



Information Systems Research

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Issues and Opinions—Those to Whom IT Matters Most: Perspectives of IT Faculty on Curricula, Courses, and Class Materials

Andrew McAfee,

To cite this article:

Andrew McAfee, (2007) Issues and Opinions—Those to Whom IT Matters Most: Perspectives of IT Faculty on Curricula, Courses, and Class Materials. Information Systems Research 18(2):142-149. <https://doi.org/10.1287/isre.1070.0127>

Full terms and conditions of use: <http://pubsonline.informs.org/page/terms-and-conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2007, INFORMS

Please scroll down for article—it is on subsequent pages



INFORMS is the largest professional society in the world for professionals in the fields of operations research, management science, and analytics.

For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Issues and Opinions

Those to Whom IT Matters Most: Perspectives of IT Faculty on Curricula, Courses, and Class Materials

Andrew McAfee

Harvard Business School, Morgan 491, Soldiers Field, Boston, Massachusetts 02163, amcafee@hbs.edu

This paper presents quantitative and qualitative results from a conference on IT teaching held in May of 2006 in Boston. Participants completed a survey in advance, and the conference consisted of presentations and interactive panel discussions. The conference revealed both heterogeneity and convergence across participants' course offerings, and grounds for both optimism and concern about the health and future of IT curricula within business schools. This paper highlights these tensions, synthesizes and extends data and discussions from the conference, and suggests open questions for faculty who teach IT.

Key words: education; teaching; core curriculum; elective curriculum; teaching cases; theories, framework

History: Vallabh Sambamurthy, Senior Editor. This paper was received on September 7, 2006, and was with the author 2 months for 2 revisions.

Introduction

The perspectives of business school deans on IT curricula are obviously of great importance and interest to IT teaching faculty, and Dhar and Sundararajan's article in this issue is a valuable addition to our body of knowledge about our own work. Dhar and Sundararajan's work sheds light on both the current standing of our course offerings and on the criteria by which they are being assessed by the senior decision makers of our institutions.

This article presents and analyzes the perspectives on IT teaching of another critical constituency: the IT teachers themselves. In May of 2006 a group of faculty who teach undergraduate and graduate IT courses, predominantly at U.S. business schools, met for a one-day conference on the Harvard Business School campus in Boston. The conference's goals were to share materials, viewpoints, and "best practices," to assess the current state and likely future of the IT teaching field, and to determine areas of consensus and diversity across participants and their classroom offerings. A first IT teaching conference, organized by Haim Mendelson of Stanford, was held in spring of 2004 at the Stanford Business School; the Boston conference

was in many ways a continuation of the discussions started at Stanford.

Prior to the conference, participants completed an online survey. The conference consisted of presentations, demonstrations, panel discussions, and a full-audience discussion. This article attempts to synthesize themes from the conference and presents qualitative data from the survey and the day's discussions. It is organized into three main sections. The first presents quantitative and qualitative information gathered by the survey, including measures of IT course popularity and demand. The second section summarizes the day's presentations and discussions, organizing them around themes as revealed by the survey. The final section discusses a set of open questions arising from the conference that might be of interest to faculty who develop courses and teach IT.

The 2004 Stanford conference consisted of approximately 30 participants, all of whom were all invited to the 2006 Boston conference, as were other faculty known by the organizers of both conferences to be interested in IT teaching issues. Other potential participants, suggested by initial invitees, were also invited. Approximately 40 people attended the Boston conference, representing the 19 schools listed in Table 1.

Table 1 Home Institutions of Participants in 2006 Boston Conference on IT Teaching

Boston University School of Management
Carnegie Mellon: Tepper School of Business
Carnegie Mellon: Heinz School of Policy
Emory University (Goizueta Business School)
Georgia Tech
Harvard Business School
Michigan State University (Broad Graduate School of Business)
MIT (Sloan School of Management)
New York University (Stern School of Business)
Stanford Graduate School of Business
Tel Aviv University
University of Arizona (Eller College of Management)
University of Maryland (Smith School of Business)
University of Michigan (School of Business)
University of Pittsburgh (Katz Graduate School of Business)
University of Rochester (Simon Business School)
University of Southern California (Marshall School of Business)
University of Texas at Dallas School of Management

Preconference Survey

Approximately one month prior to the conference, all confirmed attendees were asked to complete a Web-based survey. Attendees were sent multiple e-mail reminders to complete the survey prior to the conference. Thirty-two responses were received.

The survey asked questions in seven areas:

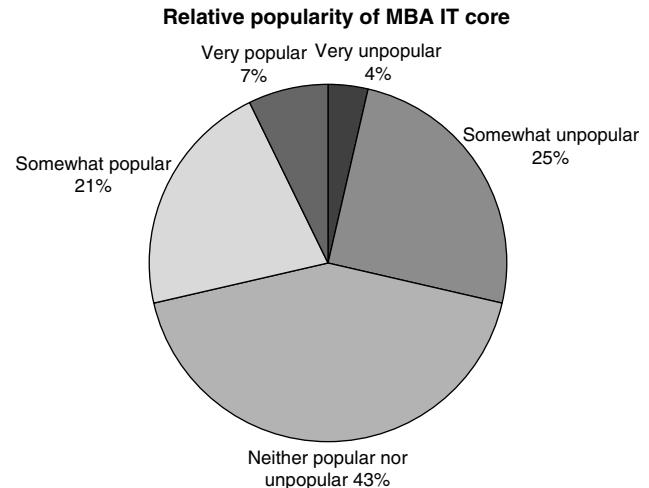
- The school's required IT curriculum, if any, at the MBA and undergraduate levels;
- Relative popularity of the school's required IT curriculum;
- Relative demand for the school's IT electives;
- Theories and frameworks used in the respondent's IT course;
- Intended audience(s) for the course;
- Mix of teaching materials used;
- The respondent's biggest concerns/questions/frustrations about IT teaching.

Responses were numerical for the first three areas and text based for the latter four. Faculty who taught more than one course filled out the survey multiple times.

Course Popularity and Demand

Survey results indicated that IT is well represented in most schools' MBA and undergraduate core curricula, but that these offerings are not universally popular with students. In addition, elective IT courses do not appear to be among the most popular at conference participants' institutions.

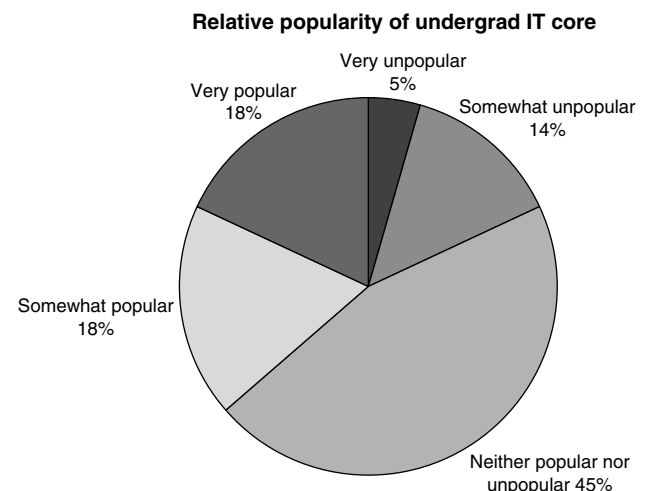
Figure 1 Responses to "If Your School Does Have a Core MBA IT/IS Course or Module, How Would You Rate Its Popularity?" ($n = 28$)



Of the 19 schools, 16 include IT in the MBA core. Core IT offerings range from 3–28 sessions, with most schools clustered at between 10–15 sessions. Of the 18 schools, 12 have IT in the undergraduate business core (Harvard Business School has no undergraduate business courses). These undergraduate cores range from 3–32 sessions, and again cluster around 10–15 sessions.

Figures 1 and 2 graph respondents' assessments of the relative popularity of their school's MBA and

Figure 2 Responses to "If Your School Does Have a Core Undergraduate IT/IS Course or Module, How Would You Rate Its Popularity?" ($n = 22$)



undergraduate IT cores, respectively, compared to the rest of the core curriculum. Only 28% of respondents believed that their institution's MBA IT core was either somewhat or very much more popular than the rest of the core; 29% reported that it was somewhat or very much more *unpopular*. The situation appears to be better in the undergraduate core, where 36% of respondents report that the IT offering is somewhat or very much more popular than the rest of the core, and only 19% report that it is less popular. In aggregate, responses to these two questions indicate that IT teachers do not currently believe that their offerings are among the most popular in their schools' core curricula. It would seem appropriate to place emphasis on improving this situation, because the core curriculum often influences students' choice of electives.

Figure 3, which graphs respondents' views of relative demand for IT electives at their schools, shows that demand is not universally robust. Of the respondents, 38% reported that there was either somewhat or much less demand for IT electives, whereas only 31% reported somewhat or much more demand.

In total, Figures 1–3 indicate that substantial opportunities exist to improve the status of IT offerings at the schools represented at the Boston conference. Because conference attendees self-selected based on their interest in IT teaching, and several of the institutions represented are known for their attention to IT, there is reason to believe that survey respondents

are not a negatively biased sample with respect to the popularity of and demand for their offerings.

Challenges

Respondents' replies to the open-ended survey question "What are your biggest concerns/frustrations/questions about IT teaching?" supply further evidence that demand for IT offerings is lagging. These responses also provide insights about why this is the case. Selected portions of responses to this question are grouped below into three categories: Demand, theoretical/conceptual base, and materials.

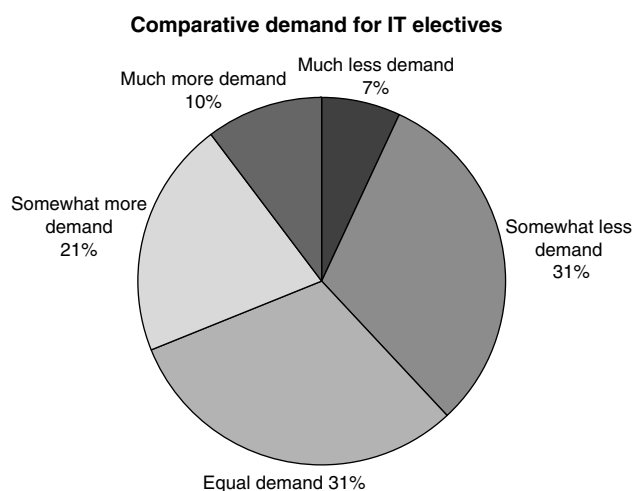
Demand

- "Lack of significant student interest"
- "Getting MBA students to take IT electives"
- "Need to convince students of value of materials"
- "MBA students show some interest for the 'sexy' stuff (Napster, iTunes, Amazon, etc.) that they are less likely to encounter in their careers but seem less interested in the more 'mundane' stuff (managing implementation projects, valuing IT investments, organizing and governing IT, etc.) that they are more likely to have to deal with in their jobs."
- "We need to spend significant amount of effort on motivation for learning the material."
- "Despite high ratings, enrollments have not grown."
- "Lack of student interest"
- "How to increase the awareness of how important IT is in business"
- "Insufficient demand for IT courses"
- "Roller coaster of student demand"
- "Lack of student interest in IT after burst of dot-com bubble."
- "Lack of student interest ('I can always hire someone from Bangalore to do this for me.')

Theoretical/Conceptual Base

- "Is there really a robust set of core principles that will still be applicable in 5–10 years (apart from a couple common sense ideas that are not necessarily IT specific)?"
- "[some students] can't see why it is an independent module since the general managerial insights often apply to other areas."
- "IT not seriously taken as a discipline of its own"

Figure 3 Responses to "How Would You Rate the Demand for Your [Elective] Course, Compared to the Average Elective at Your School?" ($n = 29$)



- “Relatively few theoretical frameworks to easily apply to course materials”
- “Technologies go out of date quickly, so identifying key principles that remain stable across different types of information technologies can be a challenge.”
- “Lack of a stable theory”
- “Unlike Accounting, Econ, etc. as a field, we have not identified the core concepts that should be taught in this course. It would be much easier to explain the course to MBA program director, deans, etc. if I didn’t have to say, ‘well, everyone teaches different topics’ ... Personally, I struggle with deciding what’s in and what’s out of this course. Additionally, I struggle with providing the students with an organizing mechanism—a framework.”
- “Often a lack of rigor in explaining concepts”

Materials

- “Need to update materials constantly”
- “Lack of current cases”
- “Lack of current and standardized material”
- “Lack of videos or demo materials”
- “Lack of an appropriate textbook”
- “Lack of good textbooks”
- “Lack of good text”
- “Textbook I am using could be better”
- “Rapid change requires constant updating of materials.”

Conference Discussion

The Boston conference consisted of seven sessions. First, Dhar and Sundararajan presented the results of their survey of attitudes toward IT curricula among business school deans. This was followed by a presentation of quantitative results from the preconference survey. The next three sessions were short presentations of core courses (five in total), elective courses (seven), and simulations and other courseware (two), respectively. Attendees volunteered to present at these sessions. The next two sessions were panel discussions titled “What makes a great course: Theories and frameworks” and “Improving the practice of teaching: Where do we go from here, and what do we need?” Participants volunteered for these panels, and conference organizers also solicited participation on them. Both of these sessions featured frequent interaction between panelists and other conference attendees. The day’s final session was a discussion of

“What Makes a Great Class?,” facilitated by David Upton of Harvard.

During the conference, two themes became clear. The first was continued heterogeneity in IT offerings’ theoretical and conceptual bases and in their mix of teaching materials. This heterogeneity was evident in survey responses, and the conference sessions underscored it. Although participants did not directly discuss the need for, or desirability of, a single theoretical base to underpin IT course offerings, there was often a sense in discussions that the current level of fragmentation and lack of a dominant theory or theories was not beneficial to the field.

The second theme was more positive. Participants repeatedly remarked on a sense of progress and convergence across their offerings. Many found this trend surprising. Because course planning and delivery are largely uncoordinated across schools, there was little reason to expect convergence. Perhaps the Stanford conference served as a catalyst, because many who attended both conferences noted that discussions in 2006 reflected a consensus on some of the issues considered in 2004. In particular, the Boston conference showed that IT courses’ intended audiences, their guiding questions, and their attitudes toward the constantly shifting landscape of available technologies were largely consistent. This was not the case in 2004.

Heterogeneity in Reference Disciplines

Presentation and discussion of IT courses revealed a wide range in disciplinary bases, and hence in theoretical and conceptual foundations. The most frequently cited reference disciplines were economics and competitive strategy. Less common were courses making use of more specific theories of IT impact, or concentrating on topics at the intersection of management and engineering or computer science. To convey extant heterogeneity, selected courses are grouped below according to their self-reported reference disciplines. (External references are provided only when respondents included them.)

Economics

- “Winning in a Network Era” (Boston University): Network effects, organizational economics
- “Business Strategy for the Digital Economy” and “Information Technology in Business and Society” (NYU Stern): Economics of digital goods online

markets, long tail, auctions pricing digital goods lock-in, network effects, first-mover considerations

- “Information Products: Applied Economics & Strategy” (Boston University): Bundling and network effects
- “Critical IT Decisions for Business Executives” (UC Irvine): Microeconomics, organizational economics
- “Information Systems for a Networked Economy” (Boston University): Economics of information
- “The Economics of Information” (MIT): Economics of information, pricing of digital goods (including bundling and versioning), price competition, transaction costs, long tail, economics of advertising, productivity and business value, intangibles, basic theory of the firm.

Strategy

- “Strategic Uses of Information Technology” (Carnegie Mellon): Porter’s Five Forces
- “Enterprise Resource Planning” (UT Dallas): Porter
- “Managing Global e-Business” (USC): Disruptive technologies
- “Real-Time Decisions Using Resource Planning Systems” (Carnegie Mellon): Resource-based view of the firm
- “IT and Strategy” (NYU): Porter

More Specific IT Impact Theories

- “Strategic Information Systems” (University of Maryland): Value disciplines, eBusiness models
- “Foundations of IS Management” (Tel Aviv University): Systems approach (Churchman 1979), entity relationship diagrams (Chen 1976)
- “Strategic Uses of Information Technology” (Carnegie Mellon University): Value disciplines
- “Managing in the Information Age” (Harvard University): IT as a general-purpose technology; organizational complements to IT
- “Information Technology for Management” (UC Irvine): Value disciplines
- “Information Technology Management” (Michigan State University): Digital business models, alignment, and governance

Engineering/Computer Science

- “Business Strategy for the Digital Economy” (NYU Stern): Technologies for delivering digital goods, digital rights management
- “The Economics of Information” (MIT): Knowledge management, basic technology trends in computers and communications, DRM and encryption, communications

Heterogeneity in Teaching Materials

Heterogeneity in reference disciplines translates, perhaps inevitably, into heterogeneity in teaching materials. Presenters and other participants reported using a wide range of textbooks, cases, exercises, academic and practitioner-oriented articles, demonstrations, simulations, and group projects in their courses. Few, if any, materials were universally used, and the Boston conference made clear that a canon of materials for teaching IT has not yet emerged. The most common textbook appeared to be *Corporate Information Strategy and Management* (Applegate et al. 2003), the most common assigned reading *Information Rules* (Shapiro and Varian 1999), and the most common case “Zara: IT for Fast Fashion” (McAfee et al. 2004).

Convergence

A participant in the Boston conference who left before the panel discussions would probably have taken away the impression that participants’ IT courses shared a few materials and little else. The pre-conference survey and initial sessions devoted to course presentations revealed substantial differences and painted a picture of independent offerings with slight overlap.

The conference’s final sessions, however, yielded a different perspective. Panelists and other attendees stressed that in multiple important areas they saw substantial convergence and consensus. Many participants remarked that they were pleasantly surprised by this finding, and all agreed that the observed convergence was a desirable trend that will hopefully continue.

The two clearest areas of convergence concerned courses’ intended audience(s) and the central question or issue addressed. The preconference survey asked respondents “What’s the intended audience for your course? Are you teaching to general managers, technologists (e.g., programmers), strategists,

entrepreneurs, CIOs in training, etc...?” Free text answers were allowed. Only 6 of 33 responses included CIOs or technologists as an intended audience for the course. Of the rest, most were clear that general managers were the course’s primary audience, often accompanied by functional managers, entrepreneurs, consultants, and strategists.

Participants who attended the 2004 Stanford conference recalled a substantially weaker consensus on intended audience. In Boston, however, there seemed to be broad agreement that convergence on this issue was a welcome development. Although some participants specified that they taught within technical programs, and so were aiming their offerings at technologists and IT managers, most stressed that they were teaching general managers.

What were they trying to teach them? Many participants articulated a “guiding question” close to the one proposed by Dhar and Sundararajan: “How does IT transform business and society?” At least three things about this question are noteworthy. First, it is concerned not with technologies themselves, but with their impact. Second, it implies that this impact is multidimensional—that IT has an effect along many axes and in many domains. Third, it also implies that there is something unique about IT that makes it worthy of dedicated study. The changes brought by IT are not identical to those brought by a new piece of capital equipment, a Six Sigma initiative, or a corporate merger. Instead, they are distinctive enough to warrant of separate consideration and separate courses.

A final and closely related area of convergence was reduced emphasis by faculty on incorporating and explaining the newest information technologies into IT courses. There was widespread agreement that there was simply too much innovation among IT producers for this to be a feasible exercise. More fundamentally, many conference participants stressed that their students did not value or benefit from technology surveys. Students reasoned that the technologies they learned about at any point in time would soon become obsolete, and so questioned the effort. Many participants stressed that IT faculty would be better advised to teach their students principles, concepts, frameworks, and theories that would endure even as technologies themselves remained in flux.

Open Questions

Because the Boston conference lasted only one day, and because over half of it was devoted to information sharing rather than discussion and synthesis, it was unlikely that all the significant themes would be revealed at the conference itself. Subsequent reflection on the days events, combined with review of survey results and materials presented, yields three additional topics of interest to IT teachers and course developers. These are the industries covered by the course, the degree to which IT management issues are included, and whether the course is structured around information technologies themselves, or around the impacts of these technologies.

Focal Industries

In response to the survey question “Which are your favorite materials to assign? Why?” one participant answered in part “Amazon, eBay, PayPal, Skype - Students just loved them.” This response highlights an important consideration for IT teachers. The eldest of these companies is 12 years old, and they are all clustered within a portion of the U.S. economy that, while unquestionably dynamic and important, is also relatively small. All of these companies also have highly digital value chains. Amazon, in fact, is the only one that involves itself with physical products.

So, although IT continues to penetrate (and undoubtedly to have an impact on) the entire economy, pedagogy around IT at business schools sometimes seems skewed toward a small set of industries and companies—those that produce and distribute either code or bits. There are several compelling reasons for this focus, beyond student enthusiasm. Economics has provided a comparatively rich theoretical base for understanding network effects, the pricing of digital goods, standards battles, and other central topics in digital industries. In addition, many consider that the dynamism and rates of innovation in these industries make them bellwethers for the rest of the economy. Finally, these sectors contain some important and fascinating companies.

However, there are at least three reasons to be concerned about this focus. First, even though students are excited to learn about these companies and industries, which probably hire a share of business school graduates disproportionate to their share of the economy, it is still likely that the majority of business

school graduates will *not* make their careers within the companies and industries that dominate current IT curricula. Second, lessons and insights from studying bit- and code-based industries might not always translate directly to more prosaic sectors of the economy. Finally, despite some notable examples such as Skype, Linux, and SAP, digital companies tend to be concentrated in the United States. This can give IT pedagogy a parochial flavor at the same time that IT use itself is an increasingly global phenomenon.

Thus, IT teachers might find it beneficial to examine the distribution of industries and companies considered by their courses, and to consider whether skewed distributions are in keeping with their pedagogic goals. An encouraging development in this area is the increasing availability of teaching materials that cover “old economy” companies and industries, often in international settings. For example, the Zara case (McAfee et al. 2004) cited in the survey for its popularity is about a Spanish clothing retailer.

Management of the IT Function

As IT teachers are designing or reviewing their syllabi, another potentially fruitful area of inquiry concerns the amount of material devoted to managing within the IT function itself. The majority of courses taught by conference participants are aimed not at CIOs in training, but at general management students, few of whom aspire to work within companies’ IT functions, or to become CIOs. This calls into question the need to consider the relatively specialized activities of an IT/IS manager, including assuring uptime and reliability, managing IT infrastructures and staff, and crafting IT outsourcing arrangements. While it may be appropriate to include these topics, given the goals of a course or the generalizability of lessons learned, faculty should probably no longer assume that it is appropriate to do so. Managing *with* IT is increasingly separate from managing IT itself. It may not be necessary to learn about the latter to do the former.

Course Structure

Conference presentations and discussions revealed what appear to be two broad approaches to structuring IT courses. The first is to build the course around

a categorization or conceptualization of impacts themselves, then to proceed to a discussion of particular technologies. The “value disciplines” framework (Treacy and Wiersema 1993, 1995) used in several courses is an example of such an approach. This framework conceptualizes IT as facilitating operational excellence, product leadership, and/or customer intimacy. Other courses start with a high-level view of a company’s value chain (Porter 1980) and explore the impact of IT on each of its links. In both cases, information technologies are considered in terms of the areas where they have an impact, not in terms of characteristics of the technologies themselves.

The reverse approach is found in courses that differentiate among the information technologies available to managers and companies. Several courses presented at the Boston conference, for example, have sessions or modules devoted to infrastructural technologies such as wireless networking and digital telephony, or application categories such as enterprise resource planning (ERP), customer relationship management (CRM), or business analytics. These courses proceed from the assumption that different information technologies have differing impacts, and so it is important for students to understand the salient characteristics that distinguish them from each other. For example, the overview note for Harvard Business School’s *Managing in the Information Age* course (McAfee 2006b; see also McAfee 2006a) categorizes end user-visible applications into three categories: Function IT, which assists with discrete tasks; enterprise IT, which imposes new multitask business processes; and network IT, which allows new interactions to emerge without imposing them. This course stresses that the three types of IT have divergent and largely nonoverlapping impacts on adopting organizations, and deliver equally distinct capabilities. It may be valuable for IT instructors to consider whether their offerings should be structured primarily around technologies, or around the impacts of these technologies. It seems clear that either approach can be productive, and can yield a course that successfully addresses its guiding question(s).

Conclusion

At the end of the Boston IT teaching conference, the atmosphere was one of optimism. Participants were pleased by the convergence evident across their

course offerings and by the high degree of consensus about appropriate guiding questions for IT pedagogy. In addition, it was evident that good new teaching materials and approaches continue to be developed, and that there was high willingness to share them. Finally, many participants spoke of a positive change in perceptions of IT among students, and more generally, among practitioners. It appears that the period of comparatively low interest in technology following the bursting of the dot-com bubble is passing, and that widespread skepticism and lack of interest among our target audiences are giving way, at least in some degree, to curiosity and interest.

Current reality, however, is not entirely positive. Many participants reported continued low demand for their offerings, and are unsure how to change this situation. Particularly troubling, many said, is an apparent perception among students that IT responsibilities can easily be outsourced, especially as technologies become more modular and very large pools of skilled and low-cost labor become available around the world. IT, according to this perception, is “something I can get someone else to do for me.”

Another perception detrimental to our efforts to fill our classrooms is the belief that IT is boring – that rather than being powerful levers for general managers, IT efforts are low-level exercises in project management, rich in technical and operational detail and short on verifiable impact. As long as these perceptions persist, it seems likely that IT faculty will continue to lack the level and type of student interest that they seek.

Resources

The INFORMS Information Systems Society, in an effort spearheaded by Chrysanthos Dellarocas of the University of Maryland, has set up an online teaching community that includes forums, blogs, collections of teaching materials, and other resources of interest to IT faculty. This community is open to instructors at institutions of higher learning around the world. It was previewed at the Boston conference, and is available at <http://informs.ismlab.usf.edu/>.

References

- Applegate, L. M., R. D. Austin, F. W. McFarlan. 2003. *Corporate Information Strategy and Management*. McGraw-Hill, Irwin, Boston, MA.
- Chen, P. 1976. The entity-relationship model—toward a unified view of data. *ACM Trans. Database Systems* 1(1) 9–36.
- Churchman, C. W. 1979. *The Systems Approach and Its Enemies*. Basic Books, New York.
- McAfee, A. 2006a. Mastering the three worlds of information technology. *Harvard Bus. Rev.* 84(11).
- McAfee, A. P. 2006b. *Managing in an Information Age: Course Overview Note for Instructors*. 607-020 Publisher Boston, Boston, MA.
- McAfee, A., V. Dessain, A. Sjoman. 2004. Zara: It for fast fashion. Harvard Business School Case Study 604-081. Publisher Boston, Boston, MA.
- Porter, M. E. 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. The Free Press, New York.
- Shapiro, C., H. R. Varian. 1999. *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School Press, Boston, MA.
- Treacy, M., F. Wiersema. 1993. Customer intimacy and other value disciplines. *Harvard Bus. Rev.* 71(1) 84–93.
- Treacy, M., F. Wiersema. 1995. *The Discipline of Market Leaders*. Addison-Wesley, Reading, MA.