Preparing MIS Students for a Global Economy

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ABSTRACT

Most Management Information Systems (MIS) careers in the future are likely to involve systems that operate internationally. Systems will be globally integrated, and many of today's students will have opportunities to participate in projects in other countries. Even those who remain in one country throughout their careers, however, will need to be aware of the differences in language and culture between areas of the world. The MIS curriculum is already overcrowded, so it is difficult for developers to include sufficient international content. This paper describes some techniques for embedding international content within existing courses in contrast to treating international information systems as a separate topic.

Keywords: MIS Curriculum, internationalization, global awareness, global competence

1. INTRODUCTION

The ways in which industrial firms are organized and managed have changed so rapidly in recent years that it has been nearly impossible for curriculum developers to keep pace, particularly in MIS. New technologies have revolutionized the business environment and have enabled the global marketplace to become a reality. For some older business disciplines, such as accounting or economics, the body of knowledge increases relatively slowly and the curriculum can be kept current more easily. With MIS, changes occur at an extremely fast, and seemingly accelerating, pace. The body of knowledge required for career success expands rapidly because new material is being added while the old information largely remains valid, or becomes obsolete at a gradual rate.

Graduating MIS students, much in demand by employers in recent years, move into a vastly different workplace than those of fifteen or twenty years ago. They are still expected to have a solid foundation in the basic skills of systems analysis and design, database management, and the fundamentals of programming, but also to be familiar with new technologies. Employers want them to have good communication skills, to be able to work in teams effectively, and to be adaptable to the changes in the work environment (Denning, 2001). All of this makes for a very crowded curriculum. While most MIS educators would agree that international content is desirable, finding ways to fit it in is quite challenging.

The American Assembly of Collegiate Schools of Business (AACSB) has long emphasized internationalization as a prime accreditation factor (Nehrt, 1987), and their current standards explicitly state that the curriculum should include coverage of global issues. In recent years, the need has become much more apparent. Students from other countries are attending U. S. universities in unprecedented numbers, especially in Information Systems and Computer Science programs; many of these will return to their home countries to work (Hazelhurst, 2001). Many native-born U.S. students will work for foreign firms, or will work on projects in foreign countries as expatriates. The labor market for IT employees has become globalized, with workers shifting readily to the countries with higher salaries (West and Bogumil, 2001). Most companies engaging in electronic commerce have customers from various countries. Many Web sites can be accessed in various languages, and inept translations may have a significant negative impact on sales. The technologies are the same the world over, but the conditions in which they are used may be very different. For designing and implementing appropriate systems, it is vitally important for MIS students to understand both the similarities and differences between countries, cultures, languages, and organizational characteristics (Webb, et al, 1999).

In the 1950's, business organizations were primarily

national, operating within the borders of a single country. During the last half century many corporations evolved to become multi-national (operating in selected foreign countries). In recent years, especially with the growth of the World Wide Web, truly global enterprises have emerged. The reasons for the swift spread of internationalization are many, including the break-up of the Soviet Union, the unification of Europe, and the invasion of national markets by foreign companies which required retaliation by the home countries. The major enabling factor, however, has been information technology (IT), particularly computerized telecommunications, which has made it possible for firms to control operations at widely dispersed sites and to respond rapidly to threats and opportunities. IT breaks down the barriers of time and location and makes applications equally accessible to everyone (Conger, 1993).

Another major factor is the rapid diffusion and standardization of technology. Such developments as computer-aided design, electronic data interchange, object-oriented technologies, and relational database systems have been adopted around the world much faster than earlier technologies (Mann, 2000). Fiber optics, satellites, wireless, and other communications technologies have enabled even Third World countries to build effective networks (Gilder, 2000). The long-term increases in computer power and software sophistication made it possible for firms to greatly reduce their product life cycles and customer order cycles, to reduce inventory costs, and to build more reliable systems. Dramatic reductions in the costs of transmission and of computing power have made these developments economically feasible for even the smallest of firms, and to nearly every world country (Gilder, 1997).

International training is increasingly popular with business employers. Business schools attempt to adapt to this demand in various ways, including the establishment of foreign campuses and research centers, forming alliances with foreign business schools, initiating exchange programs, and setting up overseas internships (Celestino, 1999). Some of the alliances include offering credit for the other school's courses and even joint degrees.

2. THE CURRICULUM CHALLENGE

The importance of internationalizing the curriculum is widely recognized among business school faculty and administrators, but there is a major problem for curriculum designers and for professors who wish to include international material in their courses: Where do you put it? How do you squeeze it into a curriculum that is already bursting at the seams? How do you justify adding this international material rather than other important topics? How do you decide what to cut to make room for it?

A curriculum is, or should be, an architecture. It is more than just the sum of the courses it contains. The outer structure, the four years allotted to an undergraduate degree or the one or two years required for a graduate degree, is quite rigid, as are the internal divisions (semesters and courses). Once created, this structure is filled with business core and major discipline courses; additional content requirements are difficult to accommodate without modifying or eliminating existing courses. Like rearranging furniture within a limited space, curriculum changes occur every year as courses are added, dropped, or altered, but the changes at any one point in time are seldom extensive, and affect a very small proportion of the total curriculum. Yet this slow rate of evolution does not accurately reflect the rapid and accelerating pace of change in the business world.
The conflict between a rigid curriculum structure and the need for dynamic adaptability and swift implementation of changes is a particularly severe problem both for MIS and for international topics; they are relatively young disciplines in a stage of rapid knowledge acquisition. The great majority of changes are for new content and new skills; rarely do topics become obsolete. Just as it is sometimes easier to knock down a building and erect a new one in its place rather than making extensive modifications to the old one, it may be simpler to completely redesign a course or a curriculum than to make major modifications.

The problem of trying to pack too much into a rigid structure will not be easily resolved. It will require painful decisions to eliminate seemingly vital material. The long-term solution may involve full faculty acceptance of the concept of "lifelong learning", and ridding ourselves of the notion that "education" is a process that ceases upon graduation. Undoubtedly almost all faculty would agree that we cannot possibly cram everything into students' minds that they will need for the rest of their lives, yet in designing courses and curricula it often seems that this is what we are trying to do.

In the short run, one promising technique is what might be called "double duty" course design. The idea is to try to find techniques for satisfying multiple learning objectives in the same time period. We should not treat international as if it were a separate discipline, but teach it in the context of other topics. This double duty

concept is useful for teaching ethics, and it is particularly appropriate for the teaching of international issues. It may be used in lectures, homework assignments, term projects, and experiential exercises such as case discussions or role plays. Specific techniques will be discussed below.

3. INTERNATIONALIZATION APPROACHES

International business programs may be characterized by the broad objectives of "global competence" and "global awareness" (Pickert, 1992). Global competence programs are designed for students who are planning for international careers. The much more limited objective of global awareness is to provide every student with the recognition that there are important international issues they should be conscious of.

3.1 Global Competence Programs

Few schools have the resources to develop a full program at the "global competence" level, intended to prepare students for actual positions involving international business. This may require intensive language training, courses in global economics and international finance, and internships in other countries, often difficult to set up effectively (Pickert, 1992). There may be a shortage of faculty qualified for international business topics, or who have sufficient interest in doing so to acquire the requisite knowledge and experience (Conger, 1993). Discipline knowledge must be both broad, encompassing practices of countries around the globe, as well as deep.

International programs are often expensive to administer, and may require that resources be diverted from other important areas. For MIS students, such programs do not allow sufficient time for acquiring information systems skills. The top-ranked International Business program (according to U.S. News - www.usnews.com) is Thunderbird Graduate School in Glendale, Arizona; the school has been completely devoted to its international programs since its establishment after World War II, and until this year (2001-02) has not even offered an MBA. All of the other schools ranked in the top ten are large state universities (e.g., University of South Carolina, UCLA, University of Michigan) or rich private schools (e.g., Wharton, Columbia, Harvard, Duke).

3.2 Global Awareness

Most business schools, therefore, adopt the much more limited objective of "global awareness", more suited to the needs of the majority of students. The goal is to "produce graduates who not only are aware of the interconnections among regions of the world, but are willing to consider national perspectives other than their own." (Pickert, 1992, p. 1). "Awareness" implies the influencing of attitudes and perspective rather than a specific body of knowledge. This goal may be addressed by any of the following: (1) a series of courses comprising an international business major or concentration, (2) a core survey course in international business, (3) international courses within business disciplines, such as International Marketing or International Information Systems, or (4) infusion (integration of international topics into existing courses).

Major or concentration: These programs are inter-disciplinary, often including an information systems course but usually focused on economics and finance. This may provide a good foundation for a student who wishes to pursue an international career, especially if the school offers foreign language training. However, it is necessarily too general to prepare one for a specialized career such as information systems. That knowledge would have to be gained from an undergraduate major or through experience.

Core course: The core course in international business would be taken by every student, but the content applicable to a particular discipline is severely limited. This is probably the least satisfactory of these approaches.

International courses in specific disciplines: These provide much more domain knowledge but less exposure to information about other disciplines. Often the discipline-specific courses collectively form the curriculum for an international business major while serving as an elective for the majors in that field. Some schools have provided a "study tour" of other countries (usually within Europe) to provide direct international exposure (Porth, 1997).

Infusion: With this approach, the objective is to include global awareness material in every course. It does not preclude the other methods; it can complement them nicely. Infusion is desirable because it exposes *all* students to international issues and concepts within the context of other material. It also requires fewer faculty resources than the other methods. If correctly implemented, integration of international topics into existing courses can encourage students to think of them as relevant to their careers rather than as an isolated discipline. It is particularly important for the information systems curriculum to provide some degree of international awareness in every course so that other necessary content is not displaced.

4. INTERNATIONAL MIS ISSUES

Some students question the value of spending time on international topics. They may feel that they will be working in the United States throughout their working careers. They tend to focus on getting that first job, and may not look far enough ahead to the international opportunities that may become available to them. They also may not realize the number of organizations today that are operating internationally. Even though their job may be in the U.S., the customers, the workforce, the management, and the organization's owners may represent many different countries (Deans and Karwan, 1997).

Many students, especially those who have always lived in the United States, and even some professors tend to think of the way things are done in this country as the only right way to do them. This is particularly true when speaking of information systems. It is not readily recognized that we might have much to learn from other countries and other cultures, even a tiny non-European nation such as Singapore. In our Information Resource Management class we have often used the Singapore Trade-Net case as an outstanding example of project management in which everything was done right, from far-sighted planning, intense organizational learning, active participation of users in a very diverse group of organizations, intelligent change management procedures, and a very successful implementation, on time, under budget, delivering many millions in savings and much more efficient trading facilities. The point is not that the U.S. is not a great country; certainly it is, but that there are opportunities for learning all over the globe.

Many of those who pursue careers as systems analysts, system developers, database specialists, programmers, network designers, or almost any other MIS specialty will probably be engaged, at some point, with projects that involve countries other than their own. Perhaps they will live in another country, perhaps not, but in any event they wll need to be aware of such factors as the following:

- *Time zone differences*. If the system is to be operated globally, in many cases it will have to be up and running 24 hours a day, 7 days a week. There will be no time available for shutting it down for hardware maintenance, for installing new software, or for reorganization of the database. Telephone communication becomes more difficult because working hours in Asia or Australia correspond with sleeping hours in the United States. Facilities and training need to be provided so that employees can communicate easily (e.g., via Lotus Notes or e-mail).
- *Language differences*. English may eventually become a universal language, but the great majority of people in the world do not know English (Wallraff, 2000). Even people who can communicate in English may not know it well enough to converse in technical terminology. In performing a project involving multiple languages, it should not be assumed that everyone has the same degree of understanding of the common language (Carney and Franciulli, 1999). A Web site in multiple languages is particularly vulnerable to misinterpretation by customers, and it is prudent to employ native speakers of each language to carefully evaluate the translations.
- *Cultural differences* may manifest themselves in the way projects are typically managed, work practices, and education of the work force. If U.S. employees are sent to a distant country to implement a project, they should be very carefully chosen (Vance and Paderon, 1993). Employees (and their families if possible) should be given an exploratory trip to the country to make certain that they understand the living conditions there and the cultural differences that may need to be adapted to. Locally hired personnel may be resentful of expatriates, often brought in at high positions and with much higher salaries and benefits than those available to the locals.
- *Project management*. If a project is being performed in a particular country with personnel primarily from other countries, the project manager must have excellent human relations skills as well as administrative and technical expertise. Off-site projects are difficult because the normal home office support is not locally available.
- *Training differences.* The work force may have been taught different work practices than those prevalent in the headquarters country. There may be more, or less, influence from unions, perhaps constraining the training that is given and the qualifications of workers permitted to be assigned to the project.
- *Database requirements.* Additional elements may be required. Certainly exchange rates will be a factor in prices, transmission of funds, budgeting, and accounting. The database designers may have to provide for frequent updating of exchange rates. Special keyboard characters may be required (e.g., umlaut or tilde). Instruction manuals may have to be written in the local language, and training sessions conducted in that language. There may be restrictions on cross-border data flows or currency transmissions out of the country.
- *System factors.* The telecommunications infrastructure in the country may be inadequate or poorly main-

tained (Garfield and Watson, 1997). Government regulation may restrict what the system can do (Bingi, Mir, and Khamalah, 2000). Previous systems may have been paper-based, so there may be a need for massive data entry with painstaking validation that would not be necessary in converting from an already mechanized system. Such factors as European unification and cross-border mergers can create very complex problems for developers (Edberg, Grupe, and Kuechler, 2001).

- *Technology transfer*. Until recently, this was a major problem for Third World countries (Conger, 1993). With the phenomenal growth of the World Wide Web, the availability of high bandwidth (Gilder, 2000), and plummeting hardware costs due to the continuance of Moore's Law (Mann, 2000), this problem is being rapidly alleviated. Students should understand the importance of these factors for global economic health.
- *Locality differences*. Symbols may be different, particularly in Asia. In China, the last name is usually given first. Kanji characters are sorted by the number of "strokes" in the character rather than by the alphabet. The number 1,000,000 is represented in China as 100,0000. There are different date formats, units of measure, and character sets. Some countries recognize daylight saving time; many do not.

5. CLASSROOM TECHNIQUES

The learning objective is to provide awareness, not a specific body of content. There are hundreds of countries in the world, and hundreds of different cultures. Each is unique, and it would be impossible to teach about any significant number of them. The idea is more of a broadening of the student's perspective, an openness to the differences as well as the similarities. The methods have to match the teaching objectives and the type of course, but all of them involve experiential learning rather than lecturing.

For management-oriented courses such as Information Resource Management, cases are ideal. There are many excellent international cases from a variety of sources, involving project management, enterprise resource planning (ERP), and many other topics appropriate for IRM. One of my favorites is Singapore Trade-Net, mentioned above. Harvard Publishing is a major source, but there are also excellent cases at Ivey Publishing, Prentice-Hall, or in textbooks such as Pearlson (2001). These cases are multi-faceted, and cover a variety of issues. They are realistic because they represent situations that actually happened and people who actually exist. An important advantage is that they provide a strong link to the world of practice which students may not receive from a textbook or from lectures (Armstrong, 1997). Cases would also be appropriate for such courses as Management of Information Systems, IS Planning, or Strategic IS. The instructor should strongly encourage students to try to visualize themselves in the situation portrayed in the case, and to analyze it from different perspectives as if it were actually happening to them.

With the availability of the Web, it has become feasible to set up multi-country projects with global teams. Several years ago this author and two Finnish instructors conducted an e-mail discussion about a Harvard case with U.S. and Finnish students. More recently several such exercises have been conducted on the Web with participation by multiple schools from several different countries. Kopczak and Fransoo (2000) have described the Global Project Coordination Course in which "three students from each of two universities on different parts of the globe form a joint project team to work on a company-sponsored project that addresses a global business issue." (p. 91). This project involved supply chain management but it should be adaptable for virtually any course that includes a team project. Recently a Web site has been set up on by Robert Davison of the City University of Hong Kong to facilitate the forming of such virtual teams; the URL for this is as follows:
http://www.is.cityu.edu.hk/research/resources/vt/vt.htm

For the more technically-oriented courses such as database management, systems analysis and design, or networks, there is usually little time for Harvard-type cases unless the topic is taught over two semesters. Such courses often include a hands-on project performed by student teams. It is quite feasible to design a short case involving a foreign country as a framework for the project, which allows the students to get a realistic idea of the problems of implementing the project in that country.

In database classes, my student teams implement a 10 to 12 table database in Oracle, with an accompanying case involving either a small airline; another for a chain of hotels. They are to imagine implementation of the database in a foreign city, such as Kathmandu, Tallinn, Nairobi, San Salvador, Lhasa, or Asuncion. The airline company (or the hotel chain) is sending them there to implement the database and test it. In addition to this technical assignment, they must also produce a "final report" containing, among other things, an International section, which includes a few paragraphs of background about the country and what the factors are that might cause problems for the business. If they did a real

project there, would the telecommunications infrastructure be adequate? Would they be able to staff the project from the local work force? Would they be able to communicate in English? Would qualified staff be available for employment? What additional data would be needed in an actual database in that country? Similar projects would be suitable for a Systems Analysis & Design course or a Networks course.

Global awareness can also be facilitated in class exercises or homework assignments. A technique appropriate for a Web design class: have each student team select an actual commercial Web site that operates in multiple countries, such as E-Bay or Amazon. Ask them to analyze how the customer interface might be changed for different countries or cultures. In teaching database design, instruct them to "reverse engineer" the database from an international perspective. Reverse engineering could also be appropriate for analyzing a world-wide network. There are simulations that can be used for teaching information systems development (Martin, 2000) with a global perspective. Instructors can enliven lectures and assignments by broadening the presentation to involve different areas of the world. Students in the class who are natives of other countries can provide unique insights which should be fascinating for the class.

6. CONCLUSIONS

This paper has addressed the problem of providing a level of awareness of international issues for MIS students in an already crowded curriculum. The phenomenal increase in use of the World Wide Web for international commerce has provided a virtual shopping environment for the entire globe. The systems to support this environment are becoming much more complex, to provide for different languages, currency exchange rates, time zone differences, and many other factors.

Students planning for international careers may require more complete programs with courses that are fully international: economics, finance, intensive language training, etc. Such programs are very expensive to provide unless the university specializes in international programs. Students in other majors, such as MIS, need to be cognizant of international issues while acquiring other skills. In information systems curricula, there is little room for even a single required course devoted exclusively to international information systems issues. If it is an elective, not every student would take it, and every MIS student needs to be aware of these issues and how to deal with them.

Embedding international content into the existing required courses is an effective approach that exposes every student to this material. By presenting it within the context of the course material rather than as an isolated, separate topic, students can comprehend it more readily and understand its importance to their careers. It is efficient because the international issues are taught in parallel with the technical content of the course. Students can relate to them and understand them because they are seeing actual examples applied to real life situations. When they encounter similar situations later in their careers, this awareness may contribute to better decisions. Most of them will probably never move to another country to perform a project, but surely the great majority will work on systems that involve more than one country. The customers will be international, the products will be manufactured in various countries, the system design will have to consider time zones and currency exchange rates. It is critically important for MIS faculty to make students aware of the special problems that might be encountered in a global environment.

Are these techniques effective in meeting the learning objective of global awareness? It is difficult to measure their value, and perhaps impossible to measure them with any degree of precision. There is much anecdotal evidence, however, that suggests they can provide a significant level of awareness. Most students enjoy case studies and other realistic exercises, so they tend to participate actively in class discussions and to show understanding of the issues. In my experience, such exercises generate a high degree of interest and an arousal of curiosity about the countries and cultures being studied. Other authors (e.g., Kopczak and Fransoo, 2000) who describe international projects report a similar satisfaction with their success.

7. REFERENCES

Armstrong, Elizabeth G. [1997], "A Hybrid Model of Problem-based Learning", David Boud and Grahame Feletti (eds.), The Challenge of Problem-based Learning, 2nd ed., pp. 137-150.

Bingi, Prasad, Ali Mir, and Joseph Khamalah [2000], "The Challenges Facing Global E-Commerce", Information Systems Management, (17:4), pp. 26-34.

Carney, Carmen V., and Matilde Franciulli [1999], "Stereotypes of Latin Americans among Graduate Students of International Management: Determining Culturual Needs of the U.S.-trained Business Professional", Journal of Language for International Business, (10:2), pp. 29-45.

Celestino, Martha L. [1999], "Graduate Education Programs with International Vision: How Graduate Business Schools are Transcending Borders", World Trade (12:7), pp. 86-91.

Conger, Sue [1993], "Issues in Teaching Globalization in Information Systems", in Mehdi Khosrowpour and Karen D. Loch (eds.), Global Information Technology Education: Issues and Trends, Idea Group Publishing, Harrisburg, PA, pp. 313-353.

Deans, P. Candace and Kirk R. Karwan [1997], Global Information Systems and Technology: Focus on the Organization and Its Functional Areas. Idea Group Publishing, Harrisburg, PA.

Denning, Peter J. [2001], "The IT Schools Movement", Communications of the ACM (44:8), August, pp. 19-22.

Edberg, Dana, Fritz H. Grupe, and William Kuechler [2001], "Practical Issues in Global IT Management", Information Systems Management, (18:1), pp. 34-46.

Garfield, M. J. and R. T. Watson [1997], "Differences in National Information Infrastructures: The Reflection of National Cultures", Journal of Strategic Information Systems (6:4), pp. 313-337.

Gilder, George [2000], "The End Is Drawing Nigh", Forbes (165:8), April 3, pp. 171-172.

Gilder, George, [1997], "Fiber Keeps Its Promise", Forbes ASAP, April 7, pp. 91-94.

Hazelhurst, Scott [2001], "Developing IT Skills Internationally: Who's Developing Whom?", Communications of the ACM (44:7), July, pp. 27-28.

Kopczak, Laura R. and Jan C. Fransoo [2000], "Teaching Supply Chain Management Through Global Projects with Global Project Teams", Production and Operations Management (9:1), pp. 91-104.

Mann, Charles C. [2000], "The End of Moore's Law?", Technology Review (103:3), pp. 42-48.

Martin, Andrew [2000], "The Design and Evolution of a Simulation/Game for Teaching Information Systems Development", Simulation & Gaming (31:4), pp. 445-463.

Nehrt, Lee C. [1987],"The Internationalization of the Curriculum", Journal of International Business Studies, (18:3), pp. 83-90.

Pearlson, Keri [2001], Managing and Using Information Systems: A Strategic Approach, John Wiley & Sons, New York.

Pickert, Sara M. [1992], Preparing for a Global Community: Achieving an International Perspective in Higher Education. The George Washington University, Washington, D.C.

Porth, Steven J. [1997], "Management Education Goes International: A Model for Designing and Teaching a Study Tour Course", Journal of Management Education (21:2), pp. 190-199.

Vance, Charles M., and Eduardo S. Paderon [1993], "An Ethical Argument for Host Country Workforce Training and Development in the Expatriate Management Assignment", Journal of Business Ethics, (12:1), pp. 635-641.

Wallraff, Barbara [2000], "What Global Language?", The Atlantic Monthly, (286:5), pp. 52-66.

Webb, Marion S., Kenneth R. Mayer, Virginia Pioche, and Lida C. Allen [1999], "Internationalization of American Business Education, Management International Review (39:4), pp. 379-397.

West, Lawrence A. and Walter A. Bogumil [2001], "Immigration and the Global IT Work Force", Communications of the ACM (44:7), July, pp. 34-38.

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ISSN 1055-3096