

The impact of IT on curricula design of Information Management and Information System Doctoral Education in China

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Abstract—Although there are a lot of researches on Information Management and Information System education in China, little research is done in examining the impact of IT on doctoral curricula by Information Management and Information System programs in China to reveal: what courses are offered? what is the most popular subject area? how Information Management and Information System schools change their curricula to meet today's challenges? In order to address above questions, this study gives a brief summary of the curricula of Information Management and Information System doctoral programs in China. Findings show that there is no national consensus of what should be the core of the Information Management and Information System discipline for PhD education in China. The largest percentage of the courses offered relate to Management Science and Engineering. Interdisciplinarity is also featured within the Information Management and Information System PhD curricula in China.

Index Terms—Information Management; Information System

I. INTRODUCTION

To meet the challenge of information explosion in digital era, Chinese Ministry of Education integrated five technology information related majors into Information Management and Information System to prepare graduates required by societies in 1998. At present, the degree of Information Management and Information System (IM) are conferred from two sources: colleges founded by School of Management, or School of Business Administration, such as SEM at Tsinghua Univ. , School of Management at Tianjin University; Colleges founded from traditional Library and Information Schools, such as Department of Information Management at Sun Yat-sen University, School of Management at Wuhan University. In fact, many Library and Information Schools changed their names and offered degree programs on IM since 1999. Syllabi in IM discipline are redesigned according to new teaching targets. Although there are a lot of researches on IM education in China, yet little research is done in examining IM doctoral curricula offered by Departments of Information Management (previously named as Department of Library and Information Science) in China to reveal: what courses are offered? What is the most popular subject area? what implications those curricula change for IM PhD education? In order to address the above questions, this study gives a brief summary of the

curricula of IM doctoral programs offered by IM schools in China.

II. IM PhD EDUCATION IN CHINA: A BRIEF REVIEW

Currently, eight departments of Information Management in China offer Ph.D. programs in IM. They are Beijing university, Jilin University, Nankai University, Renmin University, Nanjin University, Wuhan University, Sun Yat-sen University, and Huazhong Normal Univ.

School of Information Management at Wuhan University is the oldest information management education and research institutions founded in 1920. In 2003, the State Council Academic Degree Committee approved for "Management Science and Engineering" doctoral degree awarded.

Information Management Department of Beijing University was founded in 1947. After half a century of development, it has the initial concentration by a single Library Science, gradually growing into Library and Information Science. Now it offers Ph.D. programs in IM in two areas: Information Resource Management; Information Analysis and Decision.

School of Management at Jilin University originated from School of Management affiliated to former jilin University of Technology. The school offers three doctoral programs covering Management Science and Engineering; Technological Economics and Management, and Informatics.

In 2003, School of Information Resource Management at Renmin Univ. was established. In 2009, doctoral degree in Information Resource Science was offered.

Doctoral degree in Information Resource Management at Nanjing University was established in 2006. Now it offers concentrations in Information Economics; Information Resource Design; Digital Information Resource Management; Scientific Information Management; Government Information Management; Enterprize Information Management; and Sciencemetric and Evaluation.

In October 1997, Department of Information Management at Nankai University was established. In 1999, Information Science major was merged into Department of Information Management, and changed its name to Department of Information Management and Information System. In 2005, the department declared the "Management Science and Engineering" doctorate authorization.

School of Information Management at Sun Yat-sen University was founded in 2006. Now it offers doctoral programs which prepare students majoring in Management Science and Engineering; Technology Economy.

Huazhong Normal University established Department of Information Management in 1984. It now offers "Information science" doctoral programs with concentrations in Management Information Systems; Intelligence Theory; Computer Information Management; and Enterprise Information Management.

After ten years of development since 1998, these eight schools have gradually supplemented with a myriad of new programs and specializations, and offer IM Ph.D. programs in the following areas: Information System; Information Resource Management; Management Information System.

III. LITERATURE REVIEW

IM curricula have been a subject of research over the years. Many studies are carried out to examine IM curricula in China from different perspectives. For instance, He and Wang[1-2] point the problems existing in the teaching of MIS and explore solutions to the problems. Xu[3], He[4], and Cai[5] discuss the application of different research methods into IM courses. Cheng[6], Gu[7], and Wang[8] explore contents of IM course, analyze teaching targets, and construct core courses for undergraduate study. Furthermore, a lot of researchers[9-11] survey backgrounds and frameworks of curricula system, and provide the idea of constructing of IM courses for a specific university. Among these researches, some publications (e.g. He 2011; Wang 2011) are purely theoretical discussions without actual collection and analysis of curricula data. Among the studies that indeed gather and use data related to the IM curricula (e.g. Cheng 2011; Guo 2011; Wang 2011), some publications only focus on undergraduate study or graduate study. They don't examine the curricula for doctoral programs. Since PhD education is an important part of the graduate studies, there is a need for us to examine and analyze current status and curricula design from the above eight IM programs in China.

IV. METHODOLOGY

The purpose of this paper is to examine what courses are offered by IM doctoral programs in China. Because original data of curricula are required, the syllabi information for the study is collected from respective university websites. These include data on the establishment of IM schools, titles of the curricula, and descriptions of curricula. In addition, journal articles are also examined when related information cannot be obtained from the university websites. The scope is limited to doctoral level IM courses. The study is a general overview of the IM courses, and not comprehensive content analysis of the syllabus of each university. In addition, some IM programs don't offer a distinction between elective and compulsory courses, so elective and compulsory courses are calculated together in this paper.

V. FINDINGS AND DISCUSSIONS

There are 71 required courses in these eight IM schools gathered for this study, and their subject distribution is illustrated in Table 1. Findings show that the largest percentage of the courses relate to Management Science and Engineering. As can be seen from the table, these courses are grouped into the following categories (see Table 1):

A. Management Science and Engineering:

The category of management science and engineering is the most frequently mentioned course in the syllabi. The content of these courses include: Concepts and Principles of Management (Sun Yat-sen Univ.), Strategies of Management (Nankai Univ.), and Project Management (Wuhan Univ.). Logistics and Supply Chain Management (Sun-yet Univ.), and Market Management (Huazhong Normal Univ.) are also included in these courses. The advent of information technology has not only provided corporations and institutions with more effective management methods to fulfill organizational goals, but also created a large demand for information specialists who can identify and understand vital relationship between information and business decision making. As a result, large amounts of advanced management science courses are offered by all these eight PhD programs. So students can tackle practical management problems and apply their analytical and decision making abilities to solve operation issues.

B. Information related courses:

The category of information-related courses is the second frequently mentioned course in the syllabi. Content of these courses include: Information Management and Knowledge Management (Renmin Univ.); Information Dissemination (Jilin Univ.); Information Management and Information Management (Wuhan Univ.) et. al. These courses address various topics such as economic information, theory of information economy and society, models in information studies, and knowledge management. In fact, all these eight IM PhD programs in China offer information-related courses to students. This finding corroborates the literatures which claim that IM education in China has shifted to a broader information framework[8,12]. It reflects the pressure of educators felt for launching courses in "hot topics" to satisfy the needs of the society[12], since the concepts of information and related technologies have become a new dimension in information profession. Today, IM departments are expanding and enhancing the curricula by incorporating information competencies into programs.

C. Computer-related courses:

The category of computer-related courses is the third frequently mentioned course in the syllabi. The electronic environment of the 21st century has a high demand for professionals with good computer literacy. So many computer-related courses are offered in Chinese IM doctoral syllabus. These courses include many IT related courses such as programming skills, software skills, internet skills and general computing

skills. For example, at Jilin University, Data Warehouse and Data Mining are offered; Multimedia Information Processing is offered at Nanjing University; Natural Language Processing is offered at Beijing University. A significant amounts of technology related courses offered by IM PhD programs indicate that doctoral program in China is becoming more technically demanding in response to technological changes. Educators realize that students without adequate preparation may experience difficulty when they confronted with topics such as database maintenance and systems analysis[13]. So IM education helps students address weaknesses early so that students may be well prepared in future professional careers.

D. Economic related courses:

The category of economic related courses is the fourth frequently mentioned course in the syllabi. These courses include Microeconomic (Sun Yat-sen), Economic Management (Wuhan Univ.), Financial Management (Nankai Univ.), and Corporate Finance (Huazhong Normal Univ.) and so forth. These courses offer an overview of economic science with emphasis on comprehensive understanding of accounting, finance, banking theory and practice, financial engineering and so forth. These courses enable students not only to address macro issues, but also to analyze and process quantitative data. This finding is also consistent with previous studies[14-15] that the goal of these IM programs is to prepare students to possess the ability in collecting, organizing, and analyzing economic information, so that graduates will have competitive advantage in getting research and operational jobs in commercial banks, investment firms, and insurance companies.

E. Research method courses:

The category of research method course is the fifth frequently mentioned course in the syllabi. Content of these courses include: Introduction to Basic Research Concepts (Huazhong Normal Univ.); Statistical Analysis Methods (Nankai Univ.), Webometrics (Nanjing Univ.), and mixed-methods approaches to rigorous investigation and problem resolution (Nankai Univ.). Although many methods courses are launched in Chinese IM doctoral syllabus, yet we found that depth of knowledge level in research method course is not appropriate for the level of the doctoral programs after further analyzing of the courses content. For instance, Linear Models and Structural Equation are not opened up in China's IM program. For IM graduates, they should not only have the expertise necessary to carry out fairly simple surveys, they also should be familiar with advanced research design and analysis (e.g. regression coefficients)[16]. Having necessary expertise in advanced method courses may prepare IM students to conduct statistical investment and information analysis in education, research and industry.

F. Information Retrieval courses:

The category of information retrieval courses is the sixth frequently mentioned course in the syllabi. Content of information retrieval courses include Information Retrieval (Jilin Univ.); Information Retrieval and Service System(Renmin Univ.);

Document Retrieval (Jilin Univ.), and Computer Information Retrieval (Beijing Univ.). Now, students face a daily explosion of information and the challenge of using these information resources effectively and responsibly. These require IM educators to train students effective retrieval techniques. So these retrieval courses not only focus on the principles and techniques of information retrieval and access services, but also on information seeking behavior, user interaction, and communication and reference interviewing.

G. Competitive intelligence courses:

The category of competitive intelligence courses is the seventh frequently mentioned course in the syllabi. Content of these courses include: Competitive Intelligence for Commerce and Industry (Nanjin Univ.); Competitive Intelligence (Jilin Univ.); Computer Information Retrieval (Beijing Univ.). Since information industry is a very competitive environment, importing Competitive Intelligence topics into the IM educations reflects characteristic of diversity of IM professions. It indicates that although some people argue that career placement is not the responsibility of faculty or a PhD program, China's IM doctoral programs still prepare PhD students the skills and explore more opportunities for PhD students[13].

From the above analysis, we find that there is no national consensus of what should be the core of the IM discipline in China. No national consensus causes IM education in China to lack a benchmark of what is the core content of IM curricula. Interdisciplinarity is also featured within the IM PhD curricula in China. For example, courses related to competitive intelligence and finance indicate a clear relationship with business information management. Furthermore, correlations between information management and IT can also be observed. In fact, it is inevitable when more and more faculties from multiple disciplines are hired in IM schools in China[17]. It shows that knowledge and experiences from other disciplines are needed for us to provide quality IM education.

These findings lead to make the following suggestions for the IM PhD education in China:

1. Although curricula of IM doctoral education in China are revised and constructed since 1998, yet there is no national consensus of what should be the core of the IM disciplines in China. Professional organizations may play a great role in introducing new standard curricula for information professional education to emphasize core areas in information technology, management science and engineering, and a better understanding of economic issues.

2. Although existing Chinese IM PhD programs have been offering varieties of courses to meet the changing complexities, they are not able to reach all students to make them competent in their profession. For example, in addition to technical skills, students also need to possess good interpersonal and

management skills. As Murphy (1988) mentioned “Students need to be reminded that they might be hired for their technical skills, but they will be promoted for their communication skills”[18]. Improving student’s communication skills will serve them well during their entire personal and professional life span. However, at present, only Huazhong Normal Univ. IM program offer related course (Leadership in Organizations) in this area. So IM educators in China have the responsibility to incorporate these competencies into the IM curricula.

VI. CONCLUSION

The study shows that IM programs in China offer varieties of courses such as information-related courses, management course, economic course, and information retrieval course. However, the depth and breadth of subject coverage in IM PhD program vary and do not match the level of the programs sometimes. So it is still a long way for China IM programs to set up core consensus curricula; and to use more sophisticated methodologies for the interpretation of data.

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TABLE I
IM PHD COURSE CLUSTERS

Cluster name	Typical course	Fre.
Mana. course	Advanced management Senior project management Project evaluation Strategic management research Enterprise growth Supply chain management Logistics information system Corporate management Management science and engineering Complex scientific and management Operations research and logistics management Decision theory Entrepreneurship Managing organization behavior Market management Human resource management Management science theory Innovation and risk management Production management theory Logistics and supply chain management	20
Info. course	Information resource management Text information processing Information analysis and decision-making National defense science information research Information policy and information law Information management and information systems Information analysis and consulting services Information acquisition Information processing Knowledge management Information management Intellectual property research Network information dissemination Information communication Introduction to information management Evaluation of information resources Theoretical informatics	17
Computer course	Data mining ASP web-programming information retrieval Network system development Network database development Data warehouse and data mining Network database development Information systems and network technology progress Database theory and application Natural language processing Digital media and network communication Managing information technology	11
Economic course	Advanced microeconomics Economics of information Economic management symposium Corporate finance Financial analysis International business management Advanced microeconomics Modern techno-economic theory Service operations and business intelligence	9
Method course	Advanced econometrics Management research methodology Quantitative analysis of the theories and methods Statistical analysis methods Game theory and information economy Webometrics Research methods	7
Retrieval course	Information retrieval Document retrieval Information processing and retrieval techniques Computer information retrieval	4
CI course	Competitive intelligence analysis Leadership in organizations Competitive Intelligence for Commerce and Industry	3