Skunkworks for a Future University

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Reflections on a possible direction for the Faculty of Information Studies at the University of Toronto. Others, coming from different perspectives, will understand these challenges in different ways, and propose alternative visions. All such ideas will need to be critiqued, developed, and folded into others, before an actual plan could emerge. Take this a "thought-piece"—a catalyst for discussion.

1. Introduction

Suppose a latter-day Rip van Winkle stumbled, bleary-eyed, onto a modern university campus, and met a student who told him she was studying "information." He would be totally perplexed. Who *doesn't* study information? Isn't information the business of the university as a whole? We don't often think about information in the abstract, but in its most general form, the notion is almost vapidly broad.

In recent years, however, the notion of information has become exquisitely, if multifariously, specific. A raft of different theories are capturing the imaginations of theorists from all quarters: from physicists proposing to unify the foundations of quantum mechanics with information, to biologists reconfiguring the study of organisms to be a study of organic information processing, to mathematicians formalizing the information content of formulae and proofs, to cultural theorists wrestling with the loss of identity in community information networks, to philosophers using semantic notions of information to ground our understanding of

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consciousness, to lawyers hammering out how to treat information as intellectual property, to artists rethinking the creative process for dynamic informational media, to journalists distinguishing information from editorial and entertainment, to economists talking about information as capital—to engineers, historians, policy makers… The list goes on and on.

Although each of these projects has its own specificity, the sum of them is, again, almost ungraspably broad, encompassing just about every corner of the campus. Not, it should be said, that the various understandings are the same—or even necessarily commensurable. Different aspects are privileged in various accounts, different methods embraced, different idealisations legitimised. Even getting information theorists from this range of disciplines to talk to each other is no simple feat. Still, it is by no means random that all these developments are taking fire at the same time. Something radical is going on.

In the midst of this upheaval, a number of universities are forming schools or faculties of "information studies," "information science," or "informatics." Some emerge out of, or have been combined with, library schools; others are constructed *de novo*; still others have been fashioned from, or spawned by, computer science departments; and some incorporate a wide variety of disparate interdisciplinary programs, such as media design, science studies, and communication technology.

There is something undeniably special about these new programs. They embody a creative ferment and explore cutting-edge set of intuitions that, in many cases, makes them one of

[1]Famously, at least in the late 1990s, there were supposedly more than 400,000 open jobs, in ;the United States alone, requiring information technology skills. No university, especially in the public realm, could afford not to train its young to be able to acquire, and discharge, such employment opportunities.

the most intense, future-oriented places on campus. In part, they are rationalised in terms of the wildfire spread of information *technology* (IT)—and the commensurate (at least until recently) explosion of job opportunities in information-related fields.[1] But the best of them aim to be more: a locus of intellectual, as well as pragmatic, leadership for the still-emerging "information age." But as the simultaneous breadth and depth of the information revolution betrays, it is not clear what intellectual vision can—or should—guide their development.

As well as the dealing with the daunting breadth and depth of the information revolution, any possible answer to this question must also deal with a related structural dialectic. On the one hand, information technology and information-technology-based services are something like "infrastructure" for universities in particular, and organisations in general—much as libraries have been in the past. One goal of information faculty, therefore, is to educate people to lead and provide such services—i.e., to train the "information officers" of future organisations.

But to limit the subject matter of the "information sciences" to instrumental infrastructure would entirely miss the point. What the foregoing list of theoretical projects shows is that notions of information are permeating the *content*, not just the form or substrate, of intellectual life. That is: researchers are making theoretical claims about their subject matters in *computational and informational terms*. It is not just that biologists construct their models on computers; they model the gene *as an information-carrying entity*. It is not just that cognitive science constructs intelligent computers; they understand human rationality as an *information-processing* activity. (In this way, the information revolution is radically different from the advent of writing, or publishing: while the written page transformed scholarship, the theories that

were written down did not, by and large, treat their subject matters—thunderstorms, electrons, troop movements—*as pages*.)

Any school of information that contents itself with dealing with social transformations implicit in information technology, therefore, without taking on the larger, more substantive role of information in our intellectual imaginations and social rearrangements, will, even if unwittingly, relegate itself to playing a minor role in the information revolution.

Recognising the power and ubiquity of the *notion* of information, as well as the transformative impact of widespread information technology, ups the ante on the question of vision and leadership—but it does not even begin to answer it.

The analogy is clear. Information—information processing, information technology, information studies, information science, the economic and political and historical and cultural dimensions of the information age, etc.— these things are a *very* big deal. They are affecting the whole university, all of society. Everyone at the university is involved. Understanding the social consequences of networked society is taken up in sociology departments; intellectual property is studied in law schools; complex information-processing systems are designed in computer science departments; the limits of information-processing materials are studied in physics departments; human information processing strategies are explored in psychology departments and medical schools…and so on.

Given these developments, and the challenges they raise (see the table on the next page), what intellectual vision can serve a small, dedicated "Faculty of Information Studies"? What vision can simultaneously do justice to the breadth and the depth of information and information technology's potential, but still be manageable, focused, and trenchant?

Six Challenges for Information Schools

	Description	*Examples*
1	**Breadth:** Per se, the notion of "information" is vapidly broad—seemingly applicable to all intellectual work.	
2	**Penetration:** Information technology enabled practices are moving deep into every corner of the university.	*Computer modeling, 3D-visualization, computer-mediated design, distance learning, web publishing, machine grading, remote collaboration, obtaining trustable online sources, etc.*
3	**Balkanization:** A host of unclearly-related theoretical notions of information are being developed and applied in a wide variety of disciplines.	*Biology, computer science, mathematics, physics, philosophy, linguistics, etc.*
4	**Consequences:** The character, and consequences of the information technology revolution are being studied throughout the academy.	*Algorithms, processes (comp. science), universal access, digital divide (sociol., polit. science), knowledge management (business), information as capital (econ), digital composition (art, music), cyborgs (lit, cultural theory).*
5	**Socialization:** From personal conduct to social practice to business process, social life is rapidly being reconfigured in information technology terms;	*MP3s, personal information devices (Palms etc.), email, telecommuting, just-in-time-manufacture, print-on-demand, instant world-wide news reporting, satellite communication, etc.*
6	**Ubiquity:** Everyone at university, and high school, will be enmeshed, and to some extent fluent, in the use of information technology—i.e., will have some computational "literacy"	*Web skills, programming skills, multimedia development skills, etc., moving down from dedicated professional teams to experimental college courses to mainstream curricula to high school—even grammar school.*

2. Skunkworks

The answer has to do with timing, pace, and rhythm.

To get at it, note that academic units are typically distinguished in two different ways. Traditionally, disciplines and fields have been thought to be identified by *subject matter*. In recent decades, however, it has become clear that they are also—perhaps even primarily—distinguished *methodologically*: by a collection of profession-constituting approaches, methods, standards of evaluation, practices, professional organisations, etc. It is often the case that On a contemporary campus, it is more likely to be Centers, Institutes, and interdisciplinary programs that are focused on specific subject matters, to which their members (from different fields and disciplines) bring a variety of methods.

In contrast, information science and information studies, I claim, cannot be distinguished *either* by subject matter *or* by method. In fact I would go further: no information school that conceives of itself along either of those two traditional lines will be able to preserve and nourish the (genuine) excitement and promise with which they have been founded.

As already indicated, I believe the reconfiguration of society (organisations, processes, practices, communication, etc.) heralded by the development of information-processing is immense. When businesses contemplate wholesale changes to their business processes, they do not typically implement them—especially initially—throughout the whole corporation. Rather, they design pilot projects, studies, experimental versions, to see how things are going to go. We are all familiar with "prototype" products—early samples, test versions to be studied and used by a small number of people, in order to evaluate and refine the design. What these (forward-thinking) businesses do is to "prototype practices": construct trial versions, not of hardware devices, but

of *ways of doing things*—to be similarly studied, assessed, modified, and redesigned.

When change is even less well understood, or the proposed adjustment to the way things are done is even more radical, a group of employees will sometimes be broken out into an "advance team," often located in a separate location called, in industry jargon, a "**skunkworks**." Skunkwork teams are typically charged with exploring the radically novel—a way of doing things that will transform the way the main business operates. New products may be part of it, but new practices and processes—sometimes, processes enabled or facilitated by new products—are frequently part of the story.

By analogy, I believe the appropriate vision and direction for a Faculty of Information Science (FIS) is that it consider itself a "Skunkworks for a Future University." Rather than being individuated by topic or method, in the style of other academic units, information schools should be individuated *temporally*; they should be understood as a University's advance party, sent into the future to scout the territory, bring back news, routes, maps, insight, local knowledge. Or to use a different analogy, information faculty and students should be conceived as a rapid-deployment expeditionary force, sent ten or twenty years into the future, with the mandate of setting up camp and "domesticating" the territory to be occupied by the university as a whole, when it arrives, complete with all its supplies, personnel, and paraphernalia, years down the road.

It is of course not to be imagined that any such skunkworks could prototype the full content of the research of arbitrary departments (no FIS is going to study biology, or even bioinformatics). Rather, the idea is that an FIS could take on the project—something of a laboratory project, or suite of test cases—of

rethinking what the university will look like, how it will operate, etc., say, a decade or two into the future. The physical home of the information faculty could serve as a "site" for the not-yet-realized, still-being-imagined, emergent information-based university. The faculty's charge would be to develop and flesh out what critical theorists sometimes call an "imaginary": a conception (both tacit and explicit) of a university transformed by both theoretical and practical advances enabled by information-based ideas and technology. This project of inventing and imagining the future—a radical exercise in innovation—would serve as an overarching theme around which the school would distill its vision and its work.

3. Specific Consequences

In a later section I will draw out some general consequences of this vision for a school of information's own faculty and students, and speak about its impact on the university as a whole. But first it is instructive to list a handful of specific consequences, to convey a sense of what such a vision would come to.

1. **Ties with the rest of the university:** Adopting this vision would intrinsically require the information school to develop strong ties with the rest of the university—not just with students and researchers to see how they work, and to solicit input as to how things might be different, but for any number of additional reasons: to request collaboration and expertise from sociologists and anthropologists, in order to help study and interpret current trends; from computer scientists and engineers, to understand what configurations of connectivity are probable in coming decades (such as ubiquitous wireless access), and what kinds of technical facility will be common or even universal (such as embedded GPS receivers, so that everything "knows

where it is"); from historians, philosophers, and science studies people, to help discern shifts in disciplinary boundaries; from academic administrators, about support for interdisciplinary and multidisciplinary research, and how information-technology enabled practices can support radically cross-cutting forms of communication. And so on.

To the extent that the entire university could be inspired to participate collectively in such a project, the FIS could serve as a meeting ground and central locus for emerging thinking—something like a "town hall" or "watering hole" for forward-looking members of the community.

2. **Publications, digital libraries, etc.** Consider the monumental shift of publication practices to online form, with its myriad consequent complications: digital libraries, intellectual property rights, self-publishing, consequences for tenure decisions of the fact that university presses are publishing fewer books, and so on. Studying these transformations would be a paradigmatic research project for an information and library school. Universities are devoting vast resources to effecting such transformations. But they needs to understand what they are doing, and (as best as possible) imagine the consequences. This is just one of many cases where the expertise of an FIS would be of enormous value to its host institution.

   If the FIS were to explicitly address the university's future, that would provide a natural context for rich communication back and forth on an issue that every academic in the world wrestles with on a daily basis.

3. **Distance education:** Contemporary universities, partic-

ularly those in large urban centers, increasingly cater to widely diverse student bodies. Schools of information in such locales are uniquely positioned to explore the intercultural, interdisciplinary university of the future.

As explored by Brown and Duguid in their *Social Life of Information*, the very notion of a university campus is at stake. Just about everything we think about the role of a campus is slated for enormous change, as a consequence not only of information technology, and the changes in practices it will inexorably bring, but also the changes in intellectual content and method implicit in the rise of information studies. The consequences are large, but difficult to fathom. To be successful, a university must not ignore what is coming, cling tenaciously to potentially out-moded assumptions, or presume that present practice will be wholly overthrown. To think that campuses will be rendered irrelevant, for example, is phenomenally naïve: everyone with long-term experience of net-based communities recognises the inestimable value of physical proximity and direct human contact. But just *how* a campus should be used in the digital age—that is a question to which no one, yet, knows the answer.

Exploring such issues would be a tremendously exciting project. Pilot projects, exploring radically inventive reconfigurations of traditional models (such as clustering times when students are on campus and when away), could be developed, conducted, and studied. The results, intrinsically interesting in themselves, will again be of enormous importance to the hosting university.

4. **Form and content:** One of the consequences of the

digital revolution is that the divide between infrastructure (papers, equipment, libraries, etc.) and theoretical content is being blurred, mixed, and mangled almost beyond recognition. Video artists and musicians don't just *record* on video and discs; the very notion of what they are doing is transformed by the new media. Just one example: a traditional composer produces a *score*, which performers interpret. But new electronically mediated music doesn't necessarily have a score, with radical consequences for criticism, theory, etc.—even for understanding what a performance is (let alone plagiarism). It would be a tremendously important goal of an information science program to understand the full range of issues, including how material substrate and content affect and interpenetrate each other. Once again, this issue infects both the practices and the results of any research university. Having a distinct location on campus where such issues could be "thought" would be a tremendously exciting.

5. **Marketability:** Any academic program, especially if it has an interdisciplinary flavour, faces the issue of whether its students will get jobs. Just as it would be irresponsible for a university not to train people to benefit from the economic implications of the Information Age, it would be equally misguided to give them training that could not be marketed.

   A relevant lesson about this challenge was learned in cognitive science. A retrospective study of cognitive science graduates (undertaken at Indiana University) showed that those with sole degrees in cognitive science had more difficulty getting jobs than graduates from traditional disciplines. But those with double certification, who either

completed a double degree, or complemented a degree in a traditional field with a minor or masters in cognitive science, did better on the job market than those who did not. The same moral was once illustrated, in a very different setting, when the Adobe corporation observed (from bitter experience) that it was easier to train typographers to write programs than to teach programmers typographical expertise.

These stories illustrate a deep truth: information skills are not so much *self-standing* as they are *a way of doing something else*—be it writing, engineering, science, medicine, whatever. The skunkworks vision yields a collaborative, complementary, even contrapuntal conception of information-based training—a conception, I believe, that will be marketable, as well as durable, for many years.

6. **Connections with industry:** It might seem as if taking the university's own future as a research occasion would privilege the university at the expense of industry—and thus militate against strong industry connections. However I believe that exactly the converse is true. Undoubtedly, some specific issues are unique to the university context, but the vast majority hold of any general information-based organisation or firm. Large companies even call their sites "campuses." Moreover, having a concrete site where experiments were being conducted would be an unimaginable aid in conveying the content and consequence of the FIS work, and thus, among things, would be of great assistance in soliciting funds.

   The MIT Media Laboratory garnered an enviable world-wide reputation as an "out of the box" design space, thanks in no small part to the existence of concrete, ma-

terial artifacts, which visitors could see and manipulate. While not quite as concrete, having the FIS be a vibrant site of targeted, local change would increase its vitality and make it compelling. Corporations would not want to be left out of any foreseen transformations. In fact it is not difficult to imagine corporations providing support for their own "skunkwork" projects, to be funded at, or perhaps alongside, the information school.

Half a dozen quick ideas barely scratches the surface; dozens more could easily be spelled out. But I hope this much conveys a taste of what such a vision might come to.

4. General Consequences

A number of themes permeate the specific ideas enumerated above. In some ways, these are even more important than any specific project.

4a. Commitment

One of the most important aspects of this proposal is that it would galvanize not just the school of information, but the entire university community. The reason is simple. It is not just that the rest of the campus would be subjects of FIS study; much more consequentially, *their very futures would be at stake*. Properly handled, this could be parlayed into intense emotional excitement and commitment on all sides. High visibility and strong campus involvement would be to everyone's mutual benefit.

4b. External Focus

A second theme also has to do with the involvement of the world outside the school.

The best way to forge a collaborative and purposeful sense of community, in my experience, is not to have a group of people look at each other, and find each other…fascinating, convivial, whatever (that way lies irrevocable politics). Much better to orient them so that they are *looking out, in parallel, on a shared, common, external subject matter.* One of the most important aspects of the skunkworks vision, in my view, is that it locates the subject matter of the school *external to the school itself.* As a result, adopting the vision would provide structural support underneath FIS faculty and students, turning them into partners, rather than merely collaborators or competitors. Information schools are typically small—invariably dwarfed by arts and sciences, and usually also by medicine, engineering, business, law, and so on. It is easy, in such a context, for the information school to feel like a second-class citizen, or to be ignored. Viewing it as an advance team for the whole university would give it a vital place, in the university's plans and imagination, so that both its members, and the rest of the university, could readily understand its specific mission.

4c. Comprehensibility

A third theme has to do with the immediate comprehensibility of the idea. In talking with people about this idea, I have found that it takes very little time to convey. Very quickly, they start suggesting additions to the list provided in the previous section. Adopting the proposal is thus almost guaranteed to be generative; people can immediately start to imagine different directions it might take.

Comprehensibility is not a minor issue. The problem to which

this memo is addressed, about an appropriate vision for an information school, is not merely intellectual or structural. It also has a substantial political dimension. Historically, it has been difficult for people inside and outside these new schools to understand—and say—just what they are up to. Who should get a Master's or PhD in Information Science? Are they only for people who do not have other advanced degrees? Or are they complementary, so that masters and doctoral students in other fields would benefit from enrolling (see #6, above). What core courses should be taught in the curriculum? What sort of person would one expect such a school to hire?

It is a virtue of the skunkworks vision that it would be explicable, in a few sentences, to anyone in the university community.

5. Recruitment

Visions, some people will say, are easy. Making them real is the hard part. It is therefore worth addressing some tactics and strategies to make such a proposal concrete. Particularly important is the issue of personnel and recruitment, the most important ingredient in establishing an academic unit's overall callibre.

The issue of recruitment would have to be dealt with in a way that takes into account one of the most important challenges implicit in the skunkworks vision: of *staying ahead of the curve*. It is unfortunately common for future-oriented programs quickly to become tired and out of date. There would be no virtue in setting up, in the year 2004, a program aimed at 2012, which, because of limitations in our imaginations, compounded by the accelerating pace of change, actually manages to address issues that are pressing in 2007, and so grows staid and out of date before its first five-year review. This is a very real problem—especially aggravated in a university, in part because faculty tenure (twenty or thirty years,

say) is radically longer than any time constant that such a program could possibly address.

One possible recruitment strategy, therefore, would be to make a deal with the University to be given, say, half a dozen positions, which the FIS would then in turn re-offer to any interested department or unit on campus. The idea would be this: any person who was hired in such a position would spend their first 3 to 5 years in the School of Information, with a secondary or collaborative appointment in the affiliated school or department. Intellectually, their mandate, while part of the FIS, would be to explore or revamp or invent practices and methods and conceptions of their field in ways that take into account the information revolution. After their 3 to 5 year term expired, their position would devolve wholly into the affiliated unit, at which point the Information School would be given a new open position to shop around.

This is not a trivial proposal, since among other things it suggests that no one might get tenured in the School of Information. But of course other variants are possible, and in any case there is no reason to suppose that it would apply to everyone. And care would be needed in implementation. It would be absolutely vital, for example, for the University to provide an extra measure of support for such faculty, especially if they were young, in order that they not suffer from "serving two masters." This could be dealt with by the university's warranting that the tenure clock would stop, or perhaps run at half speed, for the time in the Information School. Details could be worked out in collaboration with other interdisciplinary units.

Other recruitment strategies might lead to similar effects. For example, one might maintain a stock of funding for half salaries for visiting faculty on sabbatical, so that researchers at all stages of their academic careers could come to the information school

to "re-tool" their expertise—not, as is the usual practice, in a new field, but in their *own* field, updated to deal with the transformations and reconfigurations that are implicit in the spread of informational ideas.

Corporations, too, might send professionals on their payroll, in conjunction with a compensatory contribution to the school, to conduct their own explorations of how business process, including engineering, research, etc., are subject to incipient change. Business and management schools have analogous programs; properly imagined and implemented, such a corporate partnership program might be a substantial source of FIS funding.

6. Consequences for the University as a Whole

Any University whose information school took on this "skunkworks" vision would immediately become internationally renowned. It would take tremendous guts and commitment for its university administration, as well as the school of information itself, to commit to such a vision. But the host university, too, would thereby propel itself to the forefront of international imagination, in recognition for making such a bold move.

In addition, the vision is sufficiently unique that there would be no reason for the institution that first sets out in this direction not to be *the* world leader, or anyway in the very top ranks of such a project. As universities rethink their information strategies, it is not enough merely to aim to be "in the top 20%," worldwide. Laudable as such a goal may be, it is hardly inspiring. Rather, excitement requires the articulation of a *particular* vision, with respect to which the school would then aim to be the very best. Only if the school leads in such a particular way will the mere mention of its name bring forth, in the imagination of scholars world-wide, the specific cut or perspective for which it stands. The seems es-

pecially important—and possible—in the faculty that houses the McLuhan Program. Surely there is a possibility that a vision such as the one explored here might recapture the spirit of adventure and exploration of that incomparable brand.

It seems unarguable, too, that most if not all of the studies and research projects and intellectual interests of faculty currently part of an information school would fit within this general vision. Indeed, studying the practices of information use is already what organizes most schools' present faculty. The aim of the vision is to be galvanizing, not restrictive.

Finally, it is possible that substantial institution-level funding could be garnered for the project—from the government, the host university, or even private foundations.

What are the downsides? There are of course many: (i) the project's sheer magnitude, (ii) the fact that all sorts of other constituencies on campus are dealing with information systems too, from architects to computer science departments to development offices to the library system to distance education, (iii) the inevitably conservative nature of academic institutions. But that is exactly why the "skunkworks" idea might be powerful; the "partly connected, partly separate" status of an independent faculty might be just the right locale to make such a project succeed, since it precisely poised on the periphery, with the unequalled ferment, potential, and legitimate access to the center that that implies.

Perhaps the final thing to say is that this is not a commitment that a faculty of information science could make on its own. More seriously, it is not a project that could be carried out by a faculty of information science alone. Fundamentally, it is a proposal for the entire academy—a suggestion of an incomparably exciting role for a school of information: that it reach out and secure the future of the university as a whole.