Charting A New Course: Developing and Implementing a Curriculum for a Master’s of Information Science Degree

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Abstract

This paper describes the development and implementation of an innovative curriculum, the Master’s of Information Science (MIS), which is being offered at the School of Library and Information Science (SLIS) at Indiana University. After briefly describing the dynamics of the North American information studies marketplace, the paper focuses on the reengineering effort which led to the new curriculum. The paper concludes with a discussion of the marketing effort currently under way to promote the MIS.

1. Opportunity and Evolution

The competitive dynamics of the North American information studies marketplace are changing dramatically, triggered by trends and events in the wider environment. Developments in the information economy have created unprecedented opportunities for innovative teaching and research programs which address the nexus of social and behavioral issues raised by rapid and pandemic technologization. [1] More specifically, advances in the information and communications sectors have created important technological systems, which advocates promise will support more effective work and organizational action. In practice, however, there are many significant systems failures and growing evidence of value loss at all levels: conception, design and implementation, and exploitation. Few IS professionals know how to design systems and information that other people will want to use, and can use in ways which support their work and leverage organizational value. This gap between technological possibility and social actuality has created substantial opportunities for innovative research and teaching. Indiana University’s School of Library and Information Science is developing as a center of excellence in social informatics to advance the understanding of effective information systems design and implementation. This strategy builds naturally on SLIS’s (and Indiana University’s) social scientific strengths, and also helps differentiate the School from other programs which emphasize technological or business foundations for information systems/services development.

2. History

Until the early 1990s, the master’s and post-master’s programs offered by Indiana University’s School of Library and Information Science were essentially:

- vocationally oriented;
- geared to an institutionally defined market;
- geographically distributed; and
- praxis-centered.

Within these parameters, the School was close to being “best of breed,” achieving consistently high rankings in both perception and productivity studies of North American LIS programs. Its MLS (Master of Library Science) program, the stability pillar and primary revenue generator, was (and is) highly regarded. Graduate placement rates were high. The great majority of SLIS graduates found employment in the public sector. The School occupied a de facto monopoly position within the state of Indiana, and consolidated its market dominance by using a mix of distance learning methods/technologies to support an extensive off-campus program during the late 1980s. The School also recruited nationally and internationally, relying principally on word-of-mouth recommendation. The School’s faculty was strikingly homogeneous in terms of disciplinary backgrounds, culture and professional ideology. The dominant humanistic culture imbued classroom teaching and set the tone for student socialization. Research undertaken by faculty and students was, understandably, heavily biased in favor of historical themes and the management of public sector institutions, and consequently less than reflective of the field in-the-round. To say that the School exhibited strategic drift would be a fair self-criticism.

3. The Environment

During the late 1980s and early 1990s, the competitive dynamics of the library and information science (LIS) field changed irrevocably, and not only in North America. [2] One effect of the rapid technologization of LIS curricula has been a ramping up of the entry barriers -- in terms of capital expenditures and recurrent costs. A similar re-indexing of the field is necessary with regard to human capital investments. Pace-setting LIS programs in North America have begun to recruit “outsiders,” with an unprecedented aggressiveness. This has raised dramatically the costs of staying “in play,” for some schools and departments, and will inevitably accentuate the gap between first and second rank programs. These change drivers make the choice facing LIS parent institutions particularly stark: invest or exit.

Indiana has chosen the former option.

The changing structural dynamics of the broadly defined information studies marketplace (of which traditional LIS programs constitute an important, if diminishing, subset) have triggered a variety of institutional response strategies [3], the most common being:

- marriages of convenience (e.g. LIS departments are bundled in with cognate academic tribes to cut costs and/or create academic synergies);
- growth through acquisition (e.g. LIS programs acquire parts of, or asset strip, other academic units);
- strategic coevolution (e.g. LIS and other
departments jointly develop interdisciplinary information studies programs;
• internal growth (e.g. building an undergraduate program; developing distance education modules; and
• product portfolio diversification (e.g. new degree program development).

Of course, these need not be (and are not) mutually exclusive options. The challenge by the early 1990s was to redefine the School’s mission, map out a logical migration strategy, and diversify the teaching and research portfolios, such that SLIS would be a significant player in a radically transformed academic marketplace -- one increasingly defined in terms of niche packing and quality stratification.

4. Reengineering

As can be seen in Figure 1, a central component of the reengineering effort has been the value system that has slowly evolved over the past five years and now permeates the School. Briefly, this system is based on a model of collaboration and cooperation within the School and across departmental and disciplinary boundaries. In a departure from the “lone scholar,” model which has characterized LIS for many years, SLIS now emphasizes matrix and task based teamwork, balanced with individual work. Shifting teams of faculty form to investigate problem areas, write grant proposals, and conduct research. This approach was integral to the process of curricular redesign, described below.

4.1. Structure/facilities

At IU, the overall reengineering of SLIS (See Figure 1) began in 1991/1992, with a major restructuring of the School’s off-campus programs and upgrading of the computing infrastructure -- an investment of approximately $500,000 in systems over a 2-3 period. The restructuring involved the closure of five sites around the state, in an effort to control resource dissipation and enhance quality. The consolidation continues, and by mid-1997 the School’s operations will be limited to two proximal sites -- Bloomington and Indianapolis -- with a full-time faculty of 22 (an increase of 50% over the 1992 head count). The Bloomington-Indianapolis axis allows the School to capture both residential and urban markets, and also to leverage off the collective strengths of the two campuses, with their combined enrollment of 50,000 students.

4.2. Faculty

Faculty recruitment has been a major SLIS goal of the last 5 years, resulting in an influx of 16 new hires. The intentional strategy was to recruit widely, both in terms of disciplinary backgrounds and geography. The current faculty hail from the USA, Ireland, Germany, Serbia and Bangladesh, and hold terminal degrees in the following areas:

• Computer Science
• Cultural Anthropology
• Instructional Systems Technology
• Information Science
• Information Transfer
• Law
• Library Science
• Mathematics
• Political Science
• Psychology

4.3. Curriculum

Given the complexity and richness of the information studies field, we have sought to achieve requisite variety in our faculty mix. The cultural and intellectual diversity of the present faculty has been instrumental in driving curricular change within the School. Indiana University is now one of a minority of LIS programs offering a full-blown alternative to the monolithic MLS. The introduction in 1995 of a 42-credit MIS degree alongside the established (and accredited) MLS signalled major changes in the intellectual orientation and thrust of the School.

Why “Information Science,”? There are arguments pro and contra. On the plus side, SLIS “owns,” the label and that eliminated both the threat of intramural turf battles and the need to appropriate another, possibly contested, label. The principal drawback has to do with term opacity: despite a venerable Anglo-Saxon tradition, “Information Science,” is not a self-explanatory rubric, nor an established track in the North American academic and professional theaters. A further downside is the risk of brand confusion: how do we differentiate the SLIS MIS from the generic Business School MIS (Management of Information Systems)?

Both these factors translate into a need for a concerted marketing effort. Figure 2 shows where we think the MIS is positioned in the relevant product space, here defined in terms of the relative emphasis given by established degree programs (e.g. MBA, MS in Computer Science) to technology, on the one hand, and business/management content, on the other. There is a window of opportunity, but much needs to be done to sensitize both potential students and employers to the nature, scope and relevance of the product. To that end, one of us (Rob Kling), acts as “product line manager,” for the MIS degree (another colleague performs a similar function for the more mature MLS) and is mobilizing faculty and financial resources to drive a national recruiting/promotional effort.

The domains of theoretical and empirical
investigation which define the MIS degree are shown in Figure 3 and elaborated on in Tables 1-3. The three defining dimensions of the MIS are (a) the management of content, (b) an understanding of the enabling instruments and infrastructure, and (c) an emphasis on social impact analysis.

4.3.1. Content Management. A defining (and distinguishing feature) of the SLIS Information Science program alongside the other academic options highlighted in Figure 2 is the emphasis on the management of information content, from creation through storage to ultimate use. Effective information use depends on the quality of the retrieval and filtering systems, and the degree to which these capture nuance and reflect different needs. Access alone is not enough. Within SLIS, traditional expertise in indexing and classification theory, the bases for effective organization and representation, is today reinforced by specialized knowledge and insights culled from areas such as semiotics and categorization theory.

Information is often referred to as the fourth resource. Organizations are slowly waking up to the fact that their information assets, broadly defined, can be as important as traditional (tangible) assets, like capital or plant and equipment. The effective management of this

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**Table 1. Content Management**

1. **Organizing Knowledge**
   - Categorization; Representation; Semiotics; Classification; Indexing; Cataloguing

2. **Exploiting Intellectual Capital**
   - Information accounting; Asset management; Fiscal management; Management of intellectual property rights
3. Strategic Information Management

Competitive intelligence; Information resources management; Information and competitive advantage

Table 2. Instruments and Infrastructure

1. Organizational Informatics

New organizational forms; Inter/intranet development; Information and productivity; Standards setting process

2. Human Computer Interaction

Design of cognitive artifacts; Navigation; Usability testing; User-centered design

3. Information Retrieval

Cognitive approaches to information retrieval; User modeling; Evaluation of IR systems; Filtering

4. Digital Library Design

Discovery and retrieval tools; Economic models and IPRs; Archiving and preservation of digital materials

Table 3. Social Impact Analysis

1. Technology and society

Social, Cultural and organizational effects of computerization; Social shaping of technology; Control and ownership
resource calls for a new mindset and also new accounting models, which are sensitive to the special features and value of intellectual capital -- structural or commodified. This is most powerfully reflected in the attention being given currently to the management of intellectual property rights in the publishing, software, and entertainment industries.

As the rate and scale of competition for both domestic and global markets intensify, corporations are striving to maintain their information edge. Not only are more firms implementing enterprise-wide information management strategies and policies, but they are investing more heavily in competitive intelligence and environmental scanning systems in an effort to outsmart the competition. The design and management of business and techno-economic intelligence systems/services require a blend of technical skills, domain knowledge, and information handling expertise.

4.3.2. Instruments & Infrastructure. We have labelled the second dimension which defines our program ‘Instruments & Infrastructure’. The School’s graduates are not typically programmers or systems analysts, but individuals whose primary interests lie in the areas of human factors and user modelling. The program stresses the theory base which should inform the design of cognitive artifacts, and seeks to ensure that graduates can identify those variables which are likely to promote and or inhibit effective systems design in real-world settings (public, not-for-profit, and private sector organizations).

Related to this is a desire to understand how technology impacts on organizational structures and established social practices. What paybacks and effects can be attributed directly (or indirectly) to information-related investments, whether at the strategic or operational levels within organizations? Many questions relating to value restructuring, displacement
effects, and anomie require systematic investigation as we move into an age of virtual commerce, telecommuting, and trans-organizational information systems.

The School has a number of faculty with research interests in information retrieval and filtering. Recent investigation in this area has moved well beyond statistically-based approaches to take account of cognitive processes and contextual factors which have a bearing on retrieval effectiveness.

These three strands converge under the heading of digital library design. Research is needed into the management of federated heterogeneous databases, specifically issues related to the development of search and discovery tools, semantic interoperability, indexing, and electronic archiving.

4.3.3. Social Impact Analysis. Of course, our concern with content and systems has an applied goal -- to connect users with useful information. But, we need also to understand whether and why some systems, and some kinds of information, make (or do make) a difference in people’s lives. A key feature of the program is thus exploration of the social and organizational effects of informatization. How are organizations, work groups, task setting, and social values affected by computerization? We attempt to focus on interaction effects; to better understand the social shaping of technology, and to avoid deterministic models of information technology adoption.

One site which we have investigated from a variety of angles is scholarly publishing. Here is an example of a long-established set of social practices (the ways in which, and reasons for which, scholars publish) being impacted by rapid and pervasive technological change. The set of issues is wide: technological, economic, behavioral, legal. There is much speculation, surmise and uncertainty, which, in turn, calls for rigorous, grounded research into the changing character of the primary communication system.

Technology does not operate in a social or organizational vacuum. Organizations have rules, procedures, sanctions, and rewards which affect how technology is ingested and exploited. Societies have a range of policy instruments at their disposal (subsidies, incentives, statutes) which can be invoked to stimulate or depress uptake and use. Social impact analysis calls for a sensitivity to culture and context; to behaviors and values; to the wider legal and regulatory environment.

4.4. Research

The School has a highly productive faculty, as borne out by a number of recent output studies [5], and includes a number of the most highly cited scholars in the field. Historically, the School lacked a clear (common) research focus (or set of foci), but that is changing. Areas of concentration, bolstered by selective funding and intra/inter-unit collaboration, are emerging, notably, human-computer interaction, information retrieval, and scholarly communication. A transversal theme is that of social informatics, and the School’s commitment to this nascent area is reflected in the recent establishment of the Center for Social Informatics.

Social Informatics (SI) refers to the body of research and study which examines social aspects of computerization -- including the roles of information in technological and organizational change, the uses of information technologies in social contexts, and the ways that the social organization of information technologies is influenced by social forces and social practices. The Center will articulate connections between currently disparate research strands, and act as a vehicle to promote cross-talk on and off the campus, within and between disciplines.

Research within the school covers a broad range of intersecting themes. The prevailing culture is one of collaboration and cooperation, both formal and informal, instantiated in the topology below (see Table 4), which lays out the major themes and sub-themes, along with the associated faculty.

Table 4. Research Foci.

Theories of Information

- Classification, Organization & Representation of Information: Jana Bradley, Elin Jacob, Javed Mostafa, Uta Priss, Jean Umiker-Sebeok;
- Cultural Coding and Social Behavior: Elin Jacob, Rob Kling, Jean Umiker-Sebeok;
- Semantics & Semiotics: Uta Priss, Jean Umiker-Sebeok.

Cognitive Dimensions of Information Systems

- Information Retrieval: Jana Bradley, Charles Davis, Carol Hert, Steve Harter, Javed Mostafa;
- Information Seeking: Carol Hert, Howard Rosenbaum, Ralf Shaw, Jean Umiker-Sebeok;

Organization & Management of Information Resources/Services

- Evaluation of Programs, Services & Information Systems: Danny Callison, Blaise Cronin, Shirley Fitzgibbons, Rob Kling, Tom Nisonger, Verna Pungitore, Bob Travica;
- Information Services to Children & Young Adults: Danny Callison, Shirley Fitzgibbons, Thom Gillespie;
• Information Resource Management: Jana Bradley, Blaise Cronin, Howard Rosenbaum, Herb Snyder, Bob Travica;
• IT and Changing Work/Organization: Rob Kling, Howard Rosenbaum;
• Organization Design/Strategy: Blaise Cronin, Elisabeth Davenport, Bob Travica.

Information Systems/Services in Society

• Community Development and Information Technologies: Thom Gillespie, Rob Kling, Howard Rosenbaum, Jean Umiker-Sebeok
• Information Economy, Labor Markets & Social Change: Blaise Cronin, Elisabeth Davenport, Rob Kling;
• Information Policy & Law: Kenneth Crews, Howard Rosenbaum, Herb Snyder;
• Professional and Scholarly Communication: Blaise Cronin, Steve Harter, Carol Hert, Rob Kling, Tom Nisonger;
• Social Impacts of IT & Social Shaping of IT: Howard Rosenbaum, Bob Kling, Martha Smith, Bob Travica.

Applied Informatics

SLIS faculty often study information issues in the context of specific applications and families of systems. The following lists some of the applications that are central to current SLIS research.

• Digital Libraries: Jana Bradley, Thom Gillespie, Carol Hert, Rob Kling, Javed Mostafa, Howard Rosenbaum, Bob Travica;
• Distance Education: Danny Callison;
• Electronic Publishing: Andrew Dillon, Blaise Cronin, Steve Harter, Carol Hert, Rob Kling; Howard Rosenbaum
• Entertainment, Art & Games: Thom Gillespie;
• Group Support Systems: Bob Travica;
• Health Informatics: Jana Bradley.

4.5. Marketing Strategy

The contexts within which SLIS graduates seek and find employment are expanding dramatically. Placement is no longer confined to the bottom left hand quadrant of Figure 4 (public sector libraries, in essence) but to all kinds of information handling/system building environments, whether institutionally defined or no, in both the private and not-for-profit sectors. A similar diversification can be seen with regard to the kinds of materials (texts, generically speaking) which are handled on a routine basis by information professionals. SLIS graduates will increasingly deal with primary materials, rather than surrogates or secondary services, and increasingly be involved in the construction and consumption of texts which are multimedia and dynamic in nature -- a far cry from the limited array of relatively static information products handled by LIS graduates of only a decade ago (Figure 5).

5. The MIS Curriculum

5.1. Design process

The design effort was kick-started with a series of on-and off-campus retreats, in which working goals and directions were negotiated by the full-time faculty. This process was informed by results from a local market/perception analysis [4]. We used the nominal group technique to facilitate participation and collaboration in determining structure, credit hours, scope, and broad content. After several sessions, we emerged with an agreed curricular skeleton, but one possessing relatively little flesh. The next step was the assignment of teams to clusters of subjects (e.g. information systems; information resources management), in order to (a) develop an overview and rationale for the topic area in question, (b) specify the pedagogic goals and objectives of each cluster, and, (c) produce detailed syllabi for the constituent subject areas. The process was refined and brought to closure in a series of meetings using Groupsystems V in a collaborative work laboratory. The approval seeking process required formal submissions to both the university community and the Indiana Commission for Higher Education (ICHE). The total elapsed time from project initiation to ICHE ratification was approximately three years.

5.2. Structure

All entering master’s students (both MIS and MLS) are subjected to a common core, the rationale being that certain issues are generically important. This trunk currently comprises four courses, from which all students must take three: User Needs and Behavior in Theory and Practice; Organization and Representation of Knowledge and Information; The Management of Information Environments; Introduction to Research and Statistics.

Students then proceed to the MIS core, a sextet of courses (Introduction to Human-Computer Interaction; Strategic Intelligence; Information Technology Standardization; Systems Analysis and Design; User-Centered Database Design; Organizational Information Resource), from which a minimum of four, selected in consultation with the student’s faculty advisor, must be taken. Remaining credits, again in consultation with the student’s advisor, are selected from a large elective pool. The overall structure of the degree is shown in Figure 6. The MIS requires 42 credits, six of which
may be taken outside the School of Library and Information Science.

5.3. Rationale

One purpose of the MIS is to ground students in the principles and practices of the management and use of information and information technologies (IT), core activities that will be defining elements of many of the fastest growing occupations in the information industry, itself one of the fastest growing segments of the global economy. These occupations are information-intensive and involve the use of a wide variety of information tools and technologies. There is an increasing demand for trained information professionals who understand the information life cycle and can actively participate in the creation, acquisition, organization, evaluation, dissemination, and use of digital information in a range of organizational settings.

A second purpose of the MIS degree is to provide students with a deep understanding of the people who use the technologies which form the basis of organizational communications infrastructures. One important differentiator between IU’s Master of Information Science program and similar degrees at other schools is its strong user-centered character. Programs in computer science and engineering deal with the more technical aspects of developing and managing IT and involve much more hard core programming. Although computer science programs are changing, many still focus primarily on software and hardware and only have a secondary interest in the interactions between systems and the people who use them. Programs in business information management often focus on the development of mainframe and client-server systems and the management and use of applications for specific business activities, such as financial, project, and personnel records management. Again, there is little explicit focus on the end-user.

5.4. Interdisciplinarity

The explicit focus on, and sensitivity to, the people and organizations who use information and information
systems is a foundational theme which informs much of the coursework in the MIS program. This focus is based on perspectives sourced from information science, sociology, management, psychology, communications, and semiotics -- to name but a few disciplines. Core courses examine the ways in which the user behavior can be modeled, and the methods by which information scientists gather data about different user communities. Issues in human-computer interaction, including human factors in IT design and the problem of usability, are examined in depth. There are practical courses in which students survey and interview users in order to analyze existing systems and build prototypes. Students learn about the different types of information which flow through organizations, and how information is managed across its life cycle. Context is stressed throughout the program, and students are expected to analyze and develop policies, procedures, and strategies for the management of information and IT. The link between intelligence and strategy in contemporary organizations is another undergirding theme of the MIS program.

5.5. Competitive Edge

The US Bureau of Labor Statistics predicts big growth in the number of jobs for systems analysts in the next decade (950,000 new jobs). Job growth can also be expected in related areas (e.g. information management, information science, competitive intelligence). The MIS program can provide IU graduates with a competitive edge over graduates from similar degree programs elsewhere because of the extensive knowledge they have about users, contexts, and behaviors, ranging from the individual to the macro social. In addition to having experience with the software and hardware which make up information systems, MIS graduates know how to analyze the socio-technical contexts in which IT is used, and have a set of proven techniques which enable them to accurately and effectively assess a wide range of information needs. With the theoretical knowledge and practical skills that MIS graduates acquire, they can build a user-oriented database in response to a real-world information management problem, assess users' information needs, and design an information system, such as a database, to meet these needs; organize digital and print information for optimum retrieval, gather, create, build and make accessible optimum organizational information resources, and understand the factors which affect the use of electronic information in a variety of organizational settings.
Reference Units


