Making Sense of the Digital Transformation in Design
An Introduction

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This edited collection of essays, case studies, and interviews critically examines digital transformation in design. By "digital transformation" is meant the set of transformations that occur as organizations learn to adopt and integrate digital technologies into their processes and practices, which often involves the design of new products and services. It is a significant organizational and cultural shift to embrace emerging technologies, which at a minimum can mean keeping up with new tools and techniques, but also means fostering innovation and economic growth. These organizational "shifts" to engage with emerging technologies can simultaneously expose social inequities, biases, and unethical use.

People are naturally consumers of design. Without much deliberation, they embrace digital tools, social media, websites, apps, smart devices, digital art, video games. As technologies are adopted, designs are invented, redesigned, and modified. These transformations are now familiar. Yet as our "human-technology entanglement" grows, considerations about the ethical, economic, and social outcomes of product transformations, digitization, and "algorithmization" become more urgent.[1] Satish Nambisan, Mike Wright, and Maryann Feldman pointed out that in order to use digital technologies to solve "societal challenges," underlying tensions must be explored.[2] Amarolinda Zanela Klein argued that it is essential to consider how exactly technologies

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1   Amarolinda Zanela Klein, "Ethical Issues of Digital Transformation," *Organizações & Sociedade* 29 (2022), 444.

2   Nambisan, Satish, Mike Wright, and Maryann Feldman, "The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes." *Research Policy* 48, no. 8 (2019): 103773.

are used to ensure the creation of designs that consider social justice, sustainability, "human dignity," and trust. Seeking to fill this gap, the authors in this collection investigate some of the issues that emerge in the adoption of digital technologies in design.

The chapters in this collection gather leading designers, researchers, and educators who come from the United States, China, Colombia, Germany, India, Iran, Italy, Pakistan, Singapore, and Switzerland. The authors' ideas and expertise come from varied design disciplines. Their essays, interviews, and case studies paint a layered and diverse picture of what digital transformation in design can look like.

This collection is divided into two parts. Part 1, "Digital Transformation: Essays on Equitable Processes and Practices," examines the varied ways in which designs can empower or impede the digital transformation process. Part 2, "*Digital Transformation:* Case Studies and Interviews on Educational Processes and Practices" considers the pedagogical practices and insights that have supported those pursuing design and technology-driven work, recognizing that educators and their students, in particular, have undertaken the tremendous task of preparing to work in technology-focused industries.

Part 1 provides an overarching investigation of some of the critical issues pertaining to digital transformation in design. Dr. Jeffrey Chan's chapter considers the increasing interactions between people and intelligent machines, highlighting the need for trust and trustworthy attributes in digital design. Chan explores examples like blockchain technologies and autonomous digital design. Challenging sensibilities around race, power, and privilege, Timothy Bardlavens examines the intersection between behavioral public policy ethical frameworks (BPP) and design, demonstrating that designers and organizations have the ability to "nudge" users towards certain behaviors. Examining some of these manifestations in social media, Sarah Edmands Martin questions how major platforms like TikTok can disrupt and reinvent user experience and visual semantics. Thomas Jockin considers ways to better engage people through designing and developing digital typography models that are more sensitive to users' needs. Dr. Laura Scherling next considers interventions that have been designed to address digital divide and digital access issues.

Chapters 6–9 more examine technology trends related to digital transformation in design, including digital health, the use of blockchain-based technologies, immersive design, and textile design. Catalina Alzate advocates for designers to engage with digital health technologies for women,

"FemTech," in a way that prioritizes health equity and social justice. Looking at developments in another emerging area of study, Lucilla Grossi and Luca Guerrini study how non-fungible tokens (NFTs) have transformed the art market, while also offering a new field for experimentation for designers and artists. Also considering some of the tensions between traditional and contemporary interactive and experiential design, Zhenzhen Qi investigates the agent-world entanglement and related dilemmas in contemporary gaming environments, taking into account historical events and case studies. Part 1 concludes with Nishra Ranpura looking into how the work of textile designers is simultaneously advanced and disrupted by digital transformation, questioning what it means to preserve traditional identities in textile design as digital simulations promote ease of production.

While Part 1 provides an exhaustive snapshot of digital transformation in design, Part 2 provides inspiring research on educational processes and practices. These chapters on the relationships between digital transformation, design, and education are explored through a series of case studies and interviews that provide practical examples and frameworks. Some of the themes in these chapters include design and experimentation, civic engagement research and experiences engaging with the local communities, and what it has meant to deal with digital learning during the Covid-19 pandemic.

Part 2 begins with a case study by Dr. Serena Cangiano on humanist approaches to designing inclusive interfaces. Cangiano observes that while narratives on digital transformation in education are often focused on one's coding ability, it is rarely considered how new technologies can also reinforce social inequity. Like Cangiano, Dr. John Maeda contemplates some of the inadvertent fallouts that can take place in regard to working with new technologies. In an interview with Maeda, he explores the meaning of digital transformation, considering technology use for social innovation, while describing ways in which unintended consequences of technology use can be better mediated in educational and work spaces. Chapters 12 through 14, foreground "curiosity" and "speculation" as a means to contend with digital transformation. In an interview and conversation between Rachel Berger, Juan Carlos Rodriguez Rivera, and Cristina Gaitán, Berger investigates how multi-disciplinary teams of design students can imagine design futures and address the problem of "poverty-of-the-imagination" through speculation, worldbuilding, and storytelling. Kai Franz builds on these imaginative approaches to thinking about technology by critically interrogating how the

use of computer-aided design and 3D-printed artifacts can help designers to reflect on technological determinism. He shares his ideas through his body of work and research in architecture, computational design, and art. Colleen Macklin, in an interview, shares insights into how game design and play-based interventions can support socially innovative practices to help address issues like environmental sustainability. These explorations of design pedagogy are followed by a short interview and provocation with Ellen Lupton, describing some of the contemporary issues that designers, particularly design students and young professionals, must navigate today, including epidemic levels of mental health distress. In the concluding chapters, Sahar Nikzad and Paulina Porten research how service design can promote citizen participation in light of the worldwide trend toward the creation of e-governance and Gege Dong, Mir Sana Ullah Khan, and Andrea Orellana look at how design and digital technology has transformed the way we share stories and how digital storytelling can be used for climate change education.

There is no doubt that digital technologies will continue to play a major role in society, work, and education. We envision that this edited collection will serve as a resource for designers and creative professionals across many design, technology, and research disciplines. As organizations, schools, and individuals embrace cultures of digital design, coding, research, and artificial intelligence, the broad appeal of design will only continue to grow and flourish. To date, there continues to be a limited number of publications on the topic of digital transformation in design, with a majority of digital transformation-focused literature grounded in business and economic studies,[3] or in the digital humanities and social sciences.[4] The designer's voice is frequently absent from discussions about the impacts of digital transformation. The insights of designers are an important feature of this collection because these

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3   See Mark Baker, *Digital Transformation*, 2nd ed. (Buckingham: CreateSpace Independent Publishing Platform, 2014); Neil Perkin and Peter Abraham, *Building the Agile Business through Digital Transformation* (Kogan Page, 2017); David L. Rogers, *The Digital Transformation Playbook: Rethink Your Business for the Digital Age* (New York: Columbia Business School Publishing, 2016); Kader Sakkaria, Imran Karbhari, and Trevor Macomber, *Chaos by Design: Tales of Empowerment on the Path to Digital Transformation* (California: Leaders Press, 2021).

4   e.g., Katherine Hayles, *How We Think: Digital Media and Contemporary Technogenesis* (Chicago: University of Chicago Press, 2012); Howard Gardner and Katie Davis, *The App Generation: How Today's Youth Navigate Identity, Intimacy, and Imagination in a Digital World* (New Haven, CT: Yale University Press, 2013).

perspectives help us better understand how digital transformation elevates design and renders them obsolete.

Much technology- and design-focused research continues to be lacking in diversity and it is important to create more comprehensive educational resources that support "a more diverse audience of design students, practitioners, managers, thinkers, enthusiasts, clients, consumers, and policy makers."[5] There have been some recent notable scholarly developments, as seen with research by Jacinda Walker and Ksenija Berk, and the growth of global collectives and organizations dedicated to diversity and inclusion initiatives such as Decolonising Design, and the Design Justice Network. Nevertheless, progress toward this goal has been relatively slow. As a research limitation, this book cannot be fully representative of all ethnicities, identities, and belief systems, however we aim to expand the voices that you will hear from on this important topic of digital transformation in design.

At the heart of contemporary change are the many creative professionals and educators who play central roles in digital transformations processes and practices and are also uniquely placed to interpret it. Their views are critical to understanding technology change. Collectively, these chapters address work being done across the design disciplines to address digital transformation, document what progress has been made so far, and explain what ideologies, priorities, and agendas are necessary to see more ethical processes and practices implemented.

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5   AIGA National Committees & Task Forces, "Diversity, Equity, & Inclusion," https://www .aiga.org/membership-community/diversity-equity-inclusion.