

Can we put a Number on it? Design Education Under Capitalism, Science, and Technology

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Abstract

In contemporary media contexts, graphic design work no longer focuses solely on the aesthetic or representational functionality of 2-dimensional design artefacts. In response to public expectations, economic imperatives, and dominant STEM narratives embracing technical innovation, design education is gradually reshaping and retooling itself in line with technocapitalist purposes. Design education is becoming more science-driven, introducing more data-driven research methodologies and positivist approaches such as behaviourism, computer science, design engineering, and interactive design. As the discipline of design continues to evolve, there is a growing debate over whether design-making should fully embrace technology and digital media, displacing traditional design work and curriculum with data science epistemologies that align design education with corporate interests, big data, algorithmic culture, and ‘surveillance capitalism’ (Couldry & Mejias, 2019; Crawford 2021; Zuboff, 2019).

This essay provides a critical perspective on current trends in design education sectors that embrace tech-oriented methodologies and design practices. I argue that uncritically translating the discipline of design for digital culture risks exacerbating these equity issues and power relations. Furthermore, this essay discusses what priorities in design education foster critical and even activist forms of creativity alongside building essential design skills as well as technical and aesthetic competences.

Keywords: *technology, data science, design, education, creativity*

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Introduction: Design Issues with Technology

Traditional visual design methods for genres such as advertising, packaging design, and branding require research around marketing, data collection, and consumer psychology. Newer genres such as user-centred design, user experience design, and interactive design require the collection of users' data and the use of algorithmic systems where surveillance, privacy issues, and the ethics of consent may not be addressed (Crawford, 2021). In both cases, design and creativity are shaped by market-driven forms of instrumental 'creativism' (Thumlert & Nolan, 2019) where, as Thomas Crow (1988) famously predicted, the arts have become the "research and development arm" of the culture industry and corporate interests (p. 35). What's more, the unregulated and rapid growth of tech giants and big data will not only introduce new conflicts but also exacerbate existing social issues, as well as new forms of algorithmically-mediated identity construction (Leander & Burriss, S., 2020; Lotherington, et al. 2022) whereby algorithms reconstruct our identities by deciding what we see on our social media feeds. As design education continues to try and catch up with technological trends, these issues have affected design schools, whereby curricula and pedagogies cater to the market demands over other critical factors.

Data Privacy

When working in user-centred design, designers tend to believe that the behavioural data collected about users will be used in good faith and will necessarily improve the quality of services and products targeted toward users. However, user data is surreptitiously used to build user profile information (UPI) and algorithmically predict users' behaviours (Zuboff, 2019). In this way, what Shoshana Zuboff (2019) calls *surveillance capitalism* not only puts users' pasts and presents in the hands of capital markets, but also users' futures. As Zuboff states:

Today's owners of surveillance capital have declared a fourth fictional commodity expropriated from the experiential realities of human beings whose bodies, thoughts, and feelings are as virgin and blameless as nature's once-plentiful meadows and forests before they fell to the market dynamic. In this new logic, human experience is subjugated to surveillance capitalism's market mechanisms and reborn as "behavior." These behaviors are rendered into data, ready to take their place in a numberless queue that feeds the machines for fabrication into predictions and eventual exchange in the new behavioral futures markets (p. 110)

Design inventions are increasingly becoming a mediation of behavioural data collectors. Insofar as user behaviour, attention, and user action are central to surveillance capitalism, user-centred design plays a more and more central role in mediating and modulating user experiences in digital contexts (Lotherington et al., 2022).

For example, it is common for online media platforms, especially social media, to require users to share basic information such as their name, contact details, and location; provide access to locally stored media and other data and expand their social networks by recommending users to connect with. Some technologies in recent years have pushed data collection further by capturing personal information in real-time, such as daily routines and schedules, health conditions and emotions through technologies such as fitness trackers or smartwatches, as well as the amount of time spent on a platform and what users look at. One recent example is user eye-tracking technology, which allows users to scroll on a screen hands-free as the screen tracks their eye movement. The research behind eye-tracking technology focused on how the brain and eyes function when viewing 2-D interfaces. According to Stanley, data on where and how long our eyes are looking is becoming tangible and trackable as "technology becomes a standard part of an

analytics toolbox plugged into every surveillance camera fixed on the public” (2013). This kind of technology will transform users’ behaviours into profitable data, wherein users are categorized and identified based on what they do. Meanwhile, the interactivity of users is a new source for tracking actions, constructing profiles, and algorithmically distributing content to users.

However, data collection is not new in design. What makes the data collection process today particularly hard to regulate is the algorithmic technology that does not inform users clearly and specifically about when and how they are being surveilled. Before surveillance capitalism, design genres that involved traditional marketing leveraged and focused on consumer psychology and psychographic categories. To precisely advertise to target customers, companies collected information about consumers’ behaviours through paper surveys, phone calls, and in-person communication like focus groups. Through these methods, consumers were aware of their participation in market research and clearly consented to provide their opinions and describe their behaviours. Participants were asked specific questions and could decide if and how to respond, and they could agree to some kind of terms in advance.

Today, in contrast, data collection and algorithmic mediation have made marketing research processes easier for marketers and social media corporations whose revenue depends on user attention and input. However, these processes have also diminished the agency of users to choose if and how they would like to be surveyed or, indeed, surveilled. The data collection process today has eliminated actual surveys and instead embedded the survey process into every move that users or customers make when using an online service or product. As terms-of-service agreements are often long and written using unexplained jargon, users are left in a passive position where they do not know when and how their data is being collected or how their data will be used. Once users accept the terms and conditions (or are invited to bypass consent materials) when using a digital

product, *the data collection process starts with the user experience*. Their “rights to the future tense” (Zuboff, 2019) are also compromised because users’ futural behaviours can be guided by the algorithm. In such a way, surveillance capitalism violates the basic human right to privacy and data safety for these users who are not clearly acknowledging the data-collecting system. As design research methods are a critical part of design education, the emerging design methods that centre on data collection need to proceed carefully so that students acknowledge the challenges of privacy in data collection.

Biased Data

Data analysis is also a crucial part of the user-centred design method. By analyzing collected data or developing machine learning AI to help analyze this data, designers can outline stages of ideation and prototyping for both user interfaces and future user interactions. Although data represents a certain level of ‘fact’, the actual data analysis — as well as the training of machine learning algorithms — relies on human designers’ assumptions and interpretations. Many scholars doubt the overestimated position of data in research today and believe that this data might not actually help us understand complex cultural information (Langlois et al, 2015; Noble, 2018; Van Dijck, 2014). As Langlois, Redden, and Elmer (2015) assert, “data is not a mirror of the social; it implies the abstraction of everything from thoughts, emotions, and facts into sets of computable symbols” (p. 7). Thus, ‘objective’ data do not necessarily produce objective design outcomes. At the same time, they come to shape and predict users' future interactions, thereby giving users the impression that they have free choice in online environments when in actuality, these ‘choices’ have been predetermined for them.

For example, one common strategy in the marketing and design process is to use UPI (user profile information) to create target user profiles so that their interests, preferences, and affinities can become tangible data to further predict what they might like and do in the future. Designers use UPI profiles and other data collection mechanisms—such as likes, follows, searches, and friend networks—in real-time to understand all aspects of a user so that tech companies do not miss a chance to use this knowledge to ‘address’ them with products or services, as well as provide content that will keep them on a platform. However, while data from different individuals could be diverse, eventually this data will be simplified and flattened into pre-programmed systems and categories. These systems and categories could reflect certain biases through their design as system designers are the ones deciding how to set the criteria for categorizing users and make assumptions about their identities through tangible numbers and data. In such a way, data-centric design education might not encourage students to think critically about more non-measurable elements in the design process.

Design Education Challenges

Digital innovations confront us with new challenges in design education. Historically, art and design schools regularly updated their curricula and techniques to meet the needs of the market and the economic institutions where design jobs were most often located. Though eager to fully embrace technological innovation and data science epistemologies, design disciplines must critically address the social, ethical, and ecological impacts of neoliberal design ideologies. Design educators need to rethink their educational priorities and reposition data-centred and user-centred design methods to a more critical position within a creative process that is not necessarily affixed to the aims and purposes of markets or social media corporations. Instead, design students should be encouraged to define their own inquiries that relate to social benefits through design pedagogies

to enable them to use design processes as a practice-based research method to design systems that reflect their own inquiries.

Firstly, with the understanding that data and datasets have limitations, design research must align data with social and cultural contexts to conduct a more comprehensive analysis and confront the problem of how data collection has been merged with “dataveillance” (Clarke, 1994). Secondly, the use of mixed methodologies offers important perspectives on design research and overly reductive means of constructing user identities. As Langlois, Redden, and Elmer (2015) suggest:

The first step to this new research paradigm is the acknowledgment that big data cannot provide a comprehensive understanding of the social, or even a complete understanding of a social event. Indeed, data analytics is only one step in the research process, and should be complemented with more qualitative approaches, such as participant observation and interviews. Data analytics, in this new research context, becomes a means to question assumptions about the constitutions of social groups and individuals. As data analyses are done and shared with research participants, data analytics ceases to impose an abstracted picture of the social and becomes a means for collaborative reflection (p. 10).

Thirdly, design researchers must critically consider the data and information they collect to produce critical design outcomes rather than serve for-profit objectives. These design outcomes could challenge dominant social norms, ableism, and racism, and consolidate ideological structures to advance social justice as design constitutes most of the visual communication through media that represent communities and their cultures. Certain critical strains of design theory and practice urge design to contribute tangible benefits to transform everyday experience, support social change, political resistance (Darts, 2004), and other values like “sublime uselessness”, the concept that practicing graphic design is a form of artistic critique and exploration (Cabanca,

2016). Finally, new design inventions that engage science and data critically should be encouraged through new design pedagogies.

For example, *Transborder Immigrant Tool*, developed by the Electronic Disturbance Theater in 2007, was designed to help immigrants cross the Mexico-US border more safely. It uses GPS technology that aimed to provide survival information for immigrants such as safer routes and directions to find clean water supplies. The interface was also designed to facilitate immigrants' access to low-cost cell phones. *Transborder Immigrant Tool* challenged the notion of the border as a political construct, reminding us that digital tools can be used to challenge dominant ideological concepts, such as the notion of borders (Duarte, 2015). Technological design projects like *Transborder Immigrant Tool* should be introduced in design education as an example of critical production. Pedagogies for critical production in design education can provide alternative models for thinking about design challenges and the ways in which tangible ideologies are embedded in material environments and interfaces. Critical approaches to design curricula may highlight social justice and socially transformative aims, such as decolonization or disability-led design. What's more, critical approaches can be practiced as aesthetic/design methods that question the role of arts and design education in the techno-capitalist fantasies of endless innovation, aesthetic capitalism, artificial intelligence, and surveillance.

Finally, design education must address the role of physical artefacts, as even today's market puts a such high demand on digital skills in producing digital content and products. The exploratory and inquiry-driven creative process requires aesthetic experience and experimentation associated with a variety of art mediums and problems. In this way, design students, and especially visual design students, can understand the form and structure of materials in three (or more) dimensions before representing them in a 2-dimensional interface. Students will form their own understanding of the cultural processes and material social relations within their productions and critically

examine the possible impacts or blowback of innovation. Students can create more original, situated, and personally and socially meaningful works, or design objects that support a particular community based on how that community defines and articulates its needs (rather than be surveilled into compliance). Design schools should be carefully proceeding with new tech-oriented curricula that focus more on research ethics and critical methods during the creative and innovative process. Designers and design students should be informed, through critical pedagogies, of the social impact of the systems that they design during their learning process.

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