainability.

The second phase of the project involved analysing and publishing the findings from the workshop to open the process to critique and reflection. The analysis delved into the workshop methodology, the findings from the workshop and a critical reflection on the process and outcomes from the perspective of methods used and implications for research on healthcare sustainability. The resulting publication is included as a chapter in Pfannstiel (2023), *Human-Centered Service Design for Healthcare Transformation*.

The third phase of the project involved translating the data and analysis to a design artefact that could visualise not just the findings from the workshop but also the process and details of each model. The five models, along with details of the workshop process, were used to create a synthesis map (Arun Kumar & Jones, 2022). The synthesis map provides a granular yet cohesive understanding of the complexity of intervening in healthcare systems to find sustainable modes of practice. This map is designed to engage researchers and practitioners focused on the subject of sustainable healthcare, inviting critique as well as reflection on the positioning of their work in the evolving landscape of design interventions in consumer health and clinical healthcare systems.

The fourth phase involves an exploration of opportunities to transform the map into a living artefact that connects to emerging research on the subject and serves as a

springboard for new research and design avenues. The aim is to grow the map through co-design approaches and involve stakeholders in the process of reflection and updates of the map to make it relevant to the latest scientific research while unearthing unknown unknowns. A versioning of the process and design artefacts is expected to take place as the research develops, but this phase is also open to feedback and discussion. We intentionally leave the term “living artefact” under-defined as we are yet to explore the myriad of ways in which this artefact can “grow” through public participation. As the problems of healthcare and sustainability are temporal in nature, the problem itself will grow in ways unknown to us in the present. Thus, even the development of this research should not have conclusive pre-determined or theory-driven outcomes at every stage, which might stifle the growth of the research.

## **Discussion**

The creation of policy on climate change at the national and international level relies on large-scale computational studies, typically simulations, that are based on combinations of multiple datasets of various sizes and sources. Much of the inherent complexity in these studies remains hidden from readers, as large numbers are presented at the summary level with conclusions. The continuing critical issue for advising sustainability action toward flourishing is that we have a lack of insight from scientific studies (and evaluations) as to the most effective actions we might take that have higher leverage on primary goals. As climate sustainability has been pressured by policies to be treated as an emergency, the intentional reduction in temporal horizon corresponds to a decreasing acceptance of long-term perspectives. However, regardless of whether we treat climate change as a near-term emergency or a long-term civilisational issue, the reality of slow change in healthcare systems demonstrates that most localised actions require significant timeframes to plan, decide and execute. Although focused and immediate action is important to make headway on these challenges, merely advocating action on “climate policy” is itself a counterproductive action. It is critically important to discern which actions will have the most leverage in accelerating progress on the largest number of relevant outcomes. It is equally important to shed light on the multiple effects that these actions may cause across the system.

Furthermore, for many who are unaware of the nuances of the problem, visualising the system can provide numerous opportunities to discover leverage points that can lead to meaningful action, whether through new research projects, community action, social entrepreneurship or product-service system innovation (Jones & Bowes, 2017).

The use of synthesis maps is not new to design research. However, most systems projects are steered towards a well-resolved intervention, shifting the focus to the solution rather than projecting the problem as a study and a meaningful contribution in itself. This project focuses on the use of developmental design as an approach to grow problem understanding and resolution through design artefacts towards long-term impact. We present our ongoing journey of engaging with the complexity of healthcare sustainability through the use of design research methods and the generation of design artefacts as developmental outcomes. The outcome is not a solution but a recognition of the problem and its complexity. The synthesis map presented here (Arun Kumar & Jones, 2022) is a call for interested researchers, designers and entrepreneurs to use the data and analysis captured and initiate new projects, building on the research conducted while progressing towards the next developmental phase of this project. The regular reflection on the map and involvement of stakeholders can further make it a living artefact reflecting the needs of the hour and not remain a static image of a previous time.

## **Conclusion**

This ongoing study explores developmental design as a novel application of systemic design tools towards exploratory research on long-term engagement with complex systems. The project uses systemic design tools to map, analyse and visualise the complexities of making healthcare systems sustainable. Patton's seminal work on developmental evaluation highlights the need for exploring long-term approaches to evaluation and resolution for problems like climate change and the soon-to-be COVID-19 endemic. We propose developmental design as a method to engage with the complex problem of healthcare sustainability by bringing stakeholders together towards long-term impact by driving design research.



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