

Out of the Black Box

Each quarter, we ask our new undergraduate and graduate students how they form their basis of knowledge, a question that inevitably leads to conversations referencing the information technology that informs their daily educational lives. While their interaction with their own learning environments both on and off campus, and with scholarly knowledge itself, is now almost always in digital form, it is also almost wholly embedded within an IT context that operates largely invisibly to most of our students—that is, through *black-boxed technologies*. Not only are students embedded in the array of systems and networks, databases, and digital tools provided to them by the vast IT infrastructure of our university, but they frequently traverse those local networks to venture out into other information worlds, often through the gateways of Google Search, and into the realm of large-scale commercial information providers. Their digital travels are via invisible, seamless, high-speed, and ubiquitous connectivity over a multitude of devices.

Search engines and algorithmically driven platforms are a staple of the present, and future information seeking without them seems unimaginable. As students move through a variety of digital information sources, they generally do not notice the changing contexts and nature of the information providers, and they do not see the infrastructure and labor involved in the creation and maintenance of those sources. The results obtained from quick keyword searches on Google, Bing, or other search portals are typically unquestioned in terms of their validity, value, and persistence. Indeed, many students report that they could never write a paper without Google or the Internet and cannot imagine the not-so-distant past when we did just that: working with paper-based information sources through the intermediary of campus research librarians. Ask any group of undergraduate students what it would be like if all of their information services became unavailable at the close of the library at midnight. The anguished gasps of horror would permeate far beyond the confines of the campus.

The IT services that higher education institutions and libraries now provide have been liberating for students and researchers alike, allowing academic inquiry to be undertaken without geographic, physical, or time constraints. Yet so many of these information technologies that we have rapidly embraced over the

past thirty years in higher education have contributed to another kind of constrained sphere of knowledge, in very specific ways that have gone largely unchallenged by those of us entrusted with creating and maintaining our students' informational environment. Black-boxed technologies that amass and commercialize data on students, often without their knowledge, and that often serve as privatized aggregators of their intellectual work (e.g., Turnitin) are uncritically embraced as learning technologies that will foster intellectual honesty and accountability. While on one hand, the need to detect plagiarism may be a widely accepted rationale, it is also true that these technologies surveil students and put the onus on technologies to police students—rather than our fostering trust and accountability through a framework of ethics and expertise developed in a teacher-student relationship.

Working together strategically, academics and IT professionals need to step out of the black box and consider the many dimensions of IT platforms and our digital environment.

Another unintended consequence of our hyper-investment in digital technologies is the unimaginable amount of energy and environmental impact that the ubiquitous, always-on nature of data storage and transfer has necessitated. Far from the immaterial and ethereal “cloud” as often described, these mass storage and data networks require great amounts of power, space, and other environmental resources and vast infrastructure.¹ Our comfort with these technologies, as if there is no human or environmental impact, remains intact when we are unaware—when we divorce research from implementation.

Indeed, the majority of our students have never stopped to think through the many social and economic dimensions of knowledge creation and dissemination and the role played by information technology. This begs the question: Will the future of knowledge reside with powerful information systems, unknowable algorithms, and privatized islands of data? If so, at what cost? Further, what role do we, as information technologists and educators, play in identifying and discussing these nuances with our students, staff, faculty, and campus administrators?

It's time to think critically about how technology creates the information environment of higher education. In the past, our goal has been to find a seamless, flawless IT implementation that delivers the best return on investment, but as we look to the future, deepening engagements among campus centralized IT organizations and technology researchers, whose work is interrogating the relationship between information



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systems and their broader social consequences, will lead to more intentional and thoughtful applications of technology to information problems. The framing of IT services through the former models of “return” may push the ethical decision making—and the time needed to think through all of the attendant affordances and consequences of these investments—to the bottom of a priority list. Indeed, information workers are often tacitly or even directly discouraged from engaging in the intellectual work of thinking through the ethical and environmental dimensions of the platforms they implement. Rather than obscuring the role and impact of technology, and the IT workers who implement it, we need to foreground the choices and consequences of our hyper-digital campus environments.

Policy-making around information technology has broad consequences. For example, in our research, we have identified the importance of human engagement in digital technology systems. Noble’s interrogation of the commercial values that undergird Internet search technologies—along with the unc-

rated and problematic results when students and researchers navigate the open web via Google, Bing, or some other search engine—is revealing the social consequences of biased platforms. Equally, Roberts’s research has shown that human decision-making is often obscured while at the same time it serves as an integral part of the digital information and social media production processes, as evinced in practices like commercial content moderation. Far from being a global platform of unfettered free expression and democratic engagement, the Internet is more akin to a series of privatized islands where rules and norms may differ drastically from site to site and platform to platform. These norms are further dictated by jurisdiction and geographic location in the physical world, where major platforms often must negotiate the terms under which its users will be allowed to participate. Invariably, such deals change the user experience, user access to information, and policy—which then must be enforced, typically and most effectively by human beings, who bring their own values, norms and cultural predispositions to the table.

Another example hits closer to home. In a rush to economize resources and provide a suite of learning technologies and services, many campuses have adopted Google’s Gmail, offloading the labor and investment in campus-based secure servers, training, and service for students, staff, and faculty. Granted, the previous iterations of IT management have been labor- and resource-intensive, but these have also come with certain affordances. The use of Google’s services opens up the entire campus community to a level of data mining and surveillance that goes beyond our public mandates for transparency. With each decision like this, either we can put our knowledge and information into strengthening a private commercial company, or we can strengthen the public sphere of information and our institutions’ infrastructures.

We know there is little time to think about the many dimensions of IT platforms and our digital environment. But we see incredible possibilities if academics and IT professionals work together, strategically. The future of knowledge should not be relinquished to precarious, black-boxed technologies. Let’s step out of the box. ■

Note

1. Mél Hogan and Nicole Starosielski are two of a growing number of scholars who have put these issues at the fore of their research. Safiya U. Noble has written about the way that the environmental and human damage is out of view, sequestered to the Global South, where everything from mineral extraction to e-waste is made invisible. See Noble, “A Future for Intersectional Black Feminist Technology Studies,” *S&F Online*, no. 13.3-14.1 (2016).

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