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REDESIGN OF A MASTER'S IN INFORMATION SYSTEMS CURRICULUM: THE INFLUENCE OF GLOBAL SOURCING

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ABSTRACT

We present a case study of a successful response to outsourcing, and IS job and enrollment declines through an IS curriculum redevelopment in a business school. First, we examine literature on outsourcing/offshoring phenomenon and on IS curricular redesign. A conceptual framework is presented that is useful in understanding the role of global collaborative group projects for learning about outsourcing in the IS graduate curriculum.   A case study of one approach to an IS graduate curriculum redesign is then presented. The case examines the results of a survey of IT executives that informed the design of the curriculum. The case study curriculum is compared to the MSIS 2006 national model, and results are interpreted from prior literature and workforce trends.

Key words: Global sourcing; IS education; IS curriculum; redesign; collaborative work.

I. INTRODUCTION

A problem that confronts the information systems field in the early 21st century is that although a decline has occurred in enrollments in U.S. educational
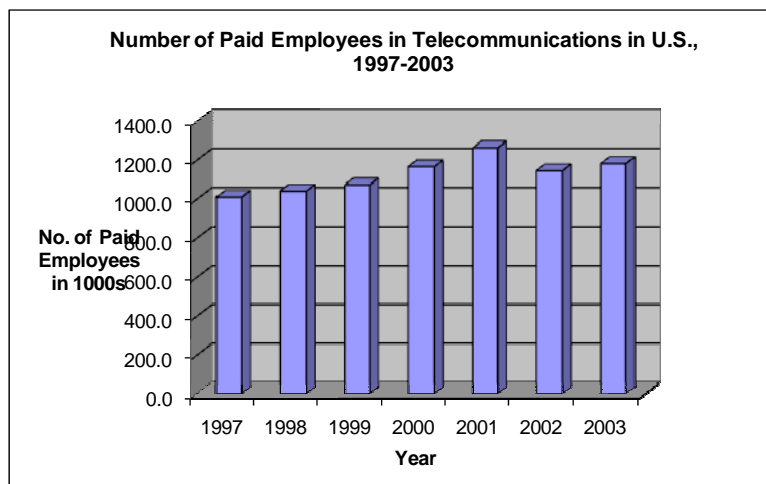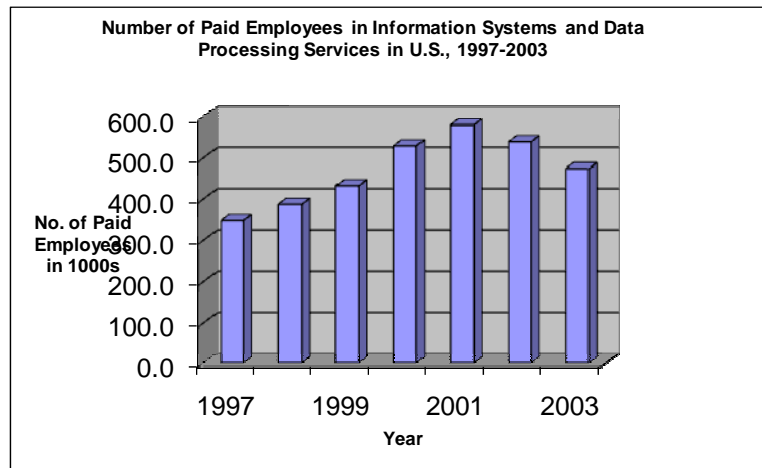
programs in information systems (IS), the domestic IS workforce continues to grow [Litecky et al, 2008].   The present paper considers master of science curricula in information systems for the first decade of the 21st century in light of the shift to global IS outsourcing.

The extent of outsourcing has been vast.   Estimates indicate that the annual value of global IT outsourcing is over $200 billion and that the Indian offshore component is over $50 billion [Xue et al, 2005; Sargent, 2006].   This mega-trend underscores the need to redesign master's curricula in information systems to recognize this change and support preparation of graduates not only to adjust to the new environment and be productive in it.   This paper now considers market trends and developments in the U.S., growth in outsourcing, a conceptual behavioral model of outsourcing, and curricular designs and changes that have taken place in response to the global IT outsourcing shift.

II. MARKET TRENDS/DEVELOPMENTS IN THE US

The U.S. national workforce in information systems and data processing (see Figure 1, top) reacted to the Dot Com Bust of 2000 with a sharp decline in 2002. IS and DP jobs dropped by 106,000, a fifth of the IS/DP workforce, from 2001 to 2003 and continued to decline [Statistical Abstract of the United States, various years).   Many jobs were not eliminated but outsourced away from the U.S., mostly to India and other countries with low-cost economies.   Although national telecommunications workforce also dropped starting in 2001, it was more gradual, with loss of 81,100 jobs from 2001 to 2003, a six percent reduction.   The

lesser decline reflects two trends, one that the Dot Com Bust hit telecommunications less hard than IS/DP and second that telecommunications jobs were less easily outsourced overseas during that period.

Number of Paid Employees in Information Systems and Data Processing Services in U.S., 1997-2003

Number of Paid Employees in Telecommunications in U.S., 1997-2003

Source: Statistical Abstract of the United States, various years.

Figure 1. Paid Employment in IS, Data Processing Services and Telecommunications in the U.S., 1997-2003

In concert with IS workforce declines, dramatic drops took place in U.S. information systems and telecommunications degree programs. A sharp reduction took place in proportion of computer science undergraduate majors starting in 2000, sliding by almost two thirds to 1.4 percent by 2004 [Foster, 2005]. Graduation ratios for Master Degrees in Computer Information Systems peaked in 2002-2003 and also began to reduce sharply. Since most of these master's programs take two years to complete [Gorgone et al., 2000], the entering enrollments had peaked in 2000-2001. Master Degree in Communications Technologies graduates peaked in 2000-2001, so their entering enrollments peaked in 1998 or 1999, before the Dot Com bust.

3. BACKGROUND ON OUTSOURCING

Even though outsourcing has grown vastly and become more global, many problems and challenges remain. One is project failure, estimated in one study at 14 percent [Xue et al., 2005]. Many outsourcing contracts do not work and need to be renegotiated, while projects often finish late [Ferguson, 2004].

Other issues concern the cross-cultural and behavioral side of outsourcing. Brooks [2006] drew together findings of other studies to identify behavioral impacts from outsourcing: job security is lessened, job commitment becomes low or non-existent, motivation is reduced as advancement opportunities disappear, job involvement lowers, employees are less embedded in their work community which encourages turnover, and psychological contracts are disrupted. A further impact is that the outsourcing depends much more on virtual teams and the virtual organization, which can be disruptive to workers. Ramingwong and Sajeev [2008]

noted a cultural challenge termed the "mum effect" that refers to stakeholders in cross-cultural outsourcing teams who keep silent when the project is failing, allowing it to continue.

A study by Xue et al. [2005] points to outsourcing's impact on corporate culture which creates subtle or hidden costs of arranging outsourcing vendors and contracts, ramping up for outsourcing, managing outsourcing work, and managing the contract, layoffs, and transition after outsourcing ends. Given the key role in outsourcing of virtual work, the study went further and conducted experiments on face-to-face versus virtual teams, finding that virtual teams had lower group cohesion, and reduced personal satisfaction.

Overall, the implications of these behavioral studies are that master's students would benefit by inclusion of more content and experiences related to outsourcing. Curricular areas that emerge as potentially important are communications, teamwork, project management, organizational change, cross-cultural understanding, virtual teams, and the virtual organization.

IV. BACKGROUND ON INFORMATION SYSTEMS CURRICULAR DEVELOPMENTS

The 2006 model MSIS curriculum comprises five sections: IS prerequisites (2 courses), business prerequisites (either 3 business courses or an integrated 2-course sequence), IS technology (4 courses), IS management (4 courses), and choice of a track (each track consists of 4 in-depth courses on a particular subject that include an industry practicum if possible). The MSIS 2006 did not emphasize

outsourcing nor encourage student cross-cultural, virtual team, or outsourcing experiences [Gorgone et al., 2006].

Two studies of IS curriculum have recognized outsourcing [Ferguson, 2004; Andriole, 2008]. Ferguson [2004] acknowledged that since IS jobs in implementation, technical support, and maintenance have tended to be outsourced offshore, master's graduates needed to be technically competent but not expert. Filling in instead are "business and communication support areas," such as project management, interpersonal skills, experience of IT work, and relationship management [Ferguson, 2004]. The study mentions that better curricular coverage of communications, cultural diversity, teamwork, risk assessment, and intellectual property help in outsourcing success.

Andriole [2008] considered the full range of computer science and IT curricular knowledge and skills areas as defined by the ACM Joint Task Force. Recommendations were made for 21st century CS and IS curricula, although specific courses were not included. For IS, curricular topics recommended include outsourcing, technology management skills including communications and teamwork, business analytics, technology performance management, business process modeling, and supply chain optimization [Andriole, 2008]. Programming and heavily technical knowledge are de-emphasized or eliminated.

V. CONCEPTUAL FRAMEWORK: A MODIFIED BEHAVIORAL MODEL OF OUTSOURCING

A study of outsourcing by Lee and Kim [1999] emphasized the attributes that determine partnership quality. Basing their model on previous models of IS

power sharing and social exchange, they included an empirical testing of the model on 74 outsourcing relationships. They found that outsourcing success was correlated with success of the outsourcing partnership [Lee and Kim, 1999].

For application in the present research, several factors in the Lee and Kim partnership model for outsourcing have been modified, based on the outsourcing and curricular literature. The model shifts from predicting "outsourcing success" to predicting "global collaborative project success" (see Figure 2). The intent is to incorporate some elements of a real world global outsourcing project. The determinants of partnership quality remain the same [Lee and Kim, 1999]. Dynamic factors relate to collaborative behaviors in a team environment. The static factor of mutual dependency stems from differences in the knowledge bases of Redlands and overseas students. It means that students in one nation have a knowledge base different from those in the other country, so some mutual dependency occurs. Although compressed into student project periods of six weeks, the groups work together and increase collaboration over time. A contextual factor, lack of cultural similarity within student binational teams, is considerable between the U.S. and India, or U.S. and Mexico, so can form obstacles. Top management support in the teaching context is the needs for support from professors in both countries, and was seen in a study of the success factors for virtual teams in teaching IS [Jones et al., 2006]. In the model, the determinants feed into the level of partnership quality, which is measured in the student teams by trust, project understanding, benefits of risk, conflict lowering,

and commitment. In short, the model serves as the conceptual framework for the present research and incorporates outsourcing.

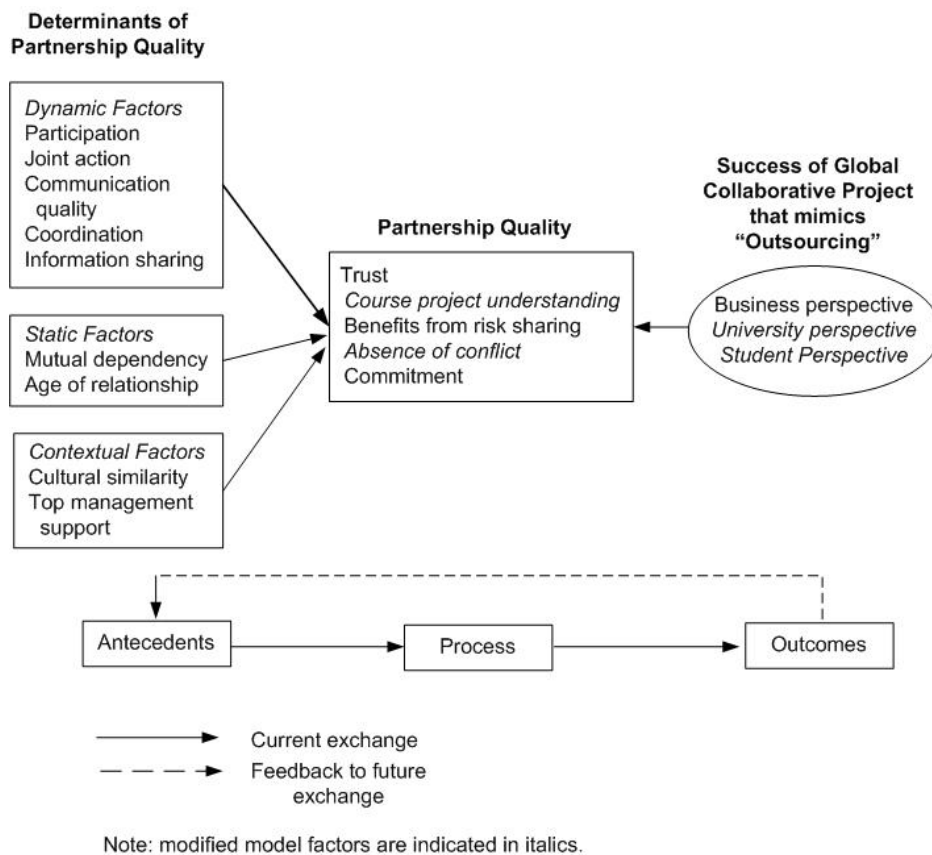Figure 2. Model of Success of a Collaborative Group Project that Mimics "Outsourcing"

VI. RESEARCH QUESTIONS

The goals of this research are to present a conceptual framework for outsourcing and evaluate a case study of master's in IT curriculum with respect to it.

The specific research questions are:

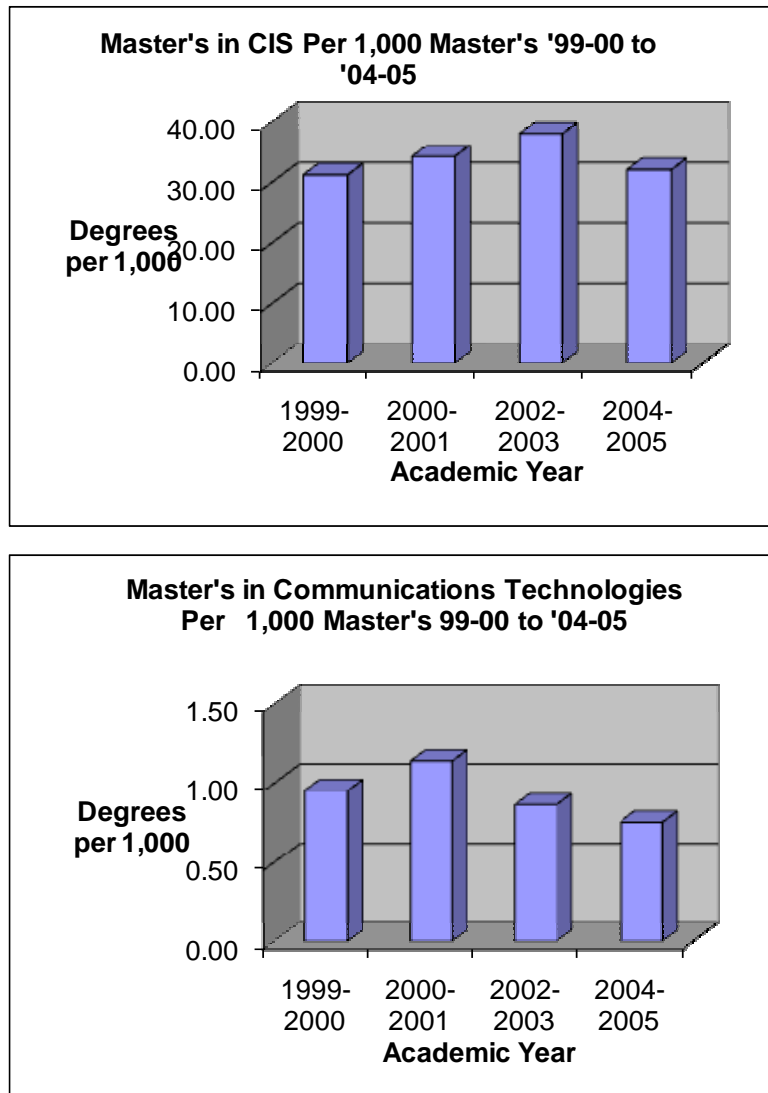(1) How can outsourcing skills development be supported as part of a Master's in IS curriculum?

(2) How successful was the case study in accomplishing the incorporation of these outsourcing skills into an MS in IS curriculum?

(3) In particular, how successful was international student team collaboration in fostering outsourcing-related skills?

(4) Does the case study demonstrate benefits from a curricular development survey of IT executives?

VII. METHODOLOGY

The research utilizes case study [Yin, 1993, 1994] and questionnaire survey methods [Saris and Gallhofer, 2007]. The case study strategy consists of definition of the study focus, framework construction, interviews, data collection, and case analysis. Case studies are often used to deepen insight into organizational and behavioral processes [Yin, 1993, 1994]. Case study investigation often has small samples which might be a single case [Yin, 1994]. Interviews of key faculty participants were conducted. Secondary data were collected consisting of key curricular memos, notes, and reports from the curricular committee, as well as school enrollment and planning reports. The responses to the ISE questionnaire surveys were included as part of the data collection. The 57 item questionnaire was designed using standard survey research methods [Saris and Gallhofer, 2007], included closed and open end questions, and was pre-tested on a small sample of staff and faculty members in the school.   Case analysis was done by consolidating the significant findings and checking to cross validate interviews, questionnaire results, and documents.

VIII. CASE STUDY: MS IN INFORMATION TECHNOLOGY REDESIGN AT UNIVERSITY OF REDLANDS

The University of Redlands commenced an undergraduate degree program in information systems in 1987 in the Department of Management and Business in Whitehead College, the former college unit that offered professional degrees. The program flourished and more faculty were added in the mid 1990s. Starting in 1998, the management and business department developed a Master of Science in Interactive Telecommunications, which emphasized traditional telecommunications as well as the rapidly growing fields of internet and web applications. This degree was offered starting in 2000 and reached an enrollment of 131 by the end of 2001. The enrollment boom was in concert with numerous graduate e-commerce, internet degrees, emphases, and minors that emerged in the U.S. at that time. For University of Redlands, the surge brought the added challenge to expand staff for the new M.S. program in the face of national shortages of full-time, academic telecommunications and IS faculty. A growing deficit had to be filled by part-time practitioner faculty. The boom ended in the aftermath of the Dot-Com bust of 2000, which not only caused the demise of countless internet-based enterprises, but also by 2002 led to a declining U.S. workforce in IS, data processing, and telecommunications jobs (see Figure 1). As mentioned earlier, the Bust was followed by lowered enrollments in most telecommunications, information systems, and computer science programs (see Figure 3).

Master's in CIS Per 1,000 Master's '99-00 to '04-05

Master's in Communications Technologies Per 1,000 Master's 99-00 to '04-05

Source: Chronicle of Higher Education, various years, data from U.S. Dept. of Education

Figure 3. Enrollment Rations for Master Degrees in Computer Information Systems (CIS) and Communications Technologies, 1999-2005

DECREASING ENROLLMENTS IN MS IN INTERACTIVE TELECOMMUNICATIONS

At University of Redlands, the School of Business, which in 2001 succeeded the former Whitehead College, experienced sharp enrollment declines in the Master of Science in Interactive Telecommunications and in its B.S. in IS.

The Master's program dropped from 131 students in late 2001 to 41 by fall 2003. Although this returned the enrollments to the level originally projected by the university, lowered student-faculty ratios, and gained more involvement of full-time faculty, the issue persisted of continuing nationwide drop in student interest in telecommunications master's programs.

RELEVANCY OF THE CURRENT CURRICULUM THRUST

In 2003-2004, the School of Business formed a curricular development committee and decided to replace the Master of Science in Interactive Telecommunications degree with a Master of Science in Information Technology (MS in IT). This change responded to the steep drop-off in enrollments, shifts in curricular content, and a global trend toward outsourcing of lower-level and more technical telecommunications and IS jobs [Lacity and Willcocks, 2001].   It also reflected the spread of internet and web concepts across multiple disciplines removed from the telecommunications field, reducing that field's hold on internet content.

In the MS in IT curriculum, greater weight was placed on IS management, strategy, change management, and systems analysis, content areas not likely to be displaced by outsourcing, while internet and web technologies were de-emphasized. The committee dug even deeper by gathering detailed enrollment and market data, as well as conducting its own survey of CIOs and other top IT managers in southern California, and studying intensively masters programs that had survived the Dot Com Bust.

DESIGN AND IMPLEMENTATION

The new curricular design hinged on an IS Executive (ISE) Survey, which suggested key curricular changes, and on ideas from the business trade press which suggested a curriculum that would recognize the urgency of outsourcing and find a central place for it.
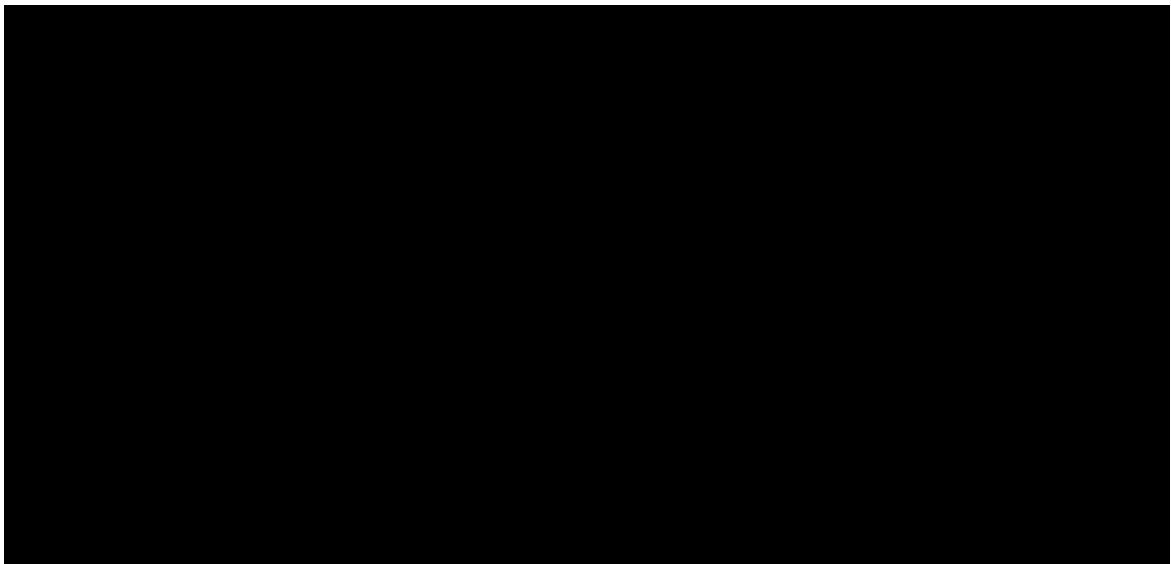
In order to assess the business world demand for a prospective MS in IS curriculum, a questionnaire survey was designed, consisting of broad, open-ended questions that covered respondents' views on the IS sector and industry, future technologies, skills needed for IS masters graduates, extent of CIO agreement regarding content areas for a MS in IS curriculum, and questions about two hypothesized MS in IS degree models. The survey was sent to executives responsible for IS in medium to large sized enterprises in Southern California. Of 31 questionnaires were sent out, 17 were received back, for a response rate of 55 percent. These leaders had in common oversight of the IT function in the organization. Their organizations were mostly medium and large size and from a variety of private and government sectors. The diversity of perspective was considered helpful, as the student pools expected in southern California would also reflect this diversity.

QUESTIONNAIRE RESULTS

ISEs' survey responses covered what they expected for future IS/IT graduates, their viewpoint on the future IT workforce, what technologies would be considered dominant in the mid term, and what skills they valued in their employees. They gave opinion on sought-after qualities for MS in IT graduates in the technical and management areas, as seen in Tables 1 and 2 respectively. Responses are on a

seven point Likert scale for which a 1 indicated "disagree completely," a 4 indicated "neutral" and a 7 indicated "agree completely. The overall weighted average of 6.1 in Table 1 reveals a high level of agreement with the 15 learning outcomes for the MS in IT.   A key finding is that the most highly rated outcomes (6.4 or higher) were to manage, guide, assess, and evaluate technical tasks, and the lowest rated ones (less than 6) were to conduct technical tasks, such as object-oriented programming, develop data-base architectures, and integrate networks, servers and protocols.   This pointed towards graduates who could oversee technical work, rather than perform the work, a skill set also appropriate for the onshore side of outsourcing relationships.

Table 1. Extent of Agreement with Hypothetical Technical Learning Outcomes, ISE Survey

For the question, "from a non-technical standpoint, a MS in IT should produce graduates who can…," the responses overall were somewhat higher (6.4 on average) than for technical, which implies the ISEs were more supportive of

less technical outcomes (Table 2). The strongest non-technical outcome (6.8 out of 7) was for teamwork and collaboration, skills appropriate for outsourcing [Ferguson, 2004]. The next three ranked outcomes were communication (writing, speaking, presenting), analytical/critical thinking, and problem analysis and solution. Communication is also well a trait preferred by employers in hiring, and is known to be a success factor for outsourcing [Ferguson, 2004]. Analytical/critical thinking and problem solving skills are cornerstone capabilities in both business and IT. Other functional areas rated highly included finance, customer relations, and personnel, responses that might reflect the local sample.

Table 2. Extent of Agreement with Hypothetical Non-Technical
Learning Outcomes, ISE Survey

From a __non-technical__ standpoint, a Master of Science in Information Technology should produce graduates who have an understanding of the following skills and abilities…	Weighted Average
leadership	6.5
project management	6.5
teamwork and collaboration	6.8
analytical/critical thinking	6.6
communication (writing, speaking/presenting)	6.6
problem analysis and solution	6.6
change management	6.4
people management	6.4
boundary spanning of IT and other areas	6.3
business implications of emerging technology	6.4
negotiating	6.1
motivation	6.4
evaluation and assessment	6.3
application of IT/IS to business needs in…	
a. operations/production	6.4
b. finance	6.5
c. marketing	6.2
d. new product development	6.3
e. accounting	6.4
f. customer relations	6.5
g. personnel management	6.5
h. supply chain management	6.3
i. distribution	6.2
Overall Average	6.4

Seven open-ended questions concerned ISE expectations for future IS/IT graduates, what the future IS workforce would be, what technologies would be dominant in the middle term, and what skills they especially valued in their employees reveal broad expectations of these leaders for graduates and employees. Regarding IT technology challenges facing organizations, ISEs gave highest ratings to security, training, and keeping current with trends.   This supported the committee's inclusion of courses on security management and emerging technologies.   The responses on what was foreseen as dominant information technologies for 2003-2006 included wireless, web services, high bandwidth communications, enterprise software, cell phones, media convergence, and extensive outsourcing. In retrospect, they were accurate.

ISEs responded on the survey that the most important technical skills needed for MS in IT graduates were as follows: web technology, project management, infrastructure, communications, security, software applications, data-base administration, IS architecture, and systems analysis. One ISE gave a general answer of "good all-around foundation in IT" and another's response was "broad understanding of the technology to be managed." Overall, the responses do not agree on the key in-depth skills, while some point to technical breadth as important.

Regarding what they considered the most important managerial skills for graduates, the ISEs rated most highly interpersonal communication skills, people and management skills, and managing processes and projects. The management skills are also generalist, rather than specialized. This resembles their open-

ended responses to describe core competencies that distinguish the most valuable members of an IS team, in which they indicated flexibility, communications, character, project management, general technical competence, people skills, and acting as a team player.

The questionnaire provided a hypothetical set of curricular topics and asked the ISEs to state their level of agreement with the topics, or to suggest additional topics for the curriculum. The hypothetical topics were drawn from the MSIS 2006 model curriculum [Gorgone et al., 2000] as well as from suggestions by the University of Redlands curriculum development committee on locally relevant topics. The hypothetical MS in IT followed the MSIS 2006 curriculum in having a required core, but differed in offering students a choice between only one of two tracks for the second year, advanced technology or technology management (see Table 3).

Table 3. Level of Agreement with Hypothetical Curricular Topics in Questionnaire and Added Topics Suggested by Respondents

	1st Year - Core	2nd Year - Track on Advanced Technology	2nd Year - Track on Technology Management
Hypothetical topics proposed by task force	Introduction to IT Database Management Networks Telecommunications Technology Convergence Electronic Commerce Systems Analysis & Design	Advanced Wireless Networks & Telecommunications Advanced Data Analysis & Database Management IS Process & Change Mgt. Project Management Web Technologies Object-oriented Programming	IT Operations Management Business & Strategic Implications of Convergence Business Fundamentals Managing a Global IS Organization Process & Change Management Demand and Capacity Planning
General level of agreement of respondents with hypothetical topics	High	Medium	High
Added topics suggested by respondents	Project Management IS Process & Change Mgt. Interpersonal Skills Technology Decision Making Web Technologies	Business Fundamentals ERP Systems Integration Security Multimedia M-business Advanced Wireless Networks Management and Leadership Advanced Technical Infra-structure Design	Project Management Personnel Management Security Principles ERP

For the hypothetical First Year Core Curriculum, ISEs indicated a high level of support. Eighty six percent of respondents showed agreement with the core, while five new topics were suggested. None of the suggested topics conforms to the standard ACM/AIS model curriculum. The suggestion to include "interpersonal skills" conforms to the high questionnaire ratings for teamwork, collaboration, communication in Table 2 and similar qualitative findings.

For the hypothetical 2nd year Track on Advanced Technology, ISEs had medium level of agreement, i.e. 58 percent, and nine new topics were recommended.   Three new topics, business fundamentals, security, and management and leadership, are appropriate for the management track. The other six are more specialized technology topics.   Security and ERP are included in two courses (Enterprise Models and Implications of Digitization) of the MSIS 2006 Curriculum.   M-business, Advanced Wireless Networks, and Advanced

Technical Infrastructure Design, concern specialized areas of networking and infrastructure.

Topics in the hypothetical Technology Management track received a high level of agreement from the ISEs -- 82 percent of responses showed agreement with them. The new ISE-requested topics going beyond the track were Project Management, Security Principles, ERP, and Personnel Management, the first three of which correspond to course content in the MSIS 2006 Curriculum.

The MS in IT curricular committee was inspired to emphasize outsourcing partly by the business and trade press at the time (2003 and 2004), which often pointed to the growing trend of global outsourcing. One key special issue of *Business Week* [March 1, 2004] entitled "Software: Programming Jobs are Heading Overseas by The Thousands: Is There a Way for the U.S. to Stay on Top?" presented many ideas that caught the committee's attention and were critical to its decision-making on the curriculum. The special issue stressed that the number of IT jobs based or contracted offshore for U.S. companies had expanded dramatically, while software and IT jobs in the U.S. were being reduced in many categories [Business Week, 2004]. At the same time, the number of computer science and software engineering graduates in Ph.D. granting universities peaked in 2002 and was decreasing. Pay levels for major IT technical and software jobs were lowering, e.g. by 17 percent for application developers and 15 percent for database engineers [Business Week, 2004].

Sparked by this special issue, the committee opened serious discussion and decided to incorporate outsourcing directly into the MS in IT curriculum by

including electronic collaboration with students and professors in India and Mexico. Rather than having students read articles on outsourcing and be lectured on it by MIS professors, many with no first-hand knowledge of it, learning could become more vital and dynamic by engaging directly with overseas faculty and students who "live and breath" outsourcing or nearsourcing.

By summer of 2004, the Redlands curricular development committee decided to implement electronic collaboration with Xavier Management Institute (XIME), a leading Indian business school and with Instituto Autónomo Tecnológico de México (ITAM), a renowned Mexican private university. In summary, it is important to reiterate the two critical and related steps for the committee that shaped the new curriculum: the ISE survey results and the key insights from the business press on the impacts of global outsourcing.

The MS in IT degree commenced offering in fall of 2004, concurrent with the phasing out of the prior MS degree in interactive telecommunications. As seen in Table 4, the degree is 48 units, consisting of a non-credit orientation course and 16 three-unit courses. The two prerequisite courses are also in the MSIS 2006 model curriculum: IS Concepts and Decision Support, and Introduction to Object Oriented Programming. It includes six courses similar to ones in the MSIS 2006 course: standard core courses in Legal, Policy, and Ethical Issues for Technology (similar to "Implications of Digitization" in the model), IT/IS Strategy, IT Architecture and Management, Systems Analysis and Design, IT Project Management, and IT Change Management [Gorgone et al., 2007]. Of these core

courses, the latter four were strongly supported by the ISE survey, while the first two were not.

Table 4. Management of Information Technology Degree Curriculum

Course No.	Course Title	Units
INFT 600	IS/IT Program Orientation	0
INFT 610	Legal, Policy, and Ethical Issues for Technology	3
MGMT 680	Marketing Management	3
INFT 615	Teams and Interpersonal Communication	3
INFT 605	Information Systems Concepts and Decision Support	3
BUAD 659	Managerial Accounting	3
BUAD 660	Managerial Finance	3
INFT 620	Introduction to Object-Oriented Programming	3
INFT 625*	Topics in Emerging Technologies and Innovations	3
INFT 630	Global E-Commerce	3
INFT 635	Information Technology Architecture and Management	3
INFT 640	Systems Analysis and Design	3
INFT 645**	Telecommunications and Networks	3
INFT 650	IT Project Management (Capstone I)	3
INFT 655	IT Change Management	3
INFT 660	Security Management	3
INFT 697	IT/IS Strategy (Capstone II)	3
	Total	48

 *Includes electronic student collaboration between students at U. Redlands and
  InstitutoTecnologico Autonomo de Mexico, Mexico City, Mexico
** Includes electronic student collaboration between students at U. Redlands and Xavier
  Management Institute, Bangalore, India

Three MS in IT business courses, marketing, managerial accounting, and managerial finance, correspond to "business pre-requisites" in the MSIS 2006. Another course that the committee added that bridges with and builds on this group is Global E-Commerce.   In addition the following MS in IT courses originated from the recommendations from the ISE survey: Teams and Interpersonal Communication, Topics in Emerging Technologies and Innovations, Telecommunications and Networks, and Security Management.

Two ISE-generated courses, INFT 625 and INFT 645, formed a basis for inclusion in the curriculum of direct student experiences with outsourcing and

nearsourcing.   The teaching mode selected was electronic collaboration between Redlands students and overseas students, with a project focus [Authors, 2008]. Collaborating student teams simulated an outsourcing environment, i.e. that of coordinated project work by virtual teams composed of U.S. and foreign members. In the projects, students confront cultural and workflow factors typical for outsourcing.   Each team sets up a management structure for the project that would resemble the leadership challenges of actual outsourcing teams.

INFT 625, Topics in Emerging Technologies and Innovations, focuses on learning about information technologies that are on the cutting edge or in the future horizon.   In the collaborative project, each team researches and writes a paper on an in-depth aspect of emerging technologies as well as analyzing why the technologies are important, including the underlying trends and the social and business implications of the technology.   The project focuses on cultural and economic differences in the technology use between the U.S. and Mexico.   This project was shared between courses at Redlands and ITAM in Mexico City.   Since Mexico is the next-door neighbor of the U.S. and a base for nearsourcing [Ania and Mejía, 2007], the intent is to simulate teaming in a nearsourcing environment.

In the second collaborative course INFT 645 (Telecommunications and Networks, binational teams with members from Redlands and XIME were charged to develop a business continuity plan (BCP) for a medium-sized U.S. company, which have included International Rectifier and Harrington Industrial Plastics. The BCP involves each team creating a design for alternative networking, disaster recovery planning, management processes in IT, a policy for switching to the

alternative backup infrastructure, and a cost-benefit analysis of the alternative. Each team has a project manager, works together collaboratively, and presents its plan to the entire class through video conferencing and a web-posted report. The collaboration takes place by IP-based video conferencing, Skype, wikis, mobile phones, and Blackboard. In one instance, senior managers from a company offered to be available as information resources and were invited to attend the final project videoconference. The choice of overseas students based in the world class outsourcing city of Bangalore helped to provide a teamwork and cultural setting resembling a real world outsourcing.

ASSESSMENT OF CURRICULAR OUTCOMES RELATED TO OUTSOURCING

The outcome of the outsourcing component of the curriculum is assessed by student evaluations of the two collaborative courses and through a special questionnaire survey study of the INFT 625 course. INFT 625 and INFT 645 student evaluation results, seen in Table 5, show an overall average course rating of 3.47 on a 4-point scale, which is between "agree" and "strongly agree." There was only slight variation between the five questions on generic learning and quality of instructor (7 percent) and small to moderate variation between course sections (12 percent). The ratings show good learning and teaching success in the collaborative courses. The subjective comments from the evaluations are mixed, revealing positive responses on the benefits of collaboration and teamwork, but negative comments of too demanding a course, need to include more BCP content in the course, and low collaboration from Indian students. The latter result might

be attributed to a cultural factor in India that the group leader serves as the team communicator.

Table 5.Student Evaluations,Global Collaboration Courses, MSIT Degree Program

Evauation Criterion	INFT 625 Section 1	INFT 625 Section 2	INFT 645 Section 1	INFT 645 Section 2	Average
The instructor stimulated my interest in learning (question 1)	3.60	3.33	3.25	3.89	3.52
The instructor encouraged me to particpate actively in the work of this course (question 2)	3.80	3.17	3.44	3.43	3.46
The instructor challenged me to do my best work (question 3)	3.87	3.50	3.37	3.43	3.54
The instructor encouraged discussion that helped students think critically (question 10)	3.80	3.50	3.50	3.43	3.56
Overall, I rate this course as excellent (question 21)	3.73	3.17	3.31	3.00	3.30
Overall, I rate this instructor as excellent (question 22)	3.87	3.17	3.37	3.43	3.46
Average	3.78	3.31	3.37	3.44	3.47

Note: scale is 1 strongly disagree, 2 disagree, 3 agree, 4 strongly agree

The success of the binational projects and perceived value of the group collaboration have been analyzed by a questionnaire study of students in INFT 625 [Ramakrishna et al., 2008]. In Table 6, on a scale of 1 ("not at all") to 5 ("very high"), the mean overall perceived value of group collaboration in INFT 625 increased significantly from 3.45 before the project to 3.94 afterwards, revealing substantial increase in perceived value. Disaggregating this further, it only represents gain for U.S. students, while the Mexican students had no change. The reason for the differing results is unclear, but might be due to the greater extent of course pre-advertising in Mexico. The perceived success of the group collaborative project was high – on average 4.41, but diverging among sections, with lower success ratings for one U.S. section (Table 7). These results show a successful collaborative project learning experience for most students, but a more limited outcome for several subgroups. Inconsistency of perceived success

resembles variation seen for real world outsourcing teams. In a study of virtual collaborative teams in an IS course, Jones et al. [2006] ascribed variation in success to differences in learning styles of individual students. They also noted that collaborations were more successful if the instructor provided greater structure and guidance, and more support for collaborative activities [Jones et al., 2006].   In the present study, although effort was made to have the collaborative projects structured by pre-assigning groups, asking for groups to establish organizational structures, and posting moderate detailed instructions and guidance for the project on the course website, even more attention might have been given to structure the collaboration.

Table 6. Perceived Value in International Group Collaboration in INFT 625

Class Section	Mean (after)	Mean (before)	n	p value
Redlands	4.31	2.92	13	0.00
OC	2.17	2.67	6	0.20
ITAM	4.42	4.42	12	1.00
All	3.94	3.45	31	0.02

Redlands = Class Section of INFT 625 located on main campus of U. of Redlands
OC = Class Section of INFT 625 located at Orange County teaching center of U. Redland
ITAM = Class at Instituto Tecnologico Autonomo de Mexico

Note: scale is 1 "not at all"   to   5 "very high"

Table 7. Perceived success of the group collaboration project in INFT 625

	Redlands	OC	ITAM	All
Mean	4.67	3.67	4.44	4.41
Range	3-5	2-5	3-5	2-5
Sample size	15	6	16	37

Redlands = Class Section of INFT 625 located on main campus of U. of Redlands
OC = Class Section of INFT 625 located at Orange County teaching center of U. Redlan
ITAM = Class at Institute Tecnologico Autonomo de Mexico

Note: scale is 1 "not at all"   to   5 "very high"

IX. DISCUSSION

Findings on collaborative project teams revealed that although most students felt this curricular element was helpful, some students felt frustrated or disappointed. It is not surprising that results were not entirely positive, since behavioral challenges and difficulties commonly occur in outsourcing collaboration [Brooks, 2006] and in virtual collaboration of teams in IS coursework [Jones et al., 2006]. There are learning benefits in trying to overcome issues, for example cultural differences and 12-hour time changes, even if some students don't feel positive about it. For one thing, it is better to work at the obstacles in an educational setting than to struggle against them in a job setting. An implication for teaching is that towards the completion of the project, it would be helpful to open up student experiences, positive or negative, in a class discussion format, i.e. to have students step away and share their thoughts with each other reflectively on the experience.

The present study agrees in many respects with the curricular ideas of studies by Ferguson et al. [2005] and Andriole [2008], but it did not incorporate the real world factors of supply chain management and business analytics recommended by Andriole and business strategy suggested by Ferguson. However, their exclusion in this case is partly from lack of interest from the ISEs in them.

The curricular approach of Huang et al. [2008] of sensitizing students to the pluses and minuses of outsourcing and having them dig deeper on pluses from a library research standpoint was not followed. The present approach rather

stressed building skills and simulating the actual experience of collaboration, rather than emphasizing library study.   The former might yield more eventual job benefits.   Both approaches intend to gain understanding of the benefits of outsourcing, to get over job-displacement sensitivities of working students, and to build confidence.

The case study must be considered in lieu of recent projections that the IS domestic workforce has bottomed out and again is growing substantially.   The continuing importance of IS management and administrative skills is reflected in employment projections 2004-2014 by the U.S. Bureau of Labor Statistics [2005]. Five of the 12 projected fastest-growing occupations and six of the 19 fastest-growing ones are in IS and IT. This not only suggests future rapid growth in IS/IT employment, but of the 794,000 new IS/IT jobs in fastest-growing occupations, 38 percent are in administration or systems analysis, i.e. jobs suitable for MS in IT graduates.

Another recent projection of the domestic IT job market in U.S. metropolitan areas points to substantial increase by 2010 [Litecky et al., 2008].   However, even if domestic demand for IS jobs were to rise sharply, it is likely overseas IS technical and maintenance jobs would also continue to grow, so that outsourcing knowledge would still be essential.   Nevertheless, the rest of the MS in IT curriculum might need to be re-balanced. This could be stimulated and enriched through a new survey of IT executives, based on their needs in IS in the growing sector and workforce post 2010.

Returning to the study's conceptual model (see Figure 2), it was largely justified. The case study reveals that at start of a given course project, determinants of partnership quality were not always realized, either from deficits in the curriculum preceding the project course or from lack real world project collaboration experience. For instance, some student project groups had problems in communication quality and overcoming cultural differences. However, as projects went along, there was learning so most students benefited and achieved a good collaborative experience. Some did not, which raises the same issues as those in the real world [Brooks, 2006; Ramingwong, 2007]. In real settings, outsourcing relationships are known to evolve and improve over time frames of projects [Kishore et al., 2003]. One issue is that the MS in IT projects were much shorter than actual outsourcing, so there might not have been time for the evolution to occur. That could be improved in a future curriculum by extending project durations over several courses or even the whole curriculum.

LIMITATIONS

The present research has several limitations. One is that the collaborative project teamwork might have had a different configuration than many outsourcing arrangements, since the Redlands and overseas students were not divided into outsourcer and client categories. However, since the overseas students were in equivalent level master's programs at leading universities, it might have been unfair to do this.   Another limitation was that only one case study is included. Although researching it in greater depth makes up for lack of larger sample especially for a novel curricular approach, having more cases in the future might

allow exploring the interplay of a wider variety of nations, cultures, and technology levels.

X. CONCLUSIONS

This research has demonstrated the benefits of incorporating direct experience of outsourcing into an MSIS curriculum and of seeking and acting on the opinions of IT executives in the region. The case study shows how a curricular team proceeded in one setting and what some of the pitfalls may be.

The research questions have been answered as follows.

(1) How can outsourcing skills development be supported as part of a Master's in IS curriculum? Yes they were supported in an MSIS curriculum by simulating the outsourcing behavioral elements through bi-national project teams.

(2) How successful was the case study in accomplishing the incorporation of these outsourcing skills into an MS in IS curriculum? The case study did accomplish student experience of practice in outsourcing skills, especially those of collaborative teams.

(3) In particular, how successful was international student team collaboration in fostering outsourcing-related skills? The evaluations indicate the student team collaboration was mostly successful in achieving the skills, but that a minority of students did not feel satisfied with their learning shortly after course completion.

(4) Does the case study demonstrate benefits from a curricular development survey of IT executives? The survey of IS executives yielded many insights, most of which were incorporated into the MS in IT curriculum. Many of them have been critical success factors for the curriculum.

Getting closer to real world through executive inputs and skills development for an outsourced IS global environment proved beneficial for the post Dot Com era, a time of downturn in the domestic IS sector. For the future, with that sector projected to grow significantly, this type of curricular approach would

seem still valid. Since technological environment is always changing, it is

recommended that the real world knowledge and inputs be continually updated

and adjustments made every few years. Finally, as occurred in the case study,

this approach can also be pursued by IS programs in less developed nations,

who would seek and develop relationships with universities in advanced

technological countries.

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