Jonathan Grudin

Viewpoint
Technology and Academic Lives

Considering the need to create new modes of interaction and approaches to assessment given a rapidly evolving academic realm.

"**I**'M OVERCOMMITTED AT the moment. I find the university at the center of a huge work speedup."
—*Vice provost and dean*

"The cult of busy-ness … is really poisonous. People don't want to be seen to have time for a leisurely intellectual conversation, because having time for that means they are insufficiently busy. They should be heading to the airport to go hustle grant money."

—*Department chair*

From Dagstuhl to *Doonesbury*, we hear about the plight of academics. Curious, I consulted over a dozen computer and information science faculty, department chairs, deans, and other administrators from leading research universities. Details differed, but heightened demands and shifting evaluation criteria were consistently raised. What drove the changes? They mentioned budget pressure and rising expectations, but unanticipated consequences of new technologies appear to be at the heart of it. Technology has dramatically improved research and teaching, yet it can also complicate academic life.

Let's consider how faculty were assessed in three worlds: technology-intensive university departments in 1975, when few had Internet access; in 1995, with the Internet but no Web services; and today. I was a graduate student in 1975, climbing the aca-

demic ladder in 1995, and am now an affiliate professor.[a]
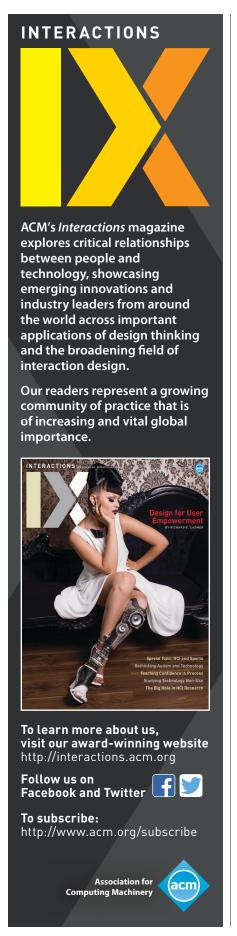
1975: The Ivory Tower Before Silicon
The world of 1975 is not easy to bring into focus, even for those of us who were there. No Internet, Web, mobile phones, Federal Express, or fax.[b] Long-distance telephone was expensive. Conferences

were difficult to organize and few in number. Research labs and departments tended to be fiefdoms or small communities, each existing in a bubble.

We relied on people who were within walking distance. Faculty thoroughly trained their graduate students to be full collaborators. They invested in explaining their research carefully to departmental colleagues to get feedback, ideas, and possible collaborations. Departmental colloquia were well attended; faculty often commented cogently on talks outside their area. At UCSD, each graduate student presented a project to the department at the end

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a My three snapshots of academic life are from graduate work at Stanford, MIT, and UCSD; rising from assistant to full professor at UC Irvine in the 1990s; and now an affiliate professor at the University of Washington.

b Facsimile machines existed but were not widely used. I first sent a fax in the late 1980s.

INTERACTIONS

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of the first year, providing all faculty with a view into their colleagues' work, methods, and student selection and training. Faculty helped one another, building the department's reputation in an outside world that was known mainly through journal articles.

It wasn't idyllic—there were factional disputes, tenure anxiety, and 'publish or perish.' Nevertheless, high familiarity enabled faculty promotion cases to be handled effectively within a department and school.

The Internet Arrives
In late 1979, halfway through my Ph.D. journey, our lab connected to the AR-PANET. Faculty and staff could access the computer and the ARPANET via modem from home. For students, the Internet precursor was largely a curiosity. For faculty, it turned out to be more significant.

Taking a postdoc in the U.K. in 1982 was like parachuting in with the clothes on my back. Communication with U.S. family, friends, and colleagues was epistolary and about one in 10 airmail letters went by sea and arrived a month late. On different occasions, the two senior professors from my UCSD lab visited and presented research co-authored with people outside our lab. I was stunned. This work had begun when I was a student but was never discussed in the lab. Prior to the ARPANET, everything was discussed. Suddenly, faculty could work with distant colleagues. They no longer had to educate departmental colleagues to get strong feedback. With faculty more focused on external discussions and collaborations, departmental meetings became less central to academic life.

1995: Assessment from Outside
After a stint in industry, I joined a remarkably democratic department: All faculty participated in all evaluations. Within months, as an assistant professor, I was voting on associate and full professor cases. Faculty were no longer well acquainted with one another's work; we relied extraordinarily heavily on external letters. This was not good news for those of us in sub-fields in which most professors had recently arrived from industry (such as IBM Research and Bell Labs), where refer-

ence letters were more balanced. The academic norm was lavish praise; readers looked for subtle negatives. My own tenure and full professor promotions encountered reference-letter turbulence but survived.

Being able to interact at a distance has phenomenal benefits, but it does reduce local interaction. This diminishing of community was reflected in the increased outsourcing of faculty assessment. It didn't seem ideal to weight the subjective opinions of outsiders so heavily, but it was manageable.

2015: The Information Age
As one of few full professors in HCI in the early 2000s, I was asked to write many letters for appointments and promotions. Over time, urgent personal requests gave way to form letters that often omit key information. External letters appeared to be losing their dominant role. This hypothesis was supported in my recent inquiries. A wealth of digital data is now available and often relied upon. One department chair wrote, "There is a pervasive atmosphere of pressure and obsessive quantification, and yes, it affects senior people, too. In part this is because as the senior ranks fill with people who came up through the obsessive quantification, the attitudes become entrenched ... People who don't buy into obsessive quantification get filtered out."

Budget-strapped legislatures demand that state universities show evidence of impact. Great teaching may not compensate for weak research, but bad teaching is tolerated less. Public universities with reduced state support and private universities facing higher costs count on rainmaking. "Funding is the first consideration for promotion to full, even though that is

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not written," observed a Promotion and Tenure Committee chair. NSF adds to reporting requirements as it awards proportionally fewer grants. In addition to teaching evaluations and grant funding, performance measures include citations and downloads, journal and conference tiering, g- and h-indices, and students matriculated. Many universities use *Academic Analytics*. External letters remain a factor, especially in appointments for which the digital record is sparser, but their subjectivity seems alien in a world of 'big data' and metrics.

Faculty CVs sprout new categories, such as mass media notices. A dean said, "I don't think much of the [research] literature is read anymore. Most of the communication is through coverage in national media (of which the research publication is the pretext)." Another dean said "A *New York Times* op-ed piece, that's huge!"

Faculty assessment is back in local hands, but the assessment is not based on the direct familiarity that marked pre-Internet academic communities. Collaborating and gathering information across distance accelerates scholarship, yet it erodes the sense of community. For example, when faculty invested in and relied on a network of local colleagues, job-hopping exacted a high price. Today's weaker local ties enable professors to play on a world stage, with benefits and costs. It is working, but stresses are felt.

Unintended Consequences

A highly beneficial technology can have an undesirable side effect. Automation of routine tasks is great, but it can put people out of work. Transparency is good, but it can facilitate unwanted surveillance. Collaborating over distances and with more people is fantastic, but it means less interaction with nearby colleagues and each collaborator on average.

Effects of technology on community extend beyond faculty assessment. Our conferences once focused on community building. As I have written previously,[1,2] a likely indirect effect of two of our most valued technologies—word processing and digital archives—was that our conferences became arbiters of quality with high rejection rates that undermine cohesion.

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We see the unquestioned value of technology but often underestimate the inextricably intertwined costs: reduced depth of social connectedness, work speedups, a troubled publication culture, lost jobs, privacy intrusions, cybercrime, distributed terrorist networks, and so on.

Addressing Indirect Consequences

Proposed solutions are often exhortations to roll back the clock: restrict academic assessments to a few high-quality publications, return journals to preeminence, build technical barriers to privacy incursions, and so on. Unfortunately, the underlying forces that brought us here are powerful, because they also bring tremendous benefits.

We smile at the story of King Canute placing his throne on the beach and commanding the incoming tide to halt. A technological tide is sweeping in that will never retreat. We can't command away undesirable side effects by issuing policy statements. Perhaps to protect valued heritage we can build a massive seawall Netherlands-style—but only if we understand the tidal forces, decide what to save and what to let go, budget for the costs, and accept that unanticipated developments could render our efforts futile, as would a 10-centimeter rise in ocean levels.

An irresistible force—technology—meets an immovable object—our genetic constitution. Behaviors that we inherited from ancestors who lived in tightly knit communities do not stand in opposition to technology, but they shape our reactions. Can we control those tendencies, build seawalls to protect us when human nature risks interacting disadvantageously with useful technologies that it did not evolve alongside? Perhaps, if we recognize the forces at work. But we have little time to develop understanding in our world

of exponential growth, with the breathtaking wave that quickly follows the first perceptible effect.[3]

To assert that we are masters of our destiny is to set thrones on the beach. We cannot always control the consequences of introducing a new technology. Bows and arrows were doomed as weapons of war by the invention of a musket that anyone could load, point, and shoot. The introduction of literacy fundamentally changed previously oral cultures; money fundamentally changed barter cultures. These technologies brought advantages and disadvantages. Socrates famously railed against writing, but despite his eloquence, he couldn't slow it down. If any technology has an irresistible trajectory, digital technology does. As it is woven ever more deeply into the fabric of our lives, it will be more difficult to link subtle effects to causes, and more challenging to address effects that are unexpected.

Conclusion

The close-knit communities of our academic predecessors are melting away. They won't come back. We must create new modes of interaction and approaches to assessment that are less impersonal and stressful, for faculty members and job candidates, grant applicants and conference submitters, for students in MOOCs and traditional courses, and more broadly throughout society. Just as technology contributed to the problems, it will help address them. Software is versatile and we are innovative. The best metaphor may not be a seawall that strives to block the forces unleashed by technology and forestall change; rather, consider a martial art that enables us, when armed with a deep understanding of those forces, to redirect them to achieve positive outcomes. [c]

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Jonathan Grudin (jgrudin@microsoft.com) is a principal researcher at Microsoft Research in Redmond, WA.