Intellectual Diversity in iSchools: Past, Present and Future

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ABSTRACT

We provide evidence and discuss early findings of faculty hiring trends among those involved in the iSchool community. To better understand the intellectual heritage and major influences shaping the development of the individual and collective identities in iSchools, we develop a classification of the intellectual domains of iSchool faculty, and present a brief descriptive analysis of the community's intellectual composition. This analysis builds on work from 2007 and additional data collected in 2009. The discussion focuses on sources of, and trends in, interdisciplinary diversity in the iSchools. We conclude with a short discussion the potential implications of these trends relative to the future development of the iSchool community.

Categories and Subject Descriptors

General Terms

Keywords

iSchool, discipline, faculty hiring, interdisciplinary, computing

1. INTRODUCTION

The iSchools represent an ongoing form of innovation regarding the interdisciplinary pursuit of teaching and research in the converging areas of information, computing and the rules of theses in human and social experience. As seen from their web presence, www.ischools.org, the iSchools present themselves as the paragon of a thriving, heterogeneous, interdisciplinary research community. Commentary and empirical work suggest that iSchools demonstrate a different form of academic focus from near neighbors in the academy such as computer science, information systems, science and technology studies, and communication (to name a few of these nearby intellectual spaces), as demonstrated by the interesting variations on school compositions by academic background [9, 27].

The goal of this paper is to share and discuss a descriptive overview of the intellectual underpinnings and institutional characteristics of the members of the iSchool Caucus. The paper continues with a discussion of the motivation for the research and prior empirical studies of the iSchools. We then present the early results of our current ongoing work. In doing this we provide a classification of iCaucus faculty members' disciplinary heritage, and discuss the evident causes for the community-level composition based on the sources of representation for specific areas of study. Finally, we discuss the implications for the community and directions for future research.

2. MOTIVATION

The emergence of new academic entities is a perennial topic of interest in sociology of science (e.g. [24]). The nature and implications of interdisciplinary research, at the levels of projects and communities, are topics in a variety of scholarly communities (e.g. [16, 17]). Our interest, as members of an iSchool and, thus, participants in the iSchool movement is also pragmatic: what trends can we detect and report regarding hiring and disciplinary structures of the faculties that make up the various iSchools?

2.1 What are iSchools?

Collectively, iSchools engage in a broad range of interdisciplinary research pursuits and offer a variety of courses that integrate studies from applied computer science, design, and library science, among other disciplines. Thematically, the iSchools typically focus on some combination of people, information and technology, across a wide variety of organizational and social contexts. As a result, course offerings at iSchools vary widely in accordance with the variety of degree program offerings.

The initial seeds of the emergence of iSchools appear to be an indirect result of a sea change in LIS programs in the 1980's, when several long-standing American Library Association (ALA) programs closed or ceased to maintain their accreditation. Hildreth and Koenig documented the prevalent survival strategies for LIS schools: merger with a larger partner or expansion into IT-related fields [14]. It comes as little surprise to members of the community that over half of the iSchools are represented as mergers or realignments in this analysis. Two iSchools have been successful mergers; Rutgers incorporated LIS with communications and journalism, and UCLA's information studies program partnered with education. Further, a number of hale LIS programs have been organizationally realigned and aggressively expanded their studies related to information technology; these include Syracuse, Pittsburgh, Drexel, Florida State, Michigan, Washington, Illinois and Indiana. Other iSchools were created new, such as at Penn State and Indiana Informatics, to bring together scholars and expand the host university's presence. Still others, like UC Irvine, Georgia Tech, and Carnegie Mellon, reflect the expanding role of an existing program. More generally, it seems clear that the intellectual background of an academic unit is influenced by the structures and interests of the local university where the iSchool exists, more than a shared common identity with others in the iSchool Caucus.

2.2 Interdisciplinarity requires disciplines

Many have noted that interdisciplinary research is both challenging and increasingly imperative to addressing many

intellectual, social and practical problems [e.g., 17]. Developing a better understanding of the factors that allow interdisciplinary academic endeavors to survive and thrive is in the interest of both the iSchools and to the broader scientific community as a means of insight into cultivating interdisciplinary research.

One attribute of interdisciplinary research is bringing together scholars from different intellectual traditions, with the degree earned by that scholar used as a proxy measure of difference. Faculties with a range of degrees among the members are typically seen as being more interdisciplinary, or at least more multidisciplinary, which allows for the possibility of doing interdisciplinary work. Simply: interdisciplinary scholarship demands having disciplinary variation [e.g., 24].

3. PRIOR WORK

The intellectual composition of an academic unit has traditionally been studied through examination of academic hiring patterns, a recurring topic for research in the sociology of science. These studies are typically focused on prestige out of concern for the potentially detrimental effects of particularistic, rather than universalistic, hiring in the academy (e.g. [2, 3, 4, 6, 15, 20, 21, 22]. Collectively, these studies have shown that in longstanding academic disciplines, changes to the social structure are slow and eventually lead to prestige stratification of the fields. While these studies lay the groundwork for the current work, they represent the concerns of mature academic disciplines in which change is slow to permeate the institutional structure. By contrast, the iSchools form an emergent, loosely coupled academic community. While this academic association has been building for some time – perhaps since the 1970s – the iSchools Caucus was chartered in 2005.

As yet, there is little scholarly research on the iSchool community. The annual iConference, currently in its fifth year, serves in part as a venue for reflection by the members on the efforts of the whole. This venue for community development among members of the iSchools Caucus has generated a few self-reflective studies from the community, but most of these are either largely conceptual or anecdotal, although some represent histories in the making [1, 5, 10, 12, 13, 18, 19, 23, 25]. Little of the discourse focused on the iSchools as a phenomenon is based on empirical data. Recent work demonstrates how errors in sampling for such a small academic community can lead to misrepresentations of the member institutions, particularly for uncertified data [7].

A 2007 study of hiring patterns in the iSchools sought to address some of these issues through empirical research on the relationship of prestige to hiring and identity in this emergent academic community [26]. This research compared the structural characteristics of faculty hiring in iSchools and Computer Science departments. A central finding from that study is repeated here: the disciplinary diversity of the iSchool community was evidenced by 674 faculty PhD degrees in 172 areas of study. While a majority of the faculty received degrees in the categories of computer and information sciences or library science, nearly half of the faculty members completed their doctoral study in other disciplines. This finding regarding the diversity of the iSchool community motivates the current research into the interdisciplinary characteristics of the iSchool faculty.

4. CURRENT WORK

The current study expands on the iSchools hiring research from 2007 and subsequent work [26, 28], but focuses on understanding variation in disciplinary training within community. Our study uses similar data that reflect on faculty composition, employing the notion from [27] that the intellectual identity of the current institution will be based in some measure upon the intellectual heritage of its faculty. While this analysis builds on the 2007 data with additional data from 2009, it is not a longitudinal analysis because faculty change over an elapsed period of two years is not sufficient to make meaningful observations.

4.1 Methods

The population for this study is the faculty of the 21 members of the iSchools Caucus as of January 29, 2009. Analyzing any community necessarily requires purposeful sampling in order to represent the phenomenon of interest. Thus, this population selection excludes those schools which may be self-identified as information schools in name or mission, but which have not joined the iSchools Caucus.

4.1.1 Data collection

The sampling frame was drawn from faculty listings on the web sites of the 21 iSchools. Data collection was done in January of 2009, giving each iSchool time to update their sites for faculty changes for that academic year. Still, some schools had less up-to-date listings of faculty than did others at the time of data collection; while some schools were potentially slightly misrepresented, all such data are subject to this bias due to the inevitable delay between hires and web page updates. These considerations aside, the quality of the sampling frame is still improved over previously available methods.

Faculty roles are variously defined among different schools, and roles such as "lecturer" or "associate in information studies" are not necessarily representative of the long-term intellectual investment in academic expertise that our analysis targets. In addition, professor emeritae are more representative of the prior identity states of a school than its current state. For these reasons, only current full-time professorial faculty were included in the sample; these were identified by their standard academic titles of professor, associate professor, assistant professor, associate dean and dean.

While most of the data came from the web sites of the individual iSchools, this did not provide the full data set, particularly as different schools' sites offer varying levels of detail about their faculty's credentials. Additional data needed for this analysis included the department or school granting the faculty members' terminal degree. These data were mined from the Proquest UMI Dissertation Abstracts database, faculty web pages, and faculty vitae to complete the full data set. Complete data were retrieved for all but three of 769 faculty members. The increase in population size from 674 in 2007 to 769 in 2009 is primarily due to the addition of two new iSchools at Carnegie Mellon and Singapore.

4.1.2 Classification

The areas of faculty specialization were coded into broad disciplinary areas, shown in Table 1. These categories are composed based on logical groupings of related fields of study, modified from the Classification of Instructional Programs (CIP) [8]. For example, Computing contains Computer Science along

with Electrical Engineering and Mathematics; Electrical Engineering and (applied) Mathematics are precursors of research in Computer Science, and many iSchool faculty with these degrees are trained in various aspects of Computing. The distinction between "information" and "library" studies was less clear; Communication Information and Library Studies was considered an Information degree due to the ambiguity stemming from the diversity of fields in the degree name, but all other instances where "library" occurred in the name were considered Library degrees. While scholars of almost entirely different backgrounds may receive degrees with the same name, it is impossible to distinguish in which category a given faculty member's educational experiences may better fit based on the degree names alone, so for these faculty members, we chose the more conservative classification of Library.

Table 1 Classification of Disciplinary Areas for 2009 iCaucus

Area	N (%)	Component Areas
Computing	233 (30%)	Computer Science, Electrical Engineering, Mathematics
Information	88 (11%)	Information Science, Information Studies, Information Transfer, Communication Information and Library Studies
Library	79 (10%)	Library Science, Information and Library Science, Library and Information Science
Social & Behavioral	78 (10%)	Psychology, Sociology, Social Sciences
Management & Policy	70 (9%)	Business, Management, Policy, Economics
Science & Engineering	69 (9%)	Life Sciences, Physical Sciences, Statistics, Engineering (not electrical)
Education	58 (8%)	Education
Humanities	54 (7%)	History, Philosophy, Literature, Multi & Interdisciplinary Studies
Communication	40 (5%)	Communication

Social & Behavioral disciplines included psychology, sociology and social sciences. Economics was grouped with law, business and management in the area of Management & Policy because the methods and applications of economics research in many iSchools is (arguably) more congruent with policy and strategy applications than the behavioral and social sciences. In the area of Science & Engineering, physical and life sciences are well represented, while statistics and engineering are related areas that appeared less frequently. The Humanities are dominated by historians, a number of whom specialize in science and technology studies, as well as scholars of literature, who are most common at iSchools with long-standing library programs.

5. FINDINGS
The breakdown for the disciplinary makeup of the full iSchools community in 2008, shown in Table 1, demonstrates that at the community level, the strongest area of emphasis is computing. The total number of computing-trained faculty is equivalent to the next three leading areas together: information sciences, library, and social & behavioral sciences.

The data presented in Table 2 helps make clear that the small number of schools and large variations in the compositions of the iSchool faculty across schools must be taken into account. For example, the dominance of computing in the overall picture is attributable to large numbers of computer science faculty from Georgia Tech and UC Irvine, two of the largest units in the iSchools Caucus. Likewise, the strong representation of communication is largely due to the presence of Rutgers, and in the future will be influenced by the recent merger of Florida State's iSchool and Communication department. Similarly, UCLA is responsible for the prominence of education. Computing aside, there is a fairly even distribution of scholars in 5 additional "core" areas for iSchools: management & policy, information, library, science & engineering, and social & behavioral studies.

6. DISCUSSION
The individual iSchools' histories and development trajectories have yielded a diverse set of intellectual roots that provide breadth and richness to these interdisciplinary research environments. In this section we discuss these roots, and somewhat more speculatively, how we expect they may affect the future development of the iSchools community.

6.1 Intellectual Heritage
Building from these findings, and particularly the examples of UCLA and Rutgers, data suggest that the processes of organizational emergence are one source of the community's intellectual breadth. For iSchools that undergo mergers or enter into institutional partnerships, the prior identities of the disciplinary consorts remain at least partially intact. This sort of outcome may be a result of culture, strategy, physical locations, accreditations, or even more likely, a combination of these factors – an institutional arrangements perspective.

Similarly, examining the iSchools based upon the areas of greatest concentration in faculty expertise shows evidence of the influence of "local logics" on their development. That is, the form and shape of the iSchool has more to do with response to the local situation of the school than a strong and shared intellectual identity across iSchools. One such example is Syracuse, where the strategic decision of a former Dean to establish a degree program in Information Management, in combination with a research focus on information policy, has yielded a faculty with one third of its members hailing from a management or policy background. Notably, however, there is greater sub-disciplinary diversity within the category of management and policy at Syracuse than elsewhere. Other examples of faculty compositions suggest similar local logics guiding their development, based on their unique outcomes. This local logics argument helps explain why Toronto, where the humanities are best represented as a proportion of faculty, and Penn State, where science and engineering fields are notably well represented – even with the inclusion of electrical engineering under the category of Computing – are both iSchools, but differ substantially in their faculty composition.

Area of study	Total N	Overall %	Berkeley	Carnegie Mellon	Drexel	Florida State	Georgia Tech	Indiana Info	Indiana SLIS	Pittsburgh	Penn State	Rutgers	Singapore	Syracuse	UC Irvine	UCLA	U Illinois	U Maryland	U Michigan	U North Carolina	U Texas Austin	U Toronto	Washington
Computing	233	30%	39%	10%	27%	8%	79%	59%	9%	28%	16%	4%	70%	3%	75%	2%	7%	11%	24%	12%	9%	16%	16%
Information	88	11%			19%	12%	1%	3%	17%	24%	11%	19%		22%	2%	2%	27%	39%	11%	28%	18%	28%	23%
Library	79	10%	11%		12%	27%		2%	22%	10%		4%		9%		8%	30%	11%	11%	48%	36%	16%	29%
Social & Behavioral	78	10%	22%	17%	12%	8%	1%	5%	22%	10%	16%	17%		16%	6%	19%	13%	11%	16%		5%		7%
Management & Policy	70	9%	17%	61%	8%	12%					21%		20%	34%		2%		6%	21%		5%		10%
Science & Engineering	69	9%	6%	2%	8%	8%	12%	21%		21%	24%	6%	10%	3%	18%	2%			3%	8%		4%	7%
Education	58	8%		2%	4%	8%	4%	2%	13%	3%	5%	4%		6%		51%		11%	3%	4%		4%	3%
Humanities	54	7%	6%	7%	8%	12%	4%	7%	17%	3%	3%	4%				10%	20%	11%	11%		18%	24%	3%
Communication	40	5%			4%	23%		2%			5%	41%		6%		6%	3%		3%		9%	8%	3%
Total	769	100%	18	41	26	26	84	61	23	29	38	48	29	32	67	67	30	18	38	25	22	25	31

This intellectual diversity, both within and between iSchools, is undoubtedly a result of many intertwined factors playing out over time. The current faculty composition is the accumulation of these events as manifest in hiring decisions that represent a dynamic combination of organizational history, current identity, and future ambitions, to which we now turn our attention.

6.2 Intellectual Agenda

The implications for the future of the iSchools suggested by this descriptive analysis are uncertain. That noted, in general, we are optimistic for the future growth of the community. In taking this position, we do not rely solely on our faith in the greater community, but also the more objective indicators that form the academic "bottom line." There are many signs of health, such as continued faculty hiring (or very brief postponements of faculty searches) during an economic recession, and burgeoning enrollments concurrent with increasing distress over declining enrollments in the adjacent fields of Computer Science and Information Systems.

We anticipate one direction for future growth in the iSchools is through further mergers, particularly with departments of communications and mass media, as the second such partnership has emerged at Florida State since the data were collected for this study. In addition, we note the official name change at Rutgers has shifted their identity away from the explicit inclusion of library studies to the implicit inclusion of these intellectual traditions under the more flexible, though ambiguous, label of information. Although stalwart librarians and researchers with library science backgrounds may take umbrage at this identity shift, it is a reflection of changes that have been underway for years already, both within the iSchool community and more broadly.

While this study does not focus on longitudinal changes, we note one observation from the accumulated data: the proportion of faculty with degrees in the Library area is diminishing while the percentage of faculty with degree in Information is increasing, generally in the same or greater proportions. We suggest that this empirical trend has to do with the dynamic nature of the environment in which the iSchools operate; the names of degree programs are changing, and new junior faculty hires are more likely to have earned diplomas emblazoned with the word "information" instead of "library" than they were even five years ago. The iSchools are not the only institutions choosing to embrace an information-centered identity.

However, we also note that there is no evidence to support the notion that Library-focused scholarship is being phased out in the iSchool community. As previously mentioned, an Information degree may be wholly focused on library science, just as easily as it may be entirely centered on human-computer interaction or information policy. Therefore, it is entirely possible that as faculty members with Library degrees retire, their successors are also scholars of library science. Despite the shift in labeling, a rose is a rose, as the saying goes.

Another potential direction for growth in the iSchool community is through partnership, merger, or simple expansion into the field of Information Systems. These and the more narrowly defined management information systems, or MIS, departments are also interdisciplinary environments focused on applied research on computing in organizational settings, and most often found in business schools. Their research goals and scholarly interests are compatible with the work of iSchools [11] and several iSchools already include faculty from this research community.

Finally, we consider the future of the newly-minted PhDs graduating from the iSchools. While we are not aware of any

reported findings regarding placement trends for graduates of iSchools, Olson and Grudin [23] note that they are faring well in the job market, although not all are choosing to pursue employment in academia. It is not clear whether this is due to a surfeit or deficit of options for graduates; broadly speaking, the last two years' job markets have not provided as many opportunities as would ordinarily be expected under better economic conditions.

In addition, following our earlier point that interdisciplinarity requires disciplines, it is an open question as to whether the iSchool graduates themselves, as interdisciplinary scholars, are adequately grounded in disciplinary roots to become desirable faculty candidates to the iSchool community itself. Each iSchool is sufficiently distinct at this juncture that for any one school, hiring from the graduates of other iSchools is unlikely to yield a net decrease in actual intellectual diversity.

However, it also seems that, given enough time, particularistic hiring practices which unduly favor graduates from within the community would lead to greater convergence not only in the faculty's degree names, but also in the actual content of their interdisciplinary heritage, leading toward institutionalization and disciplinarity. Like so many other fields, the iSchools are likely to produce more graduates than academic jobs, so the current diversity of graduate placement seems a fair indicator of potential future trends. Some end up in policy, administration, or private sector research settings, and some remain in academia.

While the idea of homogenization of the iSchools brings mixed reactions, we note that the hiring trends to date, although providing only a brief history, suggest that this is an unlikely outcome for the near future. It seems far more likely that the iSchools will continue to focus faculty recruitment on attracting the most suitable candidates for their needs based on the institutional structures of their local environment and the particular interests and needs of their unit. This implies that there will be hiring along disciplinary lines to support programmatic needs such as professional accreditation (e.g., ALA or ABET), or selecting candidates from other iSchools who bring unique blends of expertise that complement the existing faculty research portfolio.

6.3 Limitations & Future Work
The limitations of this work include the short time scale for observing change, and the use of secondary data sources that have some known issues. Future work will include further analysis of the data used in this study, as well as ongoing monitoring of the community composition for a more useful longitudinal analysis. Incorporation of these quantitatively focused analyses with qualitative and explicitly historical accounts of the iSchools' emergence (e.g. [23]) could also provide a more complete picture of the community's development.

7. CONCLUSION
The iSchools are still in an early phase of establishing identity as a community. Although it currently represents a relatively small intellectual population, some patterns are emerging with respect to interdisciplinary community development. Computing clearly plays a large role in the community as a whole, but diversity is important as well, and there are many vibrant areas of intellectual activity in the iSchools. The richness and diversity of these broad disciplinary domains make an important contribution to the

community, and the variations we observe between different iSchools' intellectual composition seem to be clearly related to local logics that, over time, have guided hiring to meet local needs. From this, we infer that these local arrangements are more important to hiring decisions than any sense of shared community identity, which is consistent with the findings of prior research on the emergence of interdisciplinary academic endeavors. These early findings reflect only a brief history of community development; however, the outlook at this time suggests that the iSchools will likely find valuable sources of fresh perspectives by pursuing new intellectual areas for growth, while continuing to cherish the important contributions of the traditional domains upon which they are building their successes.

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