At the beginning of the 21st century, the civilizations of the World entered into the next modern wave of globalization, driven by world evolving transportation systems and information technology (IT), which triggered a concept of the “death of distance” (Cairncross, 1997). The latter also “flattens” the world (Friedman, 2005), in which businesses are looking for the producers and servers providing the lowest cost possible from undeveloped or developing countries. The United States, the most advanced country in manufacturing and IT as well as some Western European countries have adopted a strategy to outsource some operational/designing jobs to countries with low wages. In effect, these outsourcing countries have lost complex systems and a need for large numbers of engineers and IT professionals. This trend has also impacted colleges which are facing declining number of students in the said areas.

Because of this downward trend, some American universities are trying to adapt their information systems programs to the needs of the current industrial shift. It is indeed a healthy reaction to this industrial shift since those programs that could not adapt to a new challenge may face extinction. This book describes the best practices of some universities reengineering their educational programs around the concept of business process integration (BPI) within a framework of enterprise-wide information systems, with the support of enterprise resource planning (ERP) software’s academic version from such leading vendors as SAP, Microsoft, and Oracle. The concept of the book is shown in Figure P-1.

The concept elucidates that the industrial trends and needs shape the academic curricula. It is because IS/CIS/MIS/IT programs are professional studies that must respond to the industrial challenges.

Table P-1 illustrates the companies’ effort to optimize IT development and operations. Almost all types of the listed improvements lead to the establishment of robust enterprise-
wide processes and systems. Good news is that 18% of outsourcing companies are bringing back in-house IT services. Some companies have brought back their services even more extensively (e.g., hotels — 38%, natural resources — 30%, communications — 29%) (InformationWeek, 2005).

The passage of the Sarbanes-Oxley Act 2002 mandates increases in information processing requirements for public companies, which has in turn led to greatly increased needs for more reliable enterprise-wide IS and also increased job opportunities for computer business applications graduates. Furthermore, the 500 most IT innovative companies still invest large amount of funds in IT, on average 3% of annual revenues. However, in 2005 they invested less ($293 million) than in 2001 ($484 million), which means that the enterprise information infrastructure has been built and now its optimization is taking place (InformationWeek, 2005, p. 38). As for today’s situation, Carr (2003) may need to re-evaluate the standpoint of “IT Doesn’t Matter.” IT does matter, but is not a novelty anymore. It is maturing and becoming a strong electronic-information infrastructure for the 21st century company, competing in the global economy.

The book is the first title in enterprise systems education. It intends to provide higher education with a direct resource, guidelines, and examples for developing an ES curriculum, teaching specific business process of ES, teaching specific IT topics in ES, and learning industrial support of ES education. The book consists of 20 chapters which are further organized into four sections.

Section I contains five chapters sharing experiences at the level of curricular development, which explores the strategic issues in the support and implementation of ERP education. A positive shift from the traditional CIS/MIS to the contemporary BIT (business information technology) majors and minors is suggested. The BIT approach reflects the Octopus Strategy, where besides a vertically oriented professional major/minor IS/CIS/MIS/BIT, IT technology penetrates almost every kind of business function and other functions as well. For example, this approach and strategy lead to the development of such courses as Accounting IT, Marketing IT, Health IT, Art IT, Music IT, Communication IT, and so forth. An important step in teaching IT at business schools is to incorporate ERP software in teaching,
Table P-1. Optimization efforts in 2005 — what steps has your company taken to optimize the efficiency of its business processes in the past 12 months (Source: InformationWeek research survey)

<table>
<thead>
<tr>
<th>Optimization steps</th>
<th>% of Responders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase use of automation</td>
<td>85</td>
</tr>
<tr>
<td>Improved data integration between systems or departments</td>
<td>82</td>
</tr>
<tr>
<td>Reengineered existing applications</td>
<td>79</td>
</tr>
<tr>
<td>Established enterprise technology standards</td>
<td>76</td>
</tr>
<tr>
<td>Business-process optimization</td>
<td>73</td>
</tr>
<tr>
<td>Established business-process frameworks and defined processes</td>
<td>62</td>
</tr>
<tr>
<td>Centralized control of IT operations</td>
<td>62</td>
</tr>
<tr>
<td>Brought in strategic consultants</td>
<td>60</td>
</tr>
<tr>
<td>Outsourced IT operations domestically</td>
<td>33</td>
</tr>
<tr>
<td>Outsourced IT operations offshore</td>
<td>29</td>
</tr>
<tr>
<td>Brought outsourced functions back in-house</td>
<td>18</td>
</tr>
</tbody>
</table>

Note: Multiple responses allowed

which exemplifies the first attempt to allow students directly to learn the integration of all business-oriented information in an enterprise via a hands-on experience.

Chapter I analyzes the critical success factors for implementing ERP systems as a vehicle for business curriculum integration at a large state university. This chapter documents the history of a College of Business Administration that implemented ERP systems in their coursework with the original goal of integrating the curriculum across disciplines. An analysis of the reason why the college was unable to achieve its goal is provided. This analysis results in lessons learned that can be useful in building technological relationships with third party organizations.

In Chapter II, the ERP education program at the Department of Information Business of the Vienna University of Economics and BA is described. Especially emphasized is the embedding into the study programs both at the department and university levels. Due to a major change in the degree programs offered by the university, including the introduction of a completely new Information Systems bachelor and master program, changes to the ERP education program became necessary. The author reports several quantitative data on the lectures both before and after the changes, including satisfaction measures. Some lessons are condensed for other institutions that are planning to introduce ERP into their curricula.

Chapter III indicates that many of the entry-level positions that graduates traditionally entered have diminished due to the economic downturn and to companies outsourcing positions to offshore companies. This chapter presents the path that one Australian University school took in introducing multiple programs in an endeavour to compliment traditional course delivery and to better connect a University School with ICT industry requirements. The programs included the use of SAP hosting centers for access to ERP systems, conducting a visiting expert teaching delivery model for SAP content and multiple SAP certification programs. The results of these programs show that flexibility in delivery
mode and effective merging of curriculum and certification content is crucial to achieving successful programs.

Chapter IV introduces a concept of the re-engineered CIS (computer information systems) curriculum accomplished at the beginning of the 21st century through a few initiatives taken by the Department of Business Information Systems at Western Michigan University’s Haworth Business College, over the time period of 2000-2005. These initiatives led to the shift from teaching the knowledge and skills of universal/generic computer information systems to more integrated knowledge and skills about how to develop complex systems such as ERP (enterprise resource planning) and e-enterprise. This curriculum shift is a response to the shift of industrial information infrastructure from information islands to the gradually integrated online (Web-driven) infrastructure of systems and services. The revised CIS program at Western Michigan University is supported by the use of ERP-like SAP R/3 and MS Great Plains software.

Chapter V presents a revised graduate CIS concentration in the MBA program at Western Michigan University’s Haworth College of Business. The new MBA-CIS concentration has been designed with a strong focus on ERP systems management, and it is proposed in response to industrial needs and to meet MBA students’ interests. The existing MBA-CIS concentration was developed in mid-1990s on the premise that future IT professionals must have mastery in technical IT skills in managing computing information resources. The recent trend in IT outsourcing triggers a new question — “What kind of IT training and education should be delivered to Americans to keep them employable in the United States?” A new premise resulted from the present environment changes that require our graduate students to have balanced knowledge in both IT skills and business processes (i.e., knowing how to apply IT to the development of business applications that support integrated business processes and enterprise operations).

Section II has six chapters which share practice in teaching the application of IT in particular business processes (e.g., supply chain management [SCM], human resources [HR], sales and distribution [SD], operations management [OM], and enterprise capstone courses of the IS/CIS/MIS/BIT majors/minors).

Chapter VI describes an enterprise resource planning (ERP) system as a system that integrates all the different functionalities within an enterprise which is used to manage the basic commercial functions in a business. This chapter describes the use of business processes and ERP systems as a mechanism to provide the integration in the capstone course. The various modules taught in the class are described and issues with the modules are raised and discussed.

Chapter VII introduces a concept of the capstone course of the CIS/BIT program at the Western Michigan University. The course is composed of lectures and five projects, which are related to each other. The lectures provide knowledge that supports every project (skills). The end-product of this course is prototyped software of an enterprise performance management system, which is demonstrated by each team as an integrated software package. The course is divided in three following parts: Part I: Enterprise system definition (classic knowledge and skills), Part II: Business process integration (trend-oriented approach), Part III: Enterprise system development (ERP prototype-demo software).

Chapter VIII emphasizes that information technology has become a critical component for human resource (HR) professionals. Human resource information systems (HRIS) have helped many HR departments automate routine processes, eliminate unnecessary work, and play a strategic role in driving employee performance. Many IT firms are now forming alliances with universities to popularize their products. This chapter first investigates the
utility and the choice of various HRIS options available to an organization. Next, it evaluates the utility of universities forming alliances with enterprise resource planning (ERP) firms to enrich their business curricula. Finally, the experiences of a college of business at a large university in Midwestern United States with the implementation of IT in the human resource management (HRM) curriculum are examined.

Chapter IX describes how enterprise systems technology is used to enhance the teaching of operations management through development and operation of a virtual manufacturing enterprise. An ongoing, real-time simulation is conducted in which operations management issues in the fictitious factory must be addressed on a daily basis. The virtual manufacturing enterprise is integrated into an operations management course to facilitate understanding of the dynamic and interrelated nature of operations planning and control in a complex manufacturing environment. Enterprise software supports the primary learning objective of understanding how operations management decisions affect customer service, capacity, inventory, and costs.

Chapter X states that in order to maintain a competitive position in today's marketplace, companies must demand a greater level of enterprise efficiency. In today's rapidly changing market, experts argue that it is no longer about becoming a powerhouse but simply about remaining competitive. That is why automating and linking the supply chain has become so imperative. Supply chain management systems link all of the company's customers, suppliers, factories, warehouses, distributors, carriers, and trading partners. These systems integrate all the key business processes across the supply chain of a company. This chapter explains the objectives of supply chain management and how SAP's supply chain management system helps companies fulfill these objectives.

Chapter XI states that in order to become globally competitive in today's dynamic business environment, organizations have to come closer to customers and deliver value added services and products in the shortest possible time. The primary business process through which this is achieved is the sales and distribution process. However, the sales and distribution process is just one part of an enterprise resource planning (ERP) system. This chapter focuses on the sales and distribution (SD) process of SAP's ERP system. This chapter will assist in learning about the basic functions that make up this process and how it affects the other modules in the ERP system. This chapter looks at the purchasing process and the materials requirements planning (MRP) process and how all the three processes are linked together to form one complete business process.

Section III includes six chapters dealing with specific issues of the enterprise-wide approach, such as the enterprise information infrastructure (service course for all business sophomores), how to customize the SAP R/3 software using the ABAP/4 language, how to configure this software for the whole company or how to develop an enterprise portal.

Chapter XII deals with sharing information in between business schools, which are attempting to integrate their curricula with enterprise software, particularly enterprise resource planning (ERP) software. Although the introduction of ERP into the undergraduate academic curriculum offers students a potentially deeper understanding of business processes in a global, information-centric environment. Connecting a new global economy with enterprise systems requires a course, which is much broader than ERP and should place enterprise systems in a much larger information-communication technology (ICT) context. This chapter presents a teaching model that provides that context, emphasizing the critical role of systems components and relationships, the central function of information in problem solving, and business perspectives of information from infrastructure to applications.
Chapter XIII states that the main role of enterprise systems is to support business operations efficiently and effectively and to create competitive advantage. Nevertheless to reap the benefits of using enterprise systems, it is essential to align the information technology goals with business goals and to establish the appropriate enterprise architecture (EA) and supporting enterprise information architecture (EIA). For students to understand the linkage between the EA and EIA and to learn the subject, a hybrid academic and industrial approach to teaching EA and EIA is proposed. This proposed hybrid approach covers theory, framework, principle and best practice of the EA and EIA in the beginning, and then moves to a practical and comprehensive approach in delivering the subject matter — EA and EIA. A real world EA and EIA project is used to illustrate the efficacy of these architectures.

Chapter XIV indicates that as more and more companies are implementing ERP to support daily business transactions, the needs for ERP trained employees are increasing as well. Industry demand has prompted many universities to consider incorporating ERP into their curriculum. Information systems programs in many universities have started offering courses that include ERP education. However, most universities have faced multi-faceted challenges related to lab setup, training, software support, and curriculum design. In this chapter, a guideline for development and teaching an ERP based course with MS Great Plains™ is provided. Teaching approach is discussed and an ERP based business curriculum is proposed. Effectiveness of the curriculum design in the classroom is analyzed based on a single semester trial of the course in two classrooms.

Chapter XV explains the trend that the business world has recognized the importance of managing business processes rather than functions. As a result business education has begun to embrace this transformation, although the organizational barriers between departments in most business schools have limited the success of teaching business from a process-oriented perspective. On the other hand, ERP technology provides an opportunity to illustrate the management of integrated business processes. One approach to using ERP software to teach business processes is through a dedicated configuration class. In this class structure, students configure an ERP system to manage the basic business processes of a small company. Because of the integrated nature of ERP systems, students must configure the system in a number of functional areas — accounting, operations, sales, etc.— many of which are not in a student’s major. The necessity of configuring an ERP system in a number of functional areas illustrates the importance of having a background in all basic business functions to successfully manage a business enterprise. This chapter provides a review of an ERP configuration course that is currently being taught at Western Michigan University using SAP R/3 business software. The context of the course, its mechanics, key learning points and areas for future development are presented.

Chapter XVI analyzes programming language ABAP/4 as the fundamental programming tool used for the development of SAP R/3 ERP system. While other OO languages such as Java, J2EE are receiving their attention in new ERP module development, ABAP/4 will continue to play an important role in SAP R/3 customizations that are often required to meet the special application needs of most SAP adopters. In this chapter, ABAP/4 language — its programming environment, types of customization for SAP R/3, teaching pedagogy, and the development of ABAP application are discussed. In specific, a simple example of ABAP/4 program that employs the sample database (flight) is included to illustrate an online application that employs both internal and external tables for data processing using SAP SQL statements. Moreover, a three-thread teaching approach is presented to highlight how ABAP/4 learning could be enhanced by experiencing (SAP), coding (ABAP programs),
and simulating (an ABAP business module). Limitations, suggestions, and future trend of ABAP/4 application development are also addressed with a concluding remark.

Chapter XVII offers an idea how enterprise portals present a great opportunity to bridge online applications with the backend business systems. Although enterprise portals are now widely adopted in the business environment, the literature has been scarce in studies on how an enterprise portal course is better delivered in the information systems curriculum. The goal of this chapter is to discuss the potential issues and challenges arising from the delivery of such a course, and to propose a comprehensive teaching framework. The framework consists of three teaching modules (i.e., portal basics, portal management and portal development) to better cover enterprise portals with topics ranging from technical details to business decisions.

Section IV contains three chapters depicting the continuous efforts done by the three major ERP software vendors whose approach to supporting universities in using their demosolutions in academic courses are provided. This section should be particularly interested for those universities that plan to reorient their curriculum towards the approach presented in this book.

Chapter XVIII focuses on a very popular enterprise system, SAP, and summarizes the outcomes of a global survey on the status quo of SAP-related education. Based on the feedback of 305 lecturers and more than 700 students, it reports on the main factors of Enterprise Systems education including critical success factors, alternative hosting models, and students’ perceptions. The results show among others an overall increasing interest in advanced SAP solutions and international collaboration, and a high satisfaction with the concept of using application hosting centers. Integrating enterprise systems solutions in the curriculum of not only universities but all types of institutes of higher learning has been a major challenge for nearly ten years. Enterprise systems education is surprisingly well documented in a number of papers on information systems education. However, most publications in this area report on the individual experiences of an institution or an academic.

Chapter XIX describes how the Microsoft Dynamics™ Academic Alliance (MDAA) helps address the challenge of teaching enterprise systems by donating business solution software (e.g., MS Great Plains) to higher educational institutions for classroom use. This chapter discusses the background of the MDAA and the types of systems available for its members. The chapter content is designed to be helpful for both business educators and administrators as they plan and implement technology into their curricula. MDAA provides another popular platform for higher education. Microsoft typically becomes a strong competitor when it enters a given software market. At this time Microsoft offers enterprise software for small and medium size companies, which is a plus in comparison to other vendors which used to aim at the large firms.

Chapter XX indicates that Oracle is becoming a major player in the industry, particularly after its acquisition of PeopleSoft. Oracle enterprise system, E-Business Suite, is not only suitable for large and medium enterprises but also small companies. Oracle E-Business Suite is an appealing alternative for institutions to consider in regard to integrating enterprise systems into their curricula. The literature of the integration of enterprise system into academic curriculum and challenges of such integration are briefly reviewed. Oracle Academic Initiative, Oracle E-Business Suite and Oracle enterprise system related education — Oracle University’s practice are introduced. One university’s experience in integrating E-Business Suite into a capstone information management course is discussed. The vision enterprise case that Oracle University uses to train its customers is suggested as a viable alternative option for academic institutions.
The book contains chapters describing how to teach the enterprise BPI with ERP demos, it does not contain descriptions of those universities’ cases which decided to specialize in a single vendor software (e.g., University of California in Chico, which specializes in SAP). Although the UC in Chico is very successful in job placements of its graduates, its approach is comparably unique and not widely adopted yet.

In conclusion, the book reflects the contingency approach, which is at the right timing (2006+), but it does not guarantee that it will last forever. Shifting focus of IT education from general skills to business process-driven IT skills seems to be a successful strategy for the 2000s. However, it is too soon to judge how it impacts on students’ potential for better jobs and their security. Further research should be undertaken to trace the industrial practices and attitude towards “local” more expensive and better educated labor force versus “offshore-outsourced” less expensive one. The IS/CIS/MIS/BIT faculty should study how the BPI/ERP-oriented curriculum has actually made a change in the careers of students who took the reengineered program, whether students were able to find better paying jobs, and whether their level of satisfaction was higher.

REFERENCES
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