A Curriculum for a Master of Science in Information Quality

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ABSTRACT

The first Master of Science in Information Quality (IQ) degree is designed and being offered to prepare students for careers in industry and government as well as advanced graduate studies. The curriculum is guided by the Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems, which are endorsed by the Association for Computing Machinery and the Association for Information Systems. The curriculum integrates two key educational innovations: (1) an interdisciplinary approach to curriculum design, and (2) a balance between theoretical rigor and practical relevance. In response to the demand from industry, the curriculum aims to educate students who can lead the effort to solve current and future information quality problems. As such, *problem-based learning* is balanced with *foundation-building learning* to effectively deliver the intellectual contents of the curriculum. Much of the individual course content is based on cumulated research results and practices developed over the last two decades. The curriculum is designed to balance information quality theory with industry best practices using modern tools and technology. It includes the skill sets that are critical to succeed as IQ professionals. Since IQ is an inter-disciplinary field, the curriculum draws upon total quality management, database, core knowledge of IQ, change management, project management, and IQ policy and strategy. The courses are delivered using case studies, hands-on laboratories, theory building, and team projects to enhance the student's learning experience. Upon completing the program, students will be equipped with sufficient breadth and depth in the IQ field to solve real world problems and pursue further studies.

Keywords: Information Quality, Data Quality, Curriculum, MSIQ, Learning, TQM, Data Integrity

1. INTRODUCTION

The field of information quality (IQ)[1] has matured significantly over the last two decades. Much of the focus of early academic research and the current data quality industry is on utilizing the Total Data Quality Management cycle (Madnick and Wang, 1992; Wang et al., 1995) or the Deming Cycle (Deming, 1986; Shewhart, 1931) for improving data quality. In the rapidly changing global economy with fast-growing volumes of structured and unstructured data being created, stored, mined, and used for business, developing capabilities that will deliver relevant and meaningful information from both the internal and external data available to an organization is a vital issue facing information providers and users with perspectives ranging from a single application to an entire enterprise or even a nation. Increasingly, leading organizations are posing questions such as

- "How do we leverage information quality strategically to achieve and sustain competitive advantage in our business?"
- "I have heard complaints about information quality in our organization. How do I systematically measure and improve information quality?"
- "What tools are available and useful for information quality management?"
- "Are there any general theories and rigorous methodology that I can apply to solving problems in my organization?"
- "Where can I learn about success (or failure) stories of other organizations in their information quality management?"
- "Where can I send my staff for formal systematic education on information quality?"

Unlike other disciplinary areas such as computer science, accounting, or finance, an academic program that provides a rigorous education to those interested in pursuing a career in the information quality field did not exist until 2006. Although various academic and industry forums exist, their purposes are often to share new development in IQ research and practices. To meet the increasing demand for highly qualified IQ professionals, it is important to establish a graduate-level program with a well-designed curriculum to provide comprehensive, systematic, and high-quality education on IQ. Graduates from this program will become the leaders and problem solvers in organizations facing IQ problems. They will also be equipped with the knowledge and skills to pursue advanced studies in the IQ field.

The development of a rigorous and practical curriculum for a Master of Science in Information Quality (MSIQ) is a pioneering and challenging undertaking. As there has been no prior effort in developing such a curriculum, one can only draw upon previous work that addresses certain aspects of IQ education. In this paper, we present an effort to offer the first MSIQ degree. Section 2 describes previous efforts to incorporate information quality topics into the Information Science curriculum. Section 3 presents the guiding philosophical discussions on the program's pedagogy. Section 4 presents the curriculum for an MSIQ Program. We present the rationales for the curriculum, as well as the structure and the contents of the curriculum. We further discuss how the proposed courses map to model curriculum for general graduate degree programs in Information Systems. Section 5 highlights the career options for individuals with degrees specializing in IQ. Finally, concluding remarks are made in Section 6.

2. RELATED WORK

A body of IQ knowledge has been accumulated, thanks in large part to the *International Conference on Information* Quality (ICIQ). This conference, held annually at MIT over the past decade, has established a premier forum for IQ researchers and practitioners. The conference grew along with, and because of, participants from more than twenty international communities. Over the years, participants of the ICIQ conference have started *SIGMOD workshops on Information Quality in Information Systems*, the *CAiSE workshop on Data and Information Quality*, and a large community, the *German Society for Information Quality,* which organizes regular conferences and workshops. In addition, *Data Management Association International* and *the International Association for Data and Information Quality* have industry conferences and workshops on IQ topics. Recently the ACM publication board approved a new *ACM Journal of Data and Information Quality*. This new ACM journal is poised to become a leading outlet for IQ researchers and practitioners.

In the academic literature, Khalil et al. (1999) identify the gap between the needs of organizations for high-quality information and the skills of university graduates from information systems (IS) programs. Their review of the 1997 model IS curriculum (Davis et al., 1997) shows that although the curriculum places a significant emphasis on quality in general, the notion of information quality is only briefly mentioned in several courses and is not addressed directly. Many universities leave the teaching of IQ to individual faculty initiatives. As a result, most graduates from IS undergraduate programs are not equipped with sufficient IQ skills even though IS professionals are increasingly becoming responsible for their organization's IQ.

Information quality is an interdisciplinary field requiring skills and knowledge from diverse areas. Chung et al. (2005) use general systems theory to classify these skills into three major categories:

1. Technical capabilities, i.e., the skills and knowledge about directly working with data using computers
2. Adaptive capabilities, i.e., the ability of identifying user information requirements, converting them into technical requirements, and measuring user satisfaction
3. Interpretive capabilities, i.e., the skills and knowledge of identifying what IQ means to diverse constituents in a specific organization and creating, facilitating, and shaping these meanings

Chung et al. (2005)'s empirical investigation showed that depending on their roles, IQ professionals perceive the

relative importance of these skills differently. The implication is that both short-term and long-term aspirations of the students need to be considered in designing IQ curricula because graduates from an IQ program will take on these various roles at different stages of their career.

Over the past decade, the Information Quality program at MIT has been offering four courses on IQ to information technology professionals and executives:

- IQ-1: IQ Principles and Foundations
- IQ-2: Advanced IQ Theories
- IQ-E: IQ for Executives
- IQ-C: IQ Case Studies

While each of these courses covers a broad range of IQ topics, they are designed with different emphases on these topics. IQ-1 focuses on IQ technical skills, IQ-2 focuses on adaptive skills, IQ-E focuses interpretative skills, and IQ-C gives the students the opportunity to apply their comprehensive skills to analyzing real world problems. Our experience with teaching these courses indicates that only a curriculum with a deeper and more systematic coverage on these diverse IQ skills can equip students with sufficient capabilities for addressing various challenges.

During the past few years, Marist College (Fisher, 2001) has offered an IQ course for college seniors majoring in IS with great success. This is the first IQ course offered to college undergraduates in the United States and it covers topics similar to those in IQ-1 and IQ-2 at the introductory and intermediate levels. Positive feedback from students, their interests to learn more about IQ topics, and their success in their IQ related careers confirm the need for a more comprehensive IQ curriculum. Beginning in 2007, Northeastern University plans to offer its first Information Quality course for undergraduate honors students, as well as a short elective course in information quality for MBA students. Nonetheless individual courses offered in a formal university setting cannot cover the depth and breadth of the skills and knowledge that an IQ degree program can offer.

Certain IQ product vendors and industry leaders have proactively responded to the critical demand for professionals with IQ skills. Examples include "Data Quality University" by Navisink Consulting, "IQ Curriculum" by Firstlogic, and "IQ certification" by Information Impact. Other renowned practitioners are designing and delivering IQ focused courses in the U.S. and internationally. While such course offerings bring valuable industry perspectives to IQ education, they are often ad-hoc and sometimes biased towards a particular vendor technology or consulting approach. An IQ curriculum offered at universities can avoid such shortcomings.

Landry et al. (2003) indicate that an effective IS curriculum should balance tradition with innovation. There has been an effort of developing and keeping up-to-date a coherent IS curriculum for more than 30 years (Gorgone et al., 2003, The Joint Task Force for Computing Curricula 2005, 2005). The most recent model curriculum is IS-2002 which is a useful reference for updating and improving existing IS undergraduate curricula (Dwyer and Knapp, 2004). In terms of IQ education, however, this model curriculum shares the same weakness of IS-1997 identified by Khalil et al. (1999) with the exception that IS-2002 does provide the prerequisite background knowledge for a Master's curriculum in IQ. The curriculum that we present in this paper rectifies this weakness by focusing on innovations in IQ management that have emerged over the past two decades.

Next we discuss the philosophical pedagogy underpinning the objectives of the program and the curriculum.

3. PHILOSOPHICAL APPROACHES TO PEDAGOGY

The MSIQ program bases its education on two complementary philosophical approaches in learning: problem-based learning (Baker, 1999) and foundation-building learning. Following the movement of professional educational programs (such as medical education) toward problem-based learning, the MSIQ Program exploits the practice-oriented problem-based learning, which facilitates learning by exposing students to the comprehensive context of the problem. As observed in Lee (2004), context-reflective problem solving is based on inter-disciplinary problem-solving techniques and approaches, and thus, supports the aim of the MSIQ Program. This approach is also in line with the much earlier inquiry by the influential scholar John Dewey (Dewey, 1933; 1938) on learning and education that emphasizes experience, inquiry, and reflection. Foundation-building education is equally important to the MSIQ program because it prepares students with theoretical rigor that will go a long way in their career.

For each course or a project, the MSIQ Program aims to promote both foundation-building learning and problem-based learning approaches instead of designating a specific course for one approach or the other. The curriculum is developed so that faculty can deliver a course in a way that maximally benefit from both approaches, with the understanding that some courses will focus more on one approach than the other based on the nature of the materials covered in the course. In terms of emphasis, case studies, projects, and thesis are designed in ways that benefit students from the perspective of problem-based learning; while other fundamental theory related contents benefit students from the perspective of foundation-building learning.

Another related philosophical approach to the MSIQ Program is the balance between theoretical rigor and practical relevance. The MSIQ Program is well-balanced in this area. First, most of the theoretical foundation courses covered in the MSIQ Program are based on applied research that uses data from the real world. Therefore, the theoretical courses have embedded rigor with relevance. Second, the curriculum exploits the need to produce IQ professionals for a growing number of companies and government organizations that are seeking individuals who can solve current and future IQ problems. This demand from the job market for IQ graduates creates a healthy environment for the MSIQ Program as it continuously works to keep the curriculum useful, relevant, and up-to-date.

Exploiting the above main philosophical approaches, the MSIQ Program provides the fully developed IQ education that is needed. The next section provides the rationale and details of the curriculum designed to produce IQ professionals who can solve IQ problems over the different stages of their careers.

4. THE CURRICULUM: RATIONALE AND STRUCTURE

4.1 Rationale for the Curriculum

The MSIQ Program is patterned after MSIS 2000, the Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems, which are endorsed by the Association for Computing Machinery and the Association for Information Systems (Gorgone et al., 2000). Designed to be compatible with the degree structures of the United States and Canada's educational systems, the MSIS 2000 model provides guidance to institutions, a curriculum direction to faculties, and a better understanding of the discipline for students and employers. MSIS 2000 is designed around a set of five building blocks, as shown in the left half of Table 1, which are meant to ensure that students master a common body of knowledge while allowing students the opportunity to specialize in a specific subject area.

Following the MSIS 2000 guidance, the MSIQ curriculum also has five building blocks. A comparison of two curricular is summarized in Table 1. The University of Arkansas at Little Rock (UALR) has implemented the MSIQ curriculum. The course numbers of UALR are used in the comparison. Detailed descriptions of the courses can be found in the Appendix. In comparing the MSIQ Program with the MSIS 2000 curriculum model, one sees that the biggest divergence occurs in the IS core. The core courses for the MSIQ Program were selected to cover those IS areas most needed by IQ professionals. The MSIQ Program requires fundamental IS courses such as Information Systems Analysis (Harris, et al., 2006) and Database Systems. For IQ professionals, a thorough knowledge of data management and systems analysis is crucial so these courses map very closely to their MSIS 2000 counterparts. Because an IQ professional's main focus is on data, the MSIS 2000 data communications and networking specification was replaced with IS coursework that emphasizes the security and use of data within an organization. Because it is likely that the majority of students in this MSIQ Program will be working IS professionals, it is anticipated that many students will have some previous experience in either IS project management or IS strategic planning. Thus electives were constructed in these areas to give students the ability to select the subject matter of most benefit to them. The last

MSIS 2000 Curriculum Building Blocks	Master of Science in Information Quality
IS Foundation: Prescribes a minimum level of prerequisite IS knowledge. • Fundamentals of IS • Hardware and Software • Programming, Data and Object Structures	Students will meet this criterion through the admission requirements for the MSIQ Program. It is anticipated that the majority of students entering this MSIQ Program will possess either a degree related to information technology or have work experience in this area.
Business Foundation: Prescribes a minimum level of basic business knowledge. • Financial Accounting • Marketing • Organizational Behavior	Students will meet this criterion either through other academic work or through work experience. It is anticipated that the majority of students entering this MSIQ Program will be working professionals familiar with a variety of business functional areas and processes.
IS Core: Defines the minimal knowledge required of all MSIS students. • Data Management • Analysis, modeling, and design • Data Communications and networking • Project and change management • IS Policy and Strategy	MSIQ students will complete the following information science/quality coursework. • IFSC 7320: Database Systems • IFSC 7310 Information Systems Analysis • One course from the following list: IFSC 5325: Data Mining Concepts and Techniques, IFSC 5330 Database Security, IFSC 7325 Advanced Data Mining, or IFSC 7360 Data Protection and Privacy. • One course from the following list: INFQ 7337 Project and Change Management, INFQ 7353 Case Studies for IQ Professionals, or INFQ 7367 IQ Policy and Strategy. • IFSC 5345 Information Visualization.
Integration: A course that allows students to synthesize what they have learned from either the perspective of integrating the Enterprise, the IS function or IS technologies.	MSIQ students must complete either INFQ 7686 Graduate Project or INFQ 7698 Thesis. Both of these courses are designed to help students synthesize, integrate, and apply what they have learned.
Career Tracks: A set of courses organized around a particular IS career.	MSIQ students will complete the following courses designed to prepare individuals for a career in Information Quality. • INFQ 7303: Introduction to Information Quality • INFQ 7318: Total Quality Management and Statistical Quality Control • INFQ 7322: Information Quality Theory • INFQ 7342: Information Quality Tools and Industry Landscape

Table 1: Comparison of MSIS 2000 and MSIQ Program

course in this list, Information Visualization, does not have a counterpart in the MSIS 2000 IS core; however, because it deals with the design and presentation of digital information, it represents an IS topic that all IQ professionals should know. In the UALR implementation of the MSIQ curriculum, students who have sufficient experience in either an IS or IQ core requirement may substitute with permission of the IQ Graduate Committee up to six hours of other relevant graduate-level courses.

The innovation and the key contribution of the MSIQ curriculum is the introduction of the set the IQ courses for the career track building blocks. Teaching materials developed for these courses provide a systematic and comprehensive treatment of research advances made in the past two decades and the technologies that implement the research results. These courses also provide a deeper treatment of the techniques introduced in the courses of the IS core building block.

Given the substantial differences between the MSIQ curriculum and the MSIS 2000 curriculum are substantial and the increasing demand for IQ professionals, it is appropriate to implement the curriculum in a degree program. This approach allows an institution to use limited resources most effectively to generate great impacts to the field.

Other institutions can benefit from the curriculum in various ways. An institution can substitute certain courses to best leverage its faculty expertise. Or alternatively, an institution can create an IQ track within an MSIS program by implementing selected courses in the IQ career track building block.

4.2 Curriculum Structure and Contents

We now present a curriculum for a Master of Science in Information Quality degree that consists of 33 credit hours[2] (27 hours of course work plus either the completion of a thesis or graduate project). The MSIQ Program is accessible to both day and evening students on either a full-time or part-time basis. While the initial offering of courses will use the traditional delivery method, plans are currently underway to deliver course work using distance education technologies. A complete description of the MSIQ Program is available at http://technologize.ualr.edu/msiq/.

Students applying to the MSIQ program are required to have a Baccalaureate degree in information science, computer science, computer information systems, management, or a related discipline from an accredited institution. Applicants must also possess a cumulative grade point average[3] of at least 3.0 on a 4.0 scale in prior coursework as well as satisfactory scores on the Graduate Record Examination general test section (GRE) or Graduate Management Admission Test (GMAT). In addition students may need to complete remedial course work specified by the MSIQ program; in particular, all students seeking regular admission to the program are expected to have completed (with a grade of B or better in each course) undergraduate course work equivalent to IFSC 4305 Object-Oriented Software. Table 2 outlines the courses that students must take to complete the MSIQ program. A complete catalog description of these courses in included in the appendix.

MSIQ Required Courses
INFQ 7303 Introduction to Information Quality
INFQ 7318 Total Quality Management & Statistical Quality Control
INFQ 7322 Information Quality Theory
INFQ 7342 Information Quality Tools and Industry Landscape
IFSC 5345 Information Visualization
IFSC 7310 Information Systems Analysis
IFSC 7320 Database Systems
Elective 1 (Select one of the following)
INFQ 7337 Project and Change Management
INFQ 7353 Case Studies for Information Quality Professionals
INFQ 7367 Information Quality Policy and Strategy
Elective 2 (Select one of the following)
IFSC 5325 Data Mining Concepts and Techniques
IFSC 7325 Advanced Data Mining
IFSC 5330 Database Security
IFSC 7360 Data Protection and Privacy
Elective 3 (Select one of the following)
INFQ 7686 Graduate Project
INFQ 7698 Graduate Thesis

Table 2: MSIQ Program Degree Plan

5. PLACEMENT OF MSIQ GRADUATES

Within the private sector, data quality initiatives are on the rise. Gartner Group estimates that investments in data quality suites are growing at a rate between 12 and 15% annually (Gilhooly, 2005). Companies are increasingly concerned about poor data quality because it inhibits the success of customer relationship management, enterprise resource planning, and data warehousing initiatives as well as contributing to compliance violations and supply chain inefficiencies.

Within the public sector, two Federal mandates have provided impetus for information quality. The Data Quality Act of 2001 (Section 515 of Public Law 106-554) requires the Office of Management and Budget to promulgate guidance to agencies ensuring the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies. Similarly, the Sarbanes-Oxley Act of 2002 places stringent auditing and reporting requirements on certain categories of information maintained by companies.

As a result of these changes, there is a growing job market for trained professionals who understand the concepts, principles, tools, models, and techniques that are essential for information quality definition, measurement, analysis, and improvement, and who can guide organizations in setting information quality policies and strategies. The area of data quality is advancing far beyond the initial definition and measurement of data quality. A deeper and more comprehensive set of knowledge is needed for broader and deeper analysis of data quality problems that includes developing strategies and policies, understanding Information Product maps, managing information as product, and applying more sophisticated methods to improving quality of data (Lee et al., 2006; Madnick et al., 2004; Madnick and Zhu, 2006; Pierce, 2005; Talburt et al., 2004; Wang et al., 1998). A recent search of www.dice.com, a job search engine for Information Technology (IT) professionals, reveals numerous postings for traditional IT jobs such as consultant, database/programmer analyst, data/systems analyst, ETL developer, and database architect that include

data quality activities as part of the job description. In addition, there are now jobs devoted entirely to information quality improvement. Titles like Data Cleansing Quality Analyst, Data Quality and Integrity Consultant, Data Quality Analyst, Data Quality Assurance Analyst, Data Quality Project Manager, and Senior Data Quality Architect are just a few of the positions available to individuals interested in this emerging career area. Employers represent a multitude of industries ranging from healthcare, manufacturing, financial services, retail, federal government, and Information Technology consulting services.

In addition to becoming IQ professionals who monitor, improve, and manage IQ for their organizations, graduates are also well prepared to pursue doctorates with a focus on developing IQ theories and techniques. Their work in practice and research will advance the field of IQ.

6. CONCLUSIONS

The University of Arkansas at Little Rock (UALR) began offering MSIQ courses in Fall 2006. Twenty-five students enrolled in the first semester of the MSIQ Program. The vast majority of MSIQ students are working professionals who are taking their MSIQ coursework on a part time basis. These working professionals come from Little Rock's business community, high tech industry, education institutions, as well as state government. A few students enrolled in the MSIQ program directly from their undergraduate programs.

As is true for any pioneering programs such as the first computer science, the first information science, or the first bio-engineering program, the creation of the MSIQ program at UALR encountered several difficulties, the primary of which was to justify the need for creating such a program. We resolved this difficulty via several means. We conducted surveys to estimate demand in the industry and to project the enrollment in the next few years. We also established strong relationships with the industry and other academic institutions to gain their support ranging from student scholarships, internship opportunities, software, and instructional materials.

In addition, the risk of the program will managed and minimized via periodic evaluations. Frequent feedbacks will be collected to adjust its materials for courses and approaches for pedagogy. Currently the UALR MSIQ program is in the process of incorporating a co-operative education experience into its curriculum so that interested students can obtain real world IQ experiences that can be applied towards the development of either a student's thesis or industry project. Other changes such as the addition of special topics courses and independent courses as well as enhancing the delivery of courses using web based learning tools are also underway. The early feedback from students and individuals familiar with the program indicates that the MSIQ program is laying the groundwork to lead other institutions in fulfilling the need for educating graduate students for the advanced and applied area of information quality as industry and government continue their demand for IQ professionals. Case in point, the UALR MSIQ program is presently negotiating with another university interested in developing its own graduate program in Information Quality.

It should be noted that there is also a strong interest and pent-up demand in the IQ community for a doctoral degree program in Information Quality. Several of the 25 students currently enrolled in the UALR MSIQ program already hold a master's degree and a number of these students have said they would have enrolled in a doctoral program in IQ if it were available. In addition several other qualified individuals, not currently enrolled in the program, have also indicated their desire to enroll in a doctoral program if it were to be offered. As a result, UALR is now working through their applied science division on developing the first-of-its-kind Ph.D. degree in Information Quality. The MSIQ curriculum provides us with a foundation on which we can develop a Ph.D. curriculum, and the MSIQ program will be a convenient stepping stone

7. ENDNOTES

[1] Throughout this paper, we will use the terms *data* and *information* interchangeably without engaging in the debate of differentiating or not differentiating the two in the interest of the focus and the space available.

[2] A credit hour roughly corresponds to one hour per week of lecture time. For example, a 3-credit hour course has 3 hours of lecture time per week.

[3] In the U.S., students receive letter grades that correspond to numerical grades, often in the scale of 0-4. The cumulative grade point average is the weighted average of the grades of a student, with the weight being the credit hours of each course

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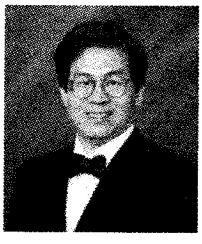
the intersection of information quality and data integration, particularly the areas of entity resolution and entity identification. Prior to his appointment at UALR, he was a leader for research and develop and product innovation at Acxiom Corporation. Professor Talburt is an inventor for several patents related to customer data integration, and the author for numerous articles on information quality and entity resolution. He also serves as an Associate Editor for the newly created ACM Journal of Data and Information Quality.



Richard Y. Wang is Director of ***MIT Information Quality*** Program at the Massachusetts Institute of Technology. He also holds an appointment as a Visiting University Professor of Information Quality, University of Arkansas at Little Rock. Before heading the MIT IQ program, Dr. Wang served as a professor at MIT for a decade. He also served on the faculty of the University of Arizona, Tucson and Boston University. Wang has put the term *Information Quality* on the intellectual map with myriad publications. In 1996, Prof. Wang organized the premier *International Conference on Information Quality*, which he has served as the general conference chair and currently serves as Chairman of the Board. Wang's books on information quality include *Quality Information and Knowledge* (Prentice Hall, 1999), *Data Quality* (Kluwer Academic, 2001), *Introduction to Information Quality* (MITIQ Publications, 2005), and *Journey to Data Quality* (MIT Press, 2006). Prof. Wang has been instrumental in the establishment of the Master of Science in Information Quality degree program at the University of Arkansas at Little Rock, the *Stuart Madnick IQ Best Paper Award* for the *International Conference on Information Quality* (the first award was made in 2006), and *the Donald Ballou & Harry Pazer IQ Ph.D. Dissertation Award.* Wang's current research focuses on extending information quality to enterprise issues such as architecture, governance, and data sharing. Additionally, he heads a U.S. Federal project on Leadership in Enterprise Architecture Deployment (LEAD). Professor Wang is the recipient of the 2005 DAMA International Academic Achievement Award.

Hongwei Zhu is an Assistant Professor of Information Technology at the College of Business and Public Administration, Old Dominion University. He holds a Ph.D. in Technology, Management and Policy from MIT. His research interests include data integration and reuse technologies, data quality management, data mining, information policy analysis, and information economics.

APPENDIX – CATALOG DESCRIPTION OF MSIQ COURSES

INFQ 7303 INTRODUCTION TO INFORMATION QUALITY

This course provides a rigorous exploration of information quality concepts, assessment, and problems in organizational information systems, databases and data warehouses. A combination of state of the art literature review and hands-on projects is used to develop knowledge and ability to meet objectives.

INFQ 7318 TOTAL QUALITY MANAGEMENT AND STATISTICAL QUALITY PROCESSES

This course provides an understanding of how the concepts and techniques of Total Quality Management may be applied to information products. Topics include continuous improvement strategies, statistical process control, experimental design, capability analysis, quality cost assessments, benchmarking, acceptance testing, and auditing.

INFQ 7322 INFORMATION QUALITY THEORY

This course is designed to provide students with the theoretical foundations critical for developing a deep understanding of the state-of-the-art information quality research from the technical, organizational and strategic perspectives. This course will prepare students to work on their thesis, project, and conduct research in the field of information quality. More specifically, students will be exposed to concepts, principles, tools, and models, and techniques that are essential for information quality definitions, measurement, analysis, and improvement. Additionally, students will be exposed to the most current, cutting-edge research that goes beyond current industry practice in information quality.

INFQ 7337 PROJECT AND CHANGE MANAGEMENT

A course on how to manage information quality improvement projects within an organizational context, including the processes related to initiating, planning, executing, controlling, reporting, and closing a project. Additional topics include identifying project champions, working with user teams, training, documentation, project integration, scope, time, cost-benefit studies, risk analysis, and change management.

INFQ 7342 INFORMATION QUALITY TOOLS AND INDUSTRY LANDSCAPE

This course is designed to develop and increase capability and skills that students need to critically understand what IQ software tools, techniques, and prototypes are currently used in industry, government, and research laboratories. The course will prepare students to make software tool recommendations on corporate data quality programs. Students will conduct a survey of academic literature and industry practices in terms of IQ tools such as data cleansing, profiling, and auditing, and will participate in a hands-on workshop on commercial IQ tools from participating vendors in the field.

INFQ 7353 CASE STUDIES FOR INFORMATION QUALITY PROFESSIONALS

This intensive and interactive course is designed to develop and increase the student's capability and skills to critically understand what constitutes data quality, how to analyze and solve data quality problems, and how to institutionalize data quality projects in an organization where data quality is not the most critical priority.

INFQ 7367 INFORMATION QUALITY POLICY AND STRATEGY

This course explores the top management, strategic perspective for aligning competitive strategy, core competencies, and information quality. Topics include the development and implementation of IQ policies and plans to achieve organizational goals; how to define systems that support the operational, administrative, and strategic IQ needs of the organization, its business units, and individual employees; approaches to managing technology and the information systems function in organizations, role of the CIO.

INFQ 7686 GRADUATE PROJECT

Prerequisites: Graduate standing and consent of the student's graduate advisor. Students, under faculty supervision, will conduct directed research on a particular problem or area of information quality and will produce reports and other deliverables appropriate to the project.

INFQ 7698 THESIS

Prerequisites: Consent of thesis advisor. Engage in a scholarly investigation of a selected problem in information quality culminating in a written and orally defended thesis.

IFSC5325 DATA MINING CONCEPTS AND TECHNIQUES

In-depth, practical coverage of essential data mining topics, including OLAP and data warehousing, data preprocessing, concept description, association rules, classification and prediction, and cluster analysis. Advanced topics include mining object-relational databases, spatial databases, multimedia databases, time-series databases, text databases, the World Wide Web, and applications in several fields.

IFSC 5330 DATABASE SECURITY

Focus on security issues in databases systems and introduction of how current and future commercial systems may be designed to ensure secrecy and confidentiality. Topics include security models, basic security mechanisms and software, statistical database security, intrusion detection, security models for next generation databases, tested techniques and proven strategies for securing an Oracle environment - from the operating system to the database to the network, and how to implement security using Oracle's built-in tools.

IFSC 5345 INFORMATION VISUALIZATION

Focus on the design and presentation of digital information through use of graphics, animation, sound, visualization software, and hypermedia in presenting information to the user. Discuss methods of presenting complex information to enhance comprehension and analysis. Incorporate visualization techniques into human-computer interfaces.

IFSC 7310 INFORMATION SYSTEMS ANALYSIS

Methods of problem identification and definition, data collection and measurement, feasibility study methods, work measurement techniques, task analysis, simulation studies, impact analysis, evaluation methods, forms and display design, proposal writing, documentation and programming standards, design strategies, documentation, and evaluation.

IFSC 7325 ADVANCED DATA MINING

Focus on advanced techniques for knowledge discovery and data mining from large databases. Analyze graphical and kernel-based machine learning, active and online learning, mining with uncertainty, spatial and temporal data mining, data mining large micro array and protein array data sets.

IFSC 7320 DATABASE SYSTEMS

Database systems and data modeling, including entity-relationship model, relational data model, normalization, structured query language (SQL), transaction management, object-oriented databases, and basics of physical database design and query evaluation.

IFSC 7360 DATA PROTECTION AND PRIVACY

Concepts and methods for creating technologies and related policies with provable guarantees of privacy protection while allowing society to collect and share person-specific information for necessary and worthy purposes. Methods include those related to the identifiability of data, record linkage, data profiling, data fusion, data anonymity, de-identification, policy specification and enforcement and privacy-preserving data mining.

Information Systems & Computing
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