IS As a Foundational Discipline for Contemporary Business

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Abstract

The Information Technology (IT) field has undergone a period of self-examination with Information Systems (IS) in many ways leading the debate about self-definition as a discipline. While helpful to the members, the paper suggests that IS could enhance its standing by recognizing and advocating a position as a foundational discipline for business education. To support this position the paper reports on a preliminary survey of faculty and students regarding the importance of IT for business and majors as a means of validating perceptions of the central role of IT for business.

Keywords: IS curriculum, IT field, foundational discipline, e-business

1. INTRODUCTION - THE IT FIELD

The Information Technology (IT) field, which includes Computer Science (CS), Software Engineering (SE) and Computer Information Systems (CIS/MIS) disciplines, is in a period of self-examination. The most encompassing expression has been the recent spate of articles in the Communications of ACM (Berghel and Sallach (2004), Denning, (2001)) reporting on the establishment of schools or college of IT to house all faculty teaching in the computer and information disciplines. Alongside this self-examination Accreditation Board for Engineering and Technology (ABET) has strengthened its role in specialty accreditation of the computing disciplines to include the IS disciplines (Impagliazzo and Gorgonne, (2002)).

The CIS/MIS discipline seems to have engaged in the longest and most intense debate, beginning in the late sixties with Ackoff (1967), resurfacing in the late eighties with the perspective of a "fragmented adhocracy" by Banville and Landry (1989). The commentary seems to have increased in step with the "dot boom and bust" with a lively exchange stimulated by Benbassat and Weber (1996) regarding diversity followed again by Benbassat and Zmud (2003) detailing the latest identity crisis and appropriate artifacts for study. These presentations have focused mostly on how the discipline defined itself, what were its reference disciplines, whether or not it had a core, and what those core elements might be. Hirschhiem and Klein (2003) provide the latest summary and propose a "body of knowledge" to define the discipline.

The self-examination of the CIS/MIS disciplines spilled outside their boundaries in 2002 with the widely distributed response by the Association for Information Systems (AIS) to the apparent diminishing focus on IS in the AACSB International accreditation recommendations. In this response, Ives et. al. argued for the centrality of IS for business programs and for a specific set of core concepts whose understanding was required of all business students.

While the debates detailed above may be important for the field and the practitioners within the area, they may not be particularly helpful to the general student population preparing for business. Rather than focusing on how to define the field, the CIS/MIS community may be better served arguing that IS is a foundational discipline for contemporary business.

2. FOUNDATIONAL DISCIPLINE

While the notion of foundational disciplines can ignite debates about the philosophical validity of the construct, in practical terms academics accept and implement the importance of foundational disciplines. For example, McGill University (2004) notes that its "…excellence stems from its strengths in areas that are the foundations of its intellectual heritage, ergo the term "foundation disciplines", while Loughborough University (2004) focuses on business education with, "The programme is distinctive in that it seeks to develop knowledge and understanding of the foundational disciplines of management and business organisations in a variety of contexts…" and the graduate program at Stanford University (2004) notes, "…we build from the basic foundational disciplines of the social sciences and techniques of deductive and inductive thought." Similarly, few question that the tests required of most college programs -- SAT, ACT, GRE or GMAT -- are based on foundational skills in either English language or mathematics. Likewise, few question that the undergraduate programs at many colleges reinforce the

foundational disciplines by requiring minimum courses in English and mathematics regardless of major and frequently test incoming students for remedial or refresher courses in these disciplines.

Considering CIS/MIS as a foundational discipline within the business program focuses the debate on those aspects of business which are unique to information technologies. For example, the US Census Bureau (2004) reports e-commerce revenues have increased 1000% in the five year period from 1998 to 2002 compared with a 23% increase in total retail sales over the same period. More importantly, e-commerce sales increased 29% between 2001 and 2002 while total retail sales stayed essentially constant. As noted by the Census Bureau, business-to-business sales make up an even larger portion of on-line commerce, especially when electronic data interchange (EDI) is included. Without the technology, its management, and its integration into business practice, the electronic revenue stream would not have developed nor proliferated. In the 21st century in mature economies, business facilitated by information technology has become mainstream.

To address the goal of providing the foundation for contemporary business, we redesigned the second required computing course for our business students to include a specific focus on databases, web design, and database driven web sites with scripting. Our goal in this course was to move students from being mere consumers of technology to producers of technology systems. The course focuses on two fundamental ideas in computing – the first that data can be separated from its description and the second, that data can be separated from its presentation. These two ideas form the core of database and the web respectively and represent a mode of thinking and expression unique to computer systems. By being unique to computers, these aspects, along with others, justify the claim as a foundational discipline because the problem solution is bounded by the discipline alone. Tying the two together with scripting to model on-line business processes gives students tangible experience with issues facing a contemporary business in developing an on-line presence. In many ways, we are trying to achieve the vision of the pioneers such as Kay (1996) and Nelson (1987) who strongly advocated for students to create their own systems, only our context is the business environment.

3. JUSTIFICATION AS A FOUNDATIONAL DISCIPLINE

Taking the position that computing is a foundational discipline for business challenges the primacy of more established business disciplines such as accounting, management, and marketing. It may also run somewhat afoul of the movement to elevate the prestige of information systems because computing may come to be viewed more as a tool and the IS faculty relegated to instruction in "tools" as Ives et. al. (2002) warns.

In the course of assessing the redesigned required course, we surveyed both students and faculty (excluding the CIS faculty) about their experience with technology, importance of technology for their discipline, and importance of technology for a contemporary business. The purpose of the survey was to determine how important students and faculty saw IT in business contexts. The sense was that if there were strong support for the centrality of IT to business, students and faculty would validate the proposition that rather than arguing about the status of IT as a field, we should build on faculty and student perception to advance IS within existing disciplines While the sample is too small to draw definitive conclusions, a future study aims to expand the responses, especially from faculty.

A reluctance to accept the position of CIS/MIS as a foundational discipline may come from the generational differences between faculty and students and the historical development of computers. In a recent survey of 45 undergraduate students enrolled in the entry level computer courses taught in the school of business, showed that the average age they first used computers in an academic setting was 9.7 years (with a range between 4 and 16 years old – the latter an international student). Using computers from an early age, approximately third grade, is an experience of the post-PC generation. This experience of growing up with computers is likely unknown to most current faculty, especially those outside technical disciplines who may not have been required to use computers until graduate programs or have since adapted to them in their careers as professors.

In the same survey both students and faculty responded to questions regarding the importance of the specific set of technologies forming the core of the course and their importance for a contemporary business. Respondents used a four point Likert scale of "Irrelevant", "Unimportant", "Important" and "Critical". Table 1 presents the questions and the average scores for both the faculty and students. The students responded to the survey towards the end of the semester and the faculty responded during the reading period at the end of the semester. It should be noted that a faculty caucus of all business faculty had approved the curriculum change in the previous semester in Fall 2003, so had they had the opportunity to debate the importance and focus of the redesigned course.

The table shows that both faculty and students generally regard the six major aspects of the course as important for a contemporary business. Interestingly, only two faculty members indicated any areas were irrelevant (score of 1) which were, using computer code to create client-side scripts and creating interactive web pages. Similarly, only one student indicated that database manipulation was irrelevant (score of 1). Generally about a third of the faculty and almost half the students indicated that all areas were critical (score of 4) to contemporary businesses.

The most interesting aspect of the data is the relatively greater importance that students give to the internet associated technologies. It will be interesting to further

investigate why students placed so much more importance on coding than did the faculty.
The same set of six questions was asked in regard to the importance of the technology for the major with responses reported in Table 2. The differences between faculty and students in this area are more obvious. Faculty and students agree on the importance of database technologies but diverge on the internet technologies. Students indicate that all six areas are important for the major while faculty respond that the internet technologies and their integration are unimportant.

4. CONCLUSION

From this preliminary study, it seems that students at the end of the course recognize the relationship between information systems as represented by a set of core technologies and their importance for contemporary businesses. Faculty outside CIS, on the other hand, seem to diminish the importance of internet technologies. Zuboff and Maxmin (2002, p. 13) note that, "The revolutionary potential of the new technologies will be ignited only when they are married to a new commercial destiny expressed in a new enterprise logic." Perhaps the faculty in other business disciplines await the new logic to be articulated better by faculty from IS – improving communications as advocated by Hirschhiem and Klein (2003). The IT revolution of the last fifty years is so entwined in the modern economy as to earn the moniker "knowledge economy" and IS may be better served by promoting its centrality to 21st century businesses than by arguing about its foundations and disciplinary legitimacy.

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Rate the importance of the technologies below for a contemporary business:	**Faculty Response (Average) 1(irrelevant) – 4 (critical) N = 12**	**Student Response (Average) 1(irrelevant) – 4 (critical) N = 45**
Database Design (determining data types, creating tables, defining relationships).	3.4	3.1
Database Manipulation (entering data, writing and running queries, producing reports).	3.5	3.3
Using HTML to create web page(s)	3.2	3.3
Using computer code to create client or server side scripts	2.7	3.2
Creating interactive web pages using HTML and code to enter or extract data from a database	3.0	3.4
Publishing a web site	3.25	3.4

TABLE 1 SURVEY RESULTS BUSINESS – FACULTY AND STUDENT AVERAGE SCORES (SPRING '04)

Rate the importance of the technologies below for your discipline/major:	**Faculty Response (Average) 1(irrelevant) – 4 (critical) N = 12**	**Student Response (Average) 1(irrelevant) – 4 (critical) N = 45**
Database Design (determining data types, creating tables, defining relationships).	3.4	3.0
Database Manipulation (entering data, writing and running queries, producing reports).	3.4	3.2
Using HTML to create web page(s)	2.6	3.2
Using computer code to create client or server side scripts	2.3	3.1
Creating interactive web pages using HTML and code to enter or extract data from a database	2.5	3.3
Publishing a web site	2.6	3.2

TABLE 2 SURVEY RESULTS DISCIPLINE/MAJOR – FACULTY AND STUDENT AVERAGE SCORES (SPRING '04)