

# The IS Model Curriculum and Outsourcing: A Call for Revision

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## ABSTRACT

Offshore outsourcing (or just "offshoring") has been a growing phenomenon in recent years. Rarely will an IT professional pick up a trade publication or journal without some article relating to outsourcing or offshoring. This in turn raises the question for IS educators – what should we be doing to better prepare our graduates for a future where offshoring is a reality? This paper looks at the following topics as they relate to IS curriculum matters for outsourcing: Outsourcing (offshoring) and success factors; the skills needed to effectively manage outsourcing; a look at outsourcing and the IS2002 model curriculum; suggested changes to IS2002 to incorporate outsourcing / offshoring education, and what skills from IS2002 are vital to being prepared for the future.

**Keywords:** outsourcing, offshoring, IS2002, success factors, IS curriculum issues

### 1. PURPOSE AND MOTIVATION

With the seemingly preponderance of jobs being outsourced to overseas locations coupled with the pronounced reduction in student enrollment in MIS/IS/IT/CIS programs in American colleges and universities, IS-related programs are perceived to many entering freshmen as being a discipline to avoid, especially as it relates to career potential. In Australia, MIS programs have been severely cut (private correspondence), faculty retrenched, and programs merged. These actions have taken a toll on business. Avison, Gregor and Wilson (2006) write that the managerial mindset of some very large businesses is such that

there is a belief that "IT doesn't matter" and that "...the outsourcing of major projects will effectively transfer all risks." This short sighted view is reported to have resulted in one company going bankrupt and two others sustaining extreme financial losses.

The future for IS seems bleak at best unless the IS curriculum is reoriented to address these critical issues that are also apparently neglected by some businesses, and our instruction is modified to make IS graduates more appealing and productive to business. But is such a reorientation possible? Thomas Friedman (2005) writes that with the cabling of the Indian subcon-

inent, massive offshore outsourcing of many tasks has occurred and many more will follow. Thus a fully functional channel for the transmission of digital media exists in a country with an outstanding educational system, and where there exists a highly educated population of young men and women willing to work for a fraction of the money that similar skill sets command in the United States. American industry seemed to flock to India and the Philippines for technology support, and then to China, Singapore, Korea, and even Vietnam for industrial workers.

Articles abound in professional magazines such as InformationWeek (such as Preston, 2006), Network World (such as Sayer, 2006), CIO magazine (such as Rosenbaum, 2006), and InfoWorld (such as Margulius, 2006) attesting to the movement of positions and corporate functions to offshore locations. Such a transfer of jobs is definitely in the best interests of other countries as their employment rises and generally is in the financial best interest of the company that initiated the offshoring. But, such offshoring can cut into IT employment in the originating company (for this paper – the United States). While small to medium-sized companies may not have the wherewithal to engage in offshoring, outsourcing is part of doing business and is already well-established. The concept of outsourcing is in transferring a non-core task from one company to another company that specializes in that task, so that that task can be performed more efficiently and effectively. However, when a task is offshored, the overall number of available jobs decreases in the United States.

The transfer of jobs is not a new feature for outsourcing of tasks has been a regular occurrence of American business; the transfer of IS tasks presumes that it may no longer be a core competency.

A strong case has recently been made (Davis, et. al., 2004) that offshoring can open up many opportunities for modifications in the IS curriculum, and that America has always done its best when it has been challenged (Friedman, 2005). This paper addresses the curricular issues of offshoring and how IS programs can adopt and benefit from this paradigm change.

This paper can not adequately cover outsourcing / offshoring or the slightly different term of Global IT Management. The paper first introduces outsourcing / offshoring (and indirectly Global IT Management) including a brief discussion on reasons for outsourcing as well as what makes for successful outsourcing. The main focus of the paper is on what IS educators (and in particular IS educators using the IS2002 model curriculum) can do to effectively educate students for the workplace. The authors give examples of how sourcing offshoring / Global IT management could be integrated into the current IS2002 model curriculum.

## 2. OUTSOURCING AND OFFSHORING

Outsourcing is the use of resources outside of an organization. Generally, such outsourcing is to delegate non-core activities to an external entity. As a concept, outsourcing has been around for centuries, one example being that the British armies during the American Revolution hired Hessian mercenaries to fight for them. Another more recent example involves the natural evolution of the automotive manufacturing operation in that almost all the parts of the cars of the early 20<sup>th</sup> century was made by the manufacturer. Over the years, increasing numbers of parts were outsourced to other manufacturers. Today, some companies merely assemble products from parts made elsewhere. Even computer-related activities have been outsourced. Recall that Ross Perot built EDS by performing the tasks of payroll generation, management, and reporting for companies, thereby permitting them to focus their resources on their core activities. (Wikipedia, 2006)

Many organizations typically outsource at least some of their functions, for example, the security requirements of a company might be outsourced to a local security company that can manage the physical security of a building or property, food service is outsourced to other companies that staff and manage cafeterias, and even custodial services are outsourced to companies to clean buildings.

Frequently such outsourcing may have occurred in the same community or region. With security, food service and custodial outsourcing, the employees from the con-

tractor arrive physically at the local property and performed the required services. With accounting or payroll, the company may have taken time cards and/or other such recording information and sent it digitally to a service provider in the area. Campuses are very familiar with outsourced services such as food services, vending, bookstores, custodial services, maintenance and security as the leading outsourced services (Gupta, 2005).

The main benefits to outsourcing have generally been to cut costs and to focus on core activities. Thus an insurance company that outsourced food service, security and custodial duties removed such employees from their payroll and allowed the company to focus on internal insurance issues.

Information Technology outsourcing started in the 1960's and 1970's when in-house expertise was not available and it was much more cost effective to hire skilled workers at a consulting / outsourcing company. (Wikipedia, 2006), (Willcocks, 1995). As academic institutions produced more qualified IT workers, outsourcing declined in the 1980's and internal IT grew as IT was considered an important function supporting the vertical integration of all aspects of a business. Today's businesses rely on computing / information technology for all aspects of the business – including telecommunications, electronic commerce, decision making and information analysis. The technologies have evolved from a central mainframe in a glassed, air conditioned, and secure room to global enterprises with complex information processing needs and environments.

The most common type of outsourcing has been to use a consulting company that specializes in IT: IBM, Accenture (formerly Arthur Anderson), Computer Associates, Hewitt Associates and many other companies offer consulting and outsourcing expertise. With regional offices, these companies have either been able to place temporary consultants into IT positions or service clients with IT support functions. The advantage to companies who hire these consulting firms has been generally to get immediate expertise without adding to the

company's payroll. Typically such arrangements are from 3 to 6 months.

A more recent phenomenon is "Offshoring" – or outsourcing functions away from the home country. For businesses in the United States the offshoring choice of preference has been India.

"In the last few years, outsourcing has emerged as one of the most critical business needs for companies to be competitive. A large number of Fortune 500 companies, including Microsoft, Oracle, Intel, General Electric, British Airways and Dell Computers amongst others, have already chosen India as a base for their global back office operations" (Fortuna, 2006).

Larry Ellison of Oracle is on record as stating: "Why should every automaker, publisher, or doctor's office have to be a tech company too, employing high-paid staff who spends all of their time fiddling around with computers?"

Thomas Friedman (2005) references many conversations with business executives and CEO's located in Far East companies. One conversation (Friedman, p. 5) with Nandan Nilekani, CEO of Infosys Technologies of Bangalore, India, dealt with the massive investment in technology during the bubble year when broadband connectivity was installed around the world. Nilekani said that the technology "created a platform where intellectual work, intellectual capital, could be delivered from anywhere. It could be disaggregated, delivered, distributed, produced, and put back together again – and this gave a whole new degree of freedom to the way we do work, especially work of an intellectual nature." He went on to say that "the playing field is being leveled." In other words, "countries like India are now able to compete for global knowledge work as never before – and that America had better get ready for this. America was going to be challenged, but, he (Nilekani) insisted, the challenge would be good for America because we are always at our best when we are being challenged" (Friedman, p 7).

In another conversation with Win Liu, director of US/EU projects for DHC, a software company located in Dalian, China, a company that has expanded from thirty to 1200 employees in six years, Liu states

that "Americans don't realize the challenge (of offshoring) to the extent that they should....We have 22 universities and colleges with over 200,000 students...More than half of those students graduate with engineering or science degrees...and spend a year studying Japanese or English, plus computer science, so that they will be employable...China is now becoming the country that develops the largest number of university graduates" (Friedman, p. 34).

Friedman describes the situation where many standard process jobs can be easily outsourced, including computing (data processing), accounting and tax returns and even the reading of X-rays and other medical tests. With high speed data transmission, a company can send gigabytes to India at 5:00 p.m. eastern time USA, and have the results back by 8:00 a.m. the next morning. Such "time swapping" opportunities can give a competitive advantage to a global business.

The Gartner Group has estimated that more than 80 percent of US companies have discussed offshore outsourcing and more than 40 percent have tried some kind of pilot program. (Pastore, 2003). A similar study by the Meta Group predicted that 80% of organizations will outsource at least one IT function by 2005 (McCue, 2005). An estimate by Forrester Research predicted that 3.3 million jobs will move offshore in the next 15 years. (Pastore, 2003).

Multinational companies with locations worldwide generally use the term "Global IT Management" because of the global nature of their business. In many multinational companies, 'offshore' development will be part of the global nature of their company.

### 3. MOTIVATION FOR OFFSHORING

The primary reason for offshore outsourcing has been financial. IT professionals outside the United States generally receive much less pay for the same work. In particular, IT outsourcing to India has significant savings. Cost savings or efficiency gains help companies maintain competitive prices without sacrificing quality or service to do it (Kakumanu, 2006). India has been favored as skilled IT professionals are

generally available, English is widely spoken, and the government has helped develop a reasonable IT infrastructure (Kumar, 2006).

The Outsourcing Institute (1998) conducted a survey in 1998 on the reasons why companies outsourced:

1. Reduce and control operating costs
2. Improve company focus
3. Gain access to world-class capabilities
4. Free internal resources for other purposes
5. Resources are not available internally
6. Accelerate reengineering benefits
7. Function difficult to manage/out of control
8. Make capital funds available
9. Share risks
10. Cash infusion

As noted in the survey, controlling costs (through lower wage / labor costs) was the primary reason for outsourcing. That cost containment would free resources for other purposes (reason #4 above), as well as make capital funds available (reason #8) and give a cash infusion to the company (#10).

But, other benefits also were presented. An underlying factor is that the quality must be evaluated by the originating company (indirectly this is reason #3 in the survey above). In 2003, of the 80 software centers that measure level 5 on the CMM (capability maturity model from the Software Engineering Institute at Carnegie Mellon University in Pittsburgh); fully 60 of them were in India (Dataquest India, 2003). "The emphasis on quality is almost a no-brainer when it comes to outsourcing such demanding work as software development, where a small error can undermine an entire project. No matter the cost savings, turning that work over to strangers would be impractical without some means to control against quality risks" (Zamiska, 2005)

Clearly, outsourcing (and offshore outsourcing) are here to stay and IS educators need to retool, relearn, and revise cur-

ricula, as necessary, to adapt to these serious challenges.

#### **4. WHAT MAKES FOR SUCCESSFUL OFFSHORING?**

In the previous section, the authors introduced outsourcing / offshoring. The authors will now present research relating to successful outsourcing / offshoring.

In a second survey from The Outsourcing Institute in 1998 the following top 10 factors for successful outsourcing were given:

1. Understanding company goals and objectives
2. A strategic vision and plan
3. Selecting the right vendor
4. Ongoing management of the relationships
5. A properly structured contract
6. Open communication with affected individual/groups
7. Senior executive support and involvement
8. Careful attention to personnel issues
9. Near term financial justification
10. Use of outside expertise

Fjermestad (2005) has identified eight factors for successful outsourcing:

1. Alignment to business strategy
2. Management support
3. Culture
4. Infrastructure
5. Contracts
6. Strategic partnership
7. Governance
8. Economics

Both of these lists emphasize the strategic nature of the outsourcing relationship. A company needs to see if the outsourced activities align to the corporate goals and vision. Likewise, both point out the need

for a strong contract with ongoing management support.

Loh and Venkatraman (1995) found that outsourcing leads to superior performance, although moderated by the cost structure of the firm. Their empirical study of 159 CIO's from Fortune 500 companies suggests that it is not 'insourcing' or 'outsourcing', but 'rightsourcing'. (Loh and Venkatraman, 1995).

The President of ACM (Association for Computing Machinery), David Patterson (2006) in an article in the Communications of the ACM entitled: "Offshoring: Finally Facts vs. Folklore" (February 2006), also has a list of skills desired in managing outsourcing:

1. Sourcing methodology and processes
2. Strategy development
3. Project management
4. Risk management
5. Contract law
6. Financial analysis
7. Supplier selection and certification
8. Relationship development.

#### **5. INFORMATION SYSTEMS MODEL CURRICULUM – A SHORT HISTORY**

Having obtained a brief overview of outsourcing / offshoring / Global IT Management (including success factors), the authors now change their focus to how to better prepare Information Systems graduates to function in a global IT marketplace.

Computing as a discipline is a recent phenomenon. Computing hardware dates from the late 1940's, but computing as an academic discipline was slower to develop. The first computer science programs emerged in the early 1960's. The earliest explicit Information System undergraduate program came in 1973 with the ACM Undergraduate Programs in Information Systems (Couger, 1973).

Since that time, there have been many information systems curriculum models – such as:

1981 – DPMA Curriculum for Undergraduate Information Systems Education (DPMA 1981)<sup>i</sup>

1986 – DPMA Model Curriculum for Undergraduate Computer Information Systems (DPMA 1986)

1991 – DPMA IS'90 Curriculum for Undergraduate Programs in Information Systems (Longenecker and Feinstein, 1991)

1997 – ACM, AIS, AITP IS'97 Model Curriculum and Guidelines for Undergraduate Programs of Information Systems (Davis, et. al., 1997)<sup>ii</sup>

And the current version:

2002 – IS'2002 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems – ACM, AIS, AITP (Gorgone, et al, 2000)

These model curricula have been widely adapted and appreciated. In the most recent versions, a more mature approach has been taken, so that skills and knowledge are more robustly defined and generalized, as compared to some of the earlier models that may have stated that students needed COBOL programming skills.

But, information technology is a moving target. What were needed skills in the 1980's may not reflect the current needs in the marketplace. For example, IS2002.2 E-Business Systems was added to the IS2002 model because of the rapid growth in the Internet and electronic commerce. ERP systems, security, outsourcing, human computer interfaces, and other topics may not be as fully covered specifically in IS2002 as occurs in the marketplace.

As described at IS2002.org, there have been many factors of the IS profession have been part of the educational expectation from early versions of the IS model curriculum (Gorgone, 2002). These are:

1. IS professionals must have a broad business and real world perspective.
2. IS professionals must have strong analytical and critical thinking skills.
3. IS professionals must have interpersonal communication and team skills and have strong ethical principles.
4. IS professionals must design and im-

plement information technology solutions that enhance organizational performance.

This paper studies the growth in outsourcing, in particular offshore outsourcing and makes the case that future Information Systems curriculum models require a more rigorous coverage of outsourcing be explicitly included. The authors' note that is offshoring outsourcing, the four educational expectations (listed above) are potentially more important.

## 6. EDUCATIONAL IMPLICATIONS FOR THE FUTURE OF IS EDUCATION

As we can see from the previous discussion, outsourcing makes sense. The outsourcing of IT functions has existed for many years – mostly domestically originally, but increasing going offshore for significant cost savings. And, offshoring of IT functions seems to be here to stay (as a form of Global IT Management). So, what are the implications for IS education, and in particular for the current IS model curriculum – IS2002 and for the next iteration of the model – which we will call IS200X?

Much of the IT activities that are sent offshore for processing are routine, not directly part of the corporate core functionality, and are of low risk. Some of the major IT activities that have been outsourced are application development (programming) and routine support (like help desk).

The authors suggest that major changes in the IS model curriculum are needed to properly prepare the next generation of IS / IT professionals. And the authors suggest that the skills needed are primarily the soft skills of IT management, project management, and especially contracts (contract law, contract management and contract negotiation).

Gordon Davis, Phillip Ein-Dor, William King and Reza Torkzadeh presented a "senior scholars" paper at ICIS 2004 relating to Offshoring (Davis 2004). This paper was exclusively written about the MSIS 2006 graduate curriculum update. They do have many suggestions for an offshore curriculum specialization option in the graduate MSIS program. [The authors will discuss these topics later in the context of where they can be incorporated into the current

IS2002 undergraduate model and in the next iteration.] These topics include

- Change Management
- Design Methodologies
- Project Management
- Business Processes
- Consumer Relationship Marketing (CRM)
- Data Warehousing
- Database Administration
- Database Systems Planning
- Electronic Commerce
- Emerging Technologies and Technology Forecasting
- ERP Systems
- Global Cultural Implications for IS
- Globalization
- IS Security
- Management of Computer Personnel
- Management of Telecommunications
- Outsourcing
- Systems Integration
- Transborder EDI and Data Flows
- Workflow and Collaborative Work

William King, another well regarded IS senior professor (and founding president of AIS, and a co-author of the last referenced article), states "many of the well-understood programming and systems analysis tasks will be offshored." He persists "that traditional low and mid level IT jobs will continue to migrate away from the US" and that IS education needs to be "weighed with gains towards the 'high end' in several areas" (King, 2005). He further states that "outsourcing / offshoring must be treated as a major and central IS paradigm." Lastly, "IS students will need to understand negotiation techniques, contract law, contract change management and develop the 'softer' skills involved in partnering and developing trust between partners." To be able to adapt to this paradigm, he suggests that IS professors will need to gain additional skills, such as

contract law, contract management and negotiation. He emphatically states "IS education must adapt and change." King (2006) lists five areas that need to be significantly covered in the IS curriculum:

1. Relationship management
2. Risk assessment and management
3. Technology and vendor assessment
4. Systems implementation
5. Integrated business and IS planning

### **7. CHANGING THE CURRENT IS CURRICULUM**

When applied to the IS2002 undergraduate curriculum, the concepts from the paper on the MSIS graduate track in Outsourcing / Offshoring could well be adapted to existing courses – most especially to IS2002.10 Project Management and Practice; IS2002.7 Logical Analysis and Design; IS2002.8 Design and Implementation of Database Management Systems; and IS2002.9 Design and Implementation in Emerging Environments. **BUT**, in a larger sense, some of these issues also apply to the business environment that surround IS programs. Taking King's five areas (above), most are predominantly *traditional* business issues. Relationship management is part of most Business School's management courses; risk assessment and management also tends to fall under the managerial umbrella. All-too-frequently curricula tend to be isolated courses – or as has been described as "silo" courses. In general, the IS professor neither knows nor understands contract negotiation; likewise, (in general) the management professor does not understand how supply chain management can utilize information systems and information technology to gain effectiveness and efficiency. As Friedman points out (2005) it is not just IS/IT functions that are being offshored.

The authors contend that after a thorough review of IS2002 and the learning objectives, and a review of the offshoring literature that IS2002 is weak on the critical success factors involved in offshoring and on strategic management issues. Undergraduates at institutions following the IS2002 model curriculum may be weak in the areas discussed. Reiterating King's

comment "IS education must adapt and change" and "outsourcing / offshoring must be treated as a major and central IS paradigm."

### **8. CHANGING THE IS CURRICULUM - OPTIONS**

In the authors' methodology, they looked at the learning objectives for each of the 10 courses in the IS2002 model curriculum. The authors used the Davis, Ein-Dor, King, Torkzadeh work as a springboard in their investigation. Although the Davis (et al) work was part of a graduate track on outsourcing in the MSIS graduate program, the authors felt that many concepts could be studied on the undergraduate curriculum level.

The authors suggest that there are several options to incorporate outsourcing / offshoring in the IS curriculum:

- a. A separate required course in IS outsourcing / offshoring
- b. Requiring a course in international business (with a strong emphasis on outsourcing management) in the business component of an IS program
- c. Reoriented the IS2002 curriculum to place less emphasis on topics that are frequently outsourced
- d. Keeping the IS2002 curriculum, but incorporating outsourcing assignments and topics as appropriate.

#### **Option 1**

In the first option above, a separate required course in IS outsourcing / offshoring is proposed. Other academic issues have discussed these topics and approaches. For example, marketing academics have wrestled with the idea of incorporating a new course in Managing Marketing Outsourcing. An advantage of a separate course is that the entire course could be devoted to an in-depth coverage of outsourcing / offshoring. As suggested by Davis, Ein-Dor, King and Torkzadeh earlier in this paper, programs could offer an offshoring curriculum specialization (although their work was specifically aimed at the graduate audience). The major drawback of this approach on the undergraduate level might be how to add an additional required course in the IS200X model cur-

riculum and yet not take out another course. Many programs that are in academic units accredited by AACSB have limitations on the number of credits in programs. In such programs, when a new required course gets added, another course must be deleted.

#### **Option 2**

In the second option above, many campuses do require IS majors to take an international business course. With the increasing global nature of business this can be valuable to students. But a drawback of such a course is that it not explicitly oriented to IS outsourcing / offshoring, but generally is a broad-based international business course.

#### **Option 3**

The third option was to deemphasize topics and areas that are frequently outsourced. When applied to the IS2002 model curriculum, with an eye at frequently outsourced areas, the authors suggest that many topics in IS2002.4 Information Technology Hardware and System Software and IS2002.5 Programming, Data, File and Object Structures and some topics of IS2002.6 Networks and Telecommunications are frequently outsourced and could be deemphasized in the curriculum. For example, many outsourcing contracts are for programming and application development (IS2002.5), or for help desk support (IS2002.4). These courses / topics / concepts could be combined into one course with less coverage in order to allow for a course in outsourcing (see option 1 above)<sup>iii</sup>

#### **Option 4**

The fourth option is to incorporate outsourcing / offshoring concepts into the current IS2002 model curriculum. Using the list compiled by Davis, Ein-Dor, King and Torkzadeh as a working list, the authors suggest the following ways to cover outsourcing / offshoring concepts in IS2002.

### **9. IS2002 COURSE BY COURSE ANALYSIS FOR OUTSOURCING CONTENT**

#### **IS 2002.1 – Fundamentals of Information Systems**

Topics from Davis, Ein-Dor, King and Torkzadeh:



- Global Cultural Implications for IS
- Outsourcing
- Globalization
- (and many of the other topics to be lightly introduced)

This is an ideal first place to expose students to outsourcing / offshoring. According to IS2002.org, "Systems theory, quality, decision making, and the organizational role of information systems are introduced. Information technology including computing and telecommunications systems are stressed. Concepts of organizations, information systems growth, and process improvement are introduced." (Gorgone, et al, 2002) These concepts are applicable to outsourcing / offshoring.

This frequently is a common or core course for all business students and is a good place to expose majors and non-majors to the issues involved in global IS / IT management.

Possible assignments in IS2002.1 that incorporate outsourcing / offshoring:

Short analytical papers about outsourcing / offshoring; Pro and Con presentations; panel discussions (by students, graduate students or community experts); and possible presentations by working IS professionals that are involved in outsourcing. [Author's note: A member of our campus IS advisory board is an IS manager at a Fortune 500 company that utilizes Indian offshoring and has presented some of the issues to our courses.]

### **IS 2002.2 – Electronic Business Strategy, Architecture and Design**

- Transborder EDI and Data Flows

The E-Business course can also reinforce the concepts from IS2002.1. The concept of supply chain management is covered in IS2002.2 – and the global aspect of supply chain management could be covered.

Possible assignments in IS2002.2 for outsourcing:

Short analytical papers about outsourcing / offshoring; discussion of multinational business systems; analysis of multinational business web sites and systems; currency

and transborder electronic data interchange analysis. [Author note: One of the authors visited Dell Computers in Ireland, who is responsible for Dell Computers in Europe, the Middle East and Africa. This author intends to require students to study Dell Computer websites for the US and for other countries to see differences. The Dell of Ireland manufacturing facility ships computers with several languages (German, French, Flemish, Spanish, etc.), different keyboards (including Cyrillic for Russian language support) and other adaptations.]

### **IS2002.3 Information Systems Theory and Practice**

Topics from Davis, Ein-Dor, King and Torkzadeh:

- Business Processes
- Customer Relationship Marketing
- Electronic Commerce
- Design Methodologies
- ERP Systems
- IS Security
- Management of Computer Personnel
- Workflow and Collaborative Work

Possible assignments in IS2002.3 related to outsourcing:

Literature review (and short analytical papers on) of global security issues (such as what would happen if an Indian company lost thousands or millions of credit card numbers and social security numbers); design of a multilingual site (supporting such languages as English, Spanish, French and multiple currencies, such as American and Canadian dollar and the Mexican Peso). [Author note: On his travel to Ireland, one of the authors visited Kerry Group – a multinational food processing company. Kerry group owns subsidiaries around the globe and processes ingredients on five continents. At one point, Kerry Group had over 20 different ERP systems and would make for an interesting case study for the IS2002.3 course.]

### **IS 2002.4 – Information Technology Hardware and System Software**

No specific outsourcing / offshoring concepts covered.

### **IS 2002.5 – Programming, Data, File and Object Structures**

No specific outsourcing / offshoring concepts covered.

Although IS2002.4 and IS2002.5 may not explicitly have outsourcing / offshoring concepts, there may be assignments and applications that relate to outsourcing and offshoring. For example, students in the IS2002.10 Project Management course may develop the specifications and manage a project where the development / programming is handled by students in the IS2002.5 course. See additional discussion under the IS2002.10 Project Management course.

### **IS 2002.6 – Networks and Telecommunication**

- Management of Telecommunications

Possible assignments in IS2002.6 for outsourcing:

Students may write on the infrastructure and maintenance issues involved in support a global telecommunications system. If interaction between different institutions has been initiated, students can compare and contrast networking and telecommunications between the two campuses and the countries.

### **IS 2002.7 – Analysis and Logical Design**

Topics from Davis, Ein-Dor, King and Turkzadeh:

- Business Processes
- Design methodologies
- Workflow and Collaborative Work

In this course, when studying the design module, instructors cover the three options for development: in-house development, package selection, outsource. With more done on outsourcing, this is an ideal place to incorporate an outsourced assignment – with analysis of costs and benefits to off-shore some functionality (such as help desk support). This could also be tied to a major project that is overseen and man-

aged by students in the IS2002.10 Project Management course, with specifications developed by students in this course (IS2002.7) and with applications developed by students in the IS2002.5 programming course.

### **IS 2002.8 – Physical Design and Implementation with DBMS**

Topics from Davis, Ein-Dor, King and Turkzadeh:

- Data Warehousing
- Database Administration
- Database Systems Planning
- Systems Integration

Here students could develop an application with a database (ranging from an Access database upward) – and have another class / campus develop the application (such as with the IS2002.5 course)

### **IS 2002.9 – Physical Design and Implementation in Emerging Environments**

- Emerging Technologies and Technology Forecasting

In this class, the emphasis is on new and emerging environments, such as ERP systems. As an assignment, students could develop the schema for an ERP system and outsource the functional design / development to another class / campus (see the discussion in the IS2002.10 course)

### **IS 2002.10 – Project Management and Practice**

Topics from Davis, Ein-Dor, King and Turkzadeh:

- Change Design
- Project Management
- Systems Integration
- Workflow and Collaborative Work
- (and as the capstone course, this implicitly can incorporate many of the other topics)

This course is an ideal place to incorporate a major outsourcing project into an IS education program. The concept of the project

management course is to take a project, develop specifications, do the analysis and design and implement the project. Generally the IS2002.10 Project Management course is done as a major team project. The authors suggest four ways to incorporate outsourcing into the IS2002.10 course:

- assign a research project to outsource processing functions to the teams
- assign an project on your campus – such as have the students in IS2002.10 class work with students in the IS2002.4 Files / Development course (i.e. “programming”)
- develop an assignment project team with students in IS2002.10 courses on two different campus (within the same country – in this context, generally the United States)
- develop a project with the management team is your IS2002.10 students and the programming team comes from a university in a different country

The authors suggest that IS2002.10 could cover outsourcing / offshoring from a practical perspective by working with students from another class or from another campus. The authors of this paper have collaborated with a colleague from Australia and could develop such an extended collaboration.

### 10. CONCLUSION

The authors have suggested four options to incorporate outsourcing / offshoring content in the undergraduate IS2002 model curriculum. There could be a new course; coverage outside the IS department (such as an international business course); combining IS2002 courses that contain content that is frequently outsourced so more emphasis can be put into courses where the skills needed for outsourcing are built; and finally explicit lists of topics and activities that could be added to the ten existing courses in the IS2002 model curriculum. Our opinion is that with some planning, outsourcing topics could be incorporated into IS2002 successfully, but do encourage others to continue this dialog.

The authors used a parallel article written for a graduate level audience (King, et al) for concepts for the undergraduate IS2002 model curriculum.

Certainly, there will always be a set of small to medium sized companies that cannot or will not engage in offshoring, and those companies will require graduates with the current skill set. But even in companies that do not use offshoring, the softer skills of contract law, contract management and negotiation will grow with the increasing complexity of information systems. Even small and medium sized enterprises will be contracting for services and purchasing software package solutions (and may do so without actual in-house development). Loh and Venkatraman (1995) may have said it best – that is it not ‘insourcing’ or ‘outsourcing’, but ‘right-sourcing’ – and in whatever means of IS instruction, the topics suggested are worth investigation and possible incorporation into quality IS academic preparation.

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<sup>i</sup> DPMA stood for Data Processing Management Association. It since has changed its name to AITP, the Association of Information Technology Professionals.

<sup>ii</sup> AIS is the Association for Information Systems; AITP is the Association of Information Technology Professionals, ACM is the Association of Computing Machinery

<sup>iii</sup> The authors conducted a thorough study of each of the learning outcomes for IS2002 (IS2002 is available at: <http://is2002.org>) in terms of what is fungible and what is not. If you are interested in this study, please contact either of the authors by e-mail.