

Rendering Systems Visible for Design: Synthesis Maps as Constructivist Design Narratives

Abstract Synthesis maps integrate research evidence, system expertise, and design proposals into visual narratives. These narratives support communication and decision-making among stakeholders. Synthesis maps evolved from earlier visualization tools in systemics and design. They help stakeholders to understand design options for complex sociotechnical systems. Other visual approaches map complexity for effective collaboration across perspectives and knowledge domains. These help stakeholder groups to work in higher-order design contexts for sociotechnical or human-ecological systems. This article describes a constructivist pedagogy for collaborative learning in small teams of mixed-discipline designers. Synthesis mapping enables these teams to learn systems methods for design research in complex problem domains. Synthesis maps integrate knowledge from research cycles and iterative sensemaking to define a coherent design narrative. While synthesis maps may include formal system modeling techniques, they do not require them. Synthesis maps tangibly render research observations and design choices. As a hybrid system design method, synthesis maps are a contribution to the design genre of visual systems thinking.

Keywords

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2 Birger Sevaldson, "GIGA-Mapping: Visualisation for Complexity and Systems Thinking in Design," in *Proceedings of Nordic Design Research Conference 2011: Making Design Matter* (Helsinki: NORDES Digital Archive, 2011), 1–20, available at <http://www.nordes.org/opj/index.php/n13/article/view/104>; Birger Sevaldson, "Systems Oriented Design: The Emergence and Development of a Designerly Approach to Address Complexity," in *Design Learning for Tomorrow: Design Education from Kindergarten to PhD. Proceedings of the 2nd International Conference for Design Education Researchers*, ed. Janne B. Reitan, Ingvild Digranes, and Liv M. Nielsen (Oslo: Høgskolen i Oslo og Akershus, 2013), 1–22.

Introduction

Synthesis mapping is a practice that supports learning, representation, and communication of perspectives, actors, and relationships in complex system challenges. Its purpose is to promote shared understanding while examining the design options available in these systems. Many design researchers and educators seek methods for the multidisciplinary study of complex sociotechnical systems, while advanced design students and teams must frame and communicate collective understandings and design proposals that address complex challenges. Designers today collaborate with colleagues from a wide range of disciplines. Each plays a part in formulating and developing the products, services, and systems of a complex, increasingly instrumented society.¹ The synthesis map emerged from earlier practices in graduate design education as a method for creating visual narratives to support these emerging concerns.

Today's highly integrated, complex platforms and data-driven systems demand a wide range of skills and knowledge in design, research, facilitation, and craft. Systems design requires more than design and research. It requires many kinds of expertise to create complex projects in public service delivery, health care, architecture, urban design, and other large sociotechnical arenas. In recent years, design education made significant strides toward developing specialized graduate programs and transdisciplinary courses to meet these needs. While many design schools offer advanced practice courses in such emerging design disciplines as service design and interaction design, however, effective methods for designing and representing socially complex systems have not kept pace. These schools do not teach systemic methods widely or consistently.

Systemic design, integrated design, and transition design all contribute to new theory, to design methods, and, increasingly, to professional practice. Among these transdisciplinary modes of systems design, however, there are few generally accepted methods similar in application to the service blueprint or journey maps in service design. The Gigamap² and the synthesis map are two types of system maps developed for working with socially complex problems. With synthesis maps we employ different design practices and pedagogies from the studio approach used for the Gigamap method. Much of the difference is due to structural constraints in the design education programs that employ these methods. Despite differences in educational objectives, synthesis mapping follows a coherent approach that complements the well-known Gigamap method.

As the title of this article suggests, the systems we describe are only as tangible as our renderings. Synthesis maps are a type of system map that a team of designers and researchers team develops in a course studio or professional project. Synthesis maps differ significantly in size, visual appearance, and application from the formal models used in systems engineering and analytical traditions. The purpose of a synthesis map is to articulate the processes and relationships that are vital to stakeholders of the system. Visual narrative enables synthesis maps to reach broader audiences than analytical models can. By increasing interest and usage, synthesis maps – along with Gigamaps, process maps, or system maps – have become useful design tools. These maps engage stakeholder groups. They represent perspectives and enable stakeholders to understand systemic problems. Synthesis maps define salient problems and design options of interest, helping observers to develop sophisticated mental models.

System maps – natural, social, or technological – represent relationships among parts. Human representations of systems are necessarily incomplete, biased, and biasing. We make necessary compromises in the pragmatics of system mapping because these maps represent functional relationships that people construct as they reach agreement using language. If we observe the social learning and

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