REDESIGNING BUSINESS CURRICULUM BY INCORPORATING SAP SOFTWARE

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*W*HILE *vertical orientation of traditional business curricula has served its purpose, today's business education demands more horizontal integration among courses. The focus to horizontal integration in designing/redesigning business programme may serve the following objectives: offering more value added courses to students; making the course offerings relevant to industry needs; logical integration of various courses within degree programmes; and improving job prospects for students. This paper illustrates how courses of a business programme have been redesigned to focus on horizontal integration. The business school took advantage of the SAP-University Alliances Programme and changed various courses to incorporate SAP materials. The lessons learnt from this exercise could be valuable to business schools in India and elsewhere as more and more institutions are forming partnership with SAP Inc.*

Key Words: ERP, SAP R/3 System, Business Process Integration, Business School Curricula.

Introduction

Business schools have commonly been criticized for being away from the reality and practice of the business world (Buckley, Peach, and Weitzel, 1989). Some major criticisms of business school curricula are: insufficient emphasis on generating "vision" in students, insufficient emphasis on integration across functional areas, and insufficient attention to the external environment. Many critics call for a broadened business curriculum with a greater emphasis on the integration of subjects across curricula.

Generating "vision" in students could to some extent be achieved by giving students flexible learning opportunity. Three basic factors of learning -learning style, control and focus- determine the approach taken by a student in the learning process. Learning style refers to the way a student processes information from course material. Control, on the other hand, refers to the degree to which the student rather than the faculty takes control of the learning activities and the instructional strategies, and focus refers to the extent to which emphasis is on providing support to student-centered learning, as opposed to traditional teacher-centered teaching. These three factors can be used as various dimensions to learning as denoted in Figure 1.

The shaded area in Figure 1 denotes flexible teaching. Here it can be seen that flexible learning enables a series of general shifts along the continua from conventional classroom teaching. Students are encouraged to actively participate in the learning process rather than passively absorb knowledge.

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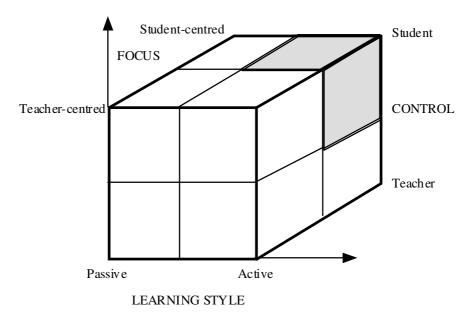
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Figure 1: Dimensions of Learning

Source: Mandal, Wong and Love, 2000.

Students have more control over instructional strategies rather than following fixed procedures set by the teacher, and also has access to a wide range of supporting resources which are student-centered rather than teacher-based. The practice of flexible learning could be summarized as ways in organising and resourcing learning by offering "the learner a more actively constructive role by providing a framework in which learning goals can be more independently pursued". Business schools should promote an atmosphere of flexible learning for confidence building and self development in students.

Insufficient emphasis on integration across functional areas is serious limitation to business programmes of majority of business schools. Business school curricula traditionally followed a vertical approach where typical disciplines included Accounting, Finance, Human Resource, Management, Marketing, Operations, and Management Information Systems. Such approach usually results in disjointed curricula which discourages the teaching of business process integration. On the other hand, employers expect fresh graduates that they hire to understand how companies function in the new economy. This expectation can be met if business curricula are redesigned to expose students to integrated business processes that require close coordination among employees across function and around the world (Strong et al. 2004).

This paper limits discussion on integration of functional areas in designing business curriculum. We highlight a current effort in changing the business education at our Business School with the introduction to Enterprise Resource Planning concepts. Every student of the Business School has been introduced to SAP R/3 (an ERP software). We discuss how the focus to horizontal integration in our business programme offered more value added courses to students, made the course offerings relevant to industry needs, and helped students in seeking jobs.

ERP in Business Curriculum

The Y2K scare almost a decade ago prompted many companies to upgrade their legacy information systems to more integrated information systems known as Enterprise Resource Planning (ERP) systems, or simply enterprise systems. Global implementation of ERP increased sharply since early 1990s

(Davenport 2000). The Sarbanes-Oxley Act, which was signed into law on July 30, 2002, also added to the thrust of ERP conversion as companies began scrambling to comply with the provisions of the law, especially the sections dealing with information system requirements. In recent years ERP implementation has not been limited to large companies. ERP vendors have developed similar solution for medium size businesses. As a result, today most medium and large companies rely on an ERP system of some sort as their information system backbone. To meet the challenges of the new economy, Business schools must produce more graduates who are equipped with knowledge and skills on enterprise systems.

Despite well documented successes of ERP systems (Haag et al. 2006), the adoption of the ERP-based curriculum into business schools have been slow. Sager *et al.* (2006) contend that "one reason behind this resistance to change is that most business school faculty members were trained in an environment which demands specialization and in which interdisciplinary knowledge is rarely valued or rewarded." It has been known that along with the curricular benefit, come integration challenges (Guthrie and Guthrie, 2000). Unlike some other recent technology innovations, integration of ERP in a course requires changes in course content as well as in pedagogy (Fedorowicz et al. 2005).

ERP systems have been used in the academic world for more than a decade (Sager et al. 2006). In the US, this trend started in 1996 with two universities joining the SAP University Alliance whose current membership in North America exceeds well over 100 universities which accounts for approximately 25 per cent of world-wide membership (Hawking et al. 2004). It is important to note that the ERP market has experienced a major shake-up and consolidation in recent years which basically left only two major players in this market: Oracle (*www.oracle.com*) and SAP (*www.sap.com*). Without elaborating why SAP was chosen over other alternatives, this paper attempts to share our experience in using SAP in our curriculum, especially our *incremental integration approach* in introducing ERP concepts to our students.

The Challenges of Integrated Curriculum

Almost two decades ago Porter and McKibbin (1988) identified the need to adapt business curriculum to assure that we train graduates with an integrated understanding of business processes and the ability to work effectively in teams to solve key business problems. This view is also supported by other researchers including Closs and Stank (1999) who suggest that business school curricula need to mirror the fact that many businesses have abandoned the vertical, functional organisational structure in favor of a more horizontal, cross-functional structure.

One approach toward curriculum integration has been to create a separate capstone course or project at the end of the students' degree programme. In business schools, this capstone course usually takes the form of a strategy course during the senior year. This strategy course usually integrates materials that the student should have learned from three or four functions, usually accounting, marketing, and operations. However, Strong et al. (2004) contend that such capstone experiences usually do not focus on operational decisions, or explore the role that extensive, shared, real-time information plays in decision-making, which are critical to the strategic orientation of many business organisations today.

The adoption of ERP systems forces firm to become integrated enterprises (Hammer, 1999). Duplaga and Astani (2003) show that integration of business areas' information systems was the most important reason for firms adopting ERP systems. ERP or enterprise systems have been recognized as a way to integrate business functions in real settings. It follows that ERP is well suited to provide exposure to students on business process integration (Fedorowicz et al. 2004).

The integration of business processes does not mean that the standard business functions such as Accounting, Human Resource, Marketing, and Operations and Production will disappear. Instead, the

objective of the ERP-based curriculum is to have the students appreciate both the functional perspective and the interdependence and interaction which take place across functions in order to complete the core business processes of an organisation. Regardless of which business function the students choose to major in their business school academic career, they have to be able to weave together the functional orientation of firm by means of integration (Hajnal and Riordan, 2004).

By focusing on business processes, rather than on specific business functions, students can gain an understanding of the complex relationships between various business functions and how these relationships effect business decision making in general (Boyle and Strong, 2006). Fedorowicz et al. (2005) stresses the importance of intertwining ERP issues with the content of business courses so students can gain a full appreciation of the effect of such systems on organisations.

Integration across business curriculum has been a common goal among universities that adopted enterprise system. However, most of them have not been successful in integrating ERP across the business disciplines. Bradford et al. (2003) shows that only 15 per cent of 35 educational adopters used ERP in more than two disciplines. Most schools used ERP in either Accounting or MIS department or both. With a few notable exceptions, most ERP educational efforts have made progress only within the MIS or Accounting curriculum, rather than across the management curriculum. While the situation may have improved over the past five years, it is clear that at the implementation of ERP-based curriculum is not without challenge. Strong et al. (2004) highlights four critical challenges that ERP educational adopters have to face: faculty motivation and commitment, confounding technical implementation expertise with user expertise, cost and technical infrastructure, and leadership issues.

Realizing the challenges of implementing ERP-based curriculum, we decided from the outset to implement the integrated curriculum in a different way. The main difference is that we introduce ERP incrementally starting from the freshman year all the way to the senior year. In each successive course, the ERP concepts are reinforced involving more complex business transactions.

Incremental Integration Approach

The objectives of incorporating ERP in our curriculum are two-fold. First, we expect our graduates to have sufficient exposure with ERP system so that they will be more marketable in the job market upon graduation. We do not expect that they will remember all the commands to run transactions in an ERP system, but we expect that they will have sufficient exposure to build their confidence to quickly learn any kind of ERP system in the market place. Second, we intend to use ERP as a vehicle to show the integration of various business processes. In other words, we want our students to have a better understanding of how different courses from different disciplines (Accounting, Finance, Marketing, Operations, etc.) are applied in synergy in a setting that is as close as possible to the real world.

Our strategy was to expose students to basic ERP concepts early on in their freshman year. These concepts are then reinforced and expanded with more advanced ERP concepts in subsequent upper-level courses in our MIS curriculum. This *incremental approach* is necessary considering that any ERP system is large and complicated in nature. We have modified one freshman course and one junior course each to contain about one-third (33 per cent) of ERP content. We have also developed two new upper-level courses, each with 100 per cent ERP content. Each of these four courses is three-credit hours. An additional one-credit hour course was also developed as an ERP standalone course. We also encourage other departments in our college to follow suit by including ERP in their courses.

The first course which we modified is *Introduction to Business Technologies*, a three-credit hour freshman-level course. The 33 per cent ERP content is focused on the customer order management which is part of SAP's Sales and Distribution module. Sales process is deliberately chosen as the first ERP exposure to students because in real life everyone is familiar with this business process. Students

learn how to process inquiries, quotations, take orders, make deliveries, create bills/invoices, and post incoming payments.

The second course to include 33 per cent SAP content is *Principles of Information Systems*, a three-credit hour junior-level course. The business process introduced in this course is the purchasing process which is an extension of the sales process within the supply chain framework. The purchasing process includes creating purchase requisitions (including vendor selection), creating purchase orders, creating goods receipts, creating invoice receipts, and posting outgoing payments. While the sales process taught in the *Introduction to Business Technologies* course deals with the demand side, the purchasing process covers the supply side. Therefore, an understanding of the sales process is a prerequisite. Students who took the older version of *Introduction to Business Technologies* (which did not include ERP) or took an equivalent course from another school are required to take the 1-credit hour ERP standalone course (*Introduction to ERP*) to make up for the deficiency.

The fourth course with ERP content is *Introduction to ERP: SAP Overview*, a three-credit hour senior-level course with 100 per cent ERP content. In this course, students review the concepts of sales and purchasing processes in more depth. In addition, students learn other business processes including pricing in sales, credit and receivables risk management, production planning, material management, accounting, and human resources. The emphasis of this course is on the integration of various business processes. Students learn how different departments work together to achieve corporate objectives. They also see how information flows from one department to other departments and how it is shared by all departments. This course is open to all business majors.

The fifth ERP course in our curriculum is *Introduction to SAP Configuration*, also a three-credit senior level course. The prerequisite for this course is *Introduction to ERP: SAP Overview* with a final grade of at least B. This advanced SAP course is project oriented and rather demanding. For the final project students are asked to show their understanding of various business processes by configuring (implementing) SAP in a reasonably large hypothetical company. It is certainly impossible to expose students to more than 8,000 SAP different configuration decisions; however the objective of this course is to expose students to major issues in configuration and to build their confidence in solving configuration problems.

The five different ERP courses above show our *incremental approach* in teaching ERP. While the first two courses are required for all business majors, the last two courses are intended more for MIS majors even though other majors are welcome as long as they satisfy the prerequisites. In fact, we have many students from the College of Engineering who take these two advanced SAP courses. SAP training outside campus is known to be very costly. Students who realize the value of this skill are highly motivated to maximize their educational experience by taking these courses. High motivation and enthusiasm from students make the classes very dynamic and enjoyable both for the students and the instructor.

Conclusion

The incremental approach in our ERP-based curriculum has been working very well. We have seen many advantages of this approach. Firstly, because of the reinforcement of ERP concepts in successive courses throughout their business education programme, our graduates have a more thorough understanding about ERP. While the emphasis of the ERP courses is on teaching the best practices of business processes, after being exposed to several years to SAP our graduates become more acquainted with SAP system and are ready to meet the demand of industries, mainly petrochemical industries, in our area that need a large supply of new hires with SAP skills on hand. Secondly, spreading the ERP content to different courses at different level involve more instructors to teach ERP. By so doing, the

responsibility to teach ERP does not fall on just a few individuals. Even if these instructors leave, the ERP programme will remain strong.

We have also identified courses offered by other departments which are appropriate to include portions of SAP modules. To encourage faculty members from other departments to incorporate ERP in their courses, we make ourselves available to help them develop SAP materials. We expect to see courses with ERP content from other departments in the future.

References

Boyle, T.A. and Strong, S.E. (2006), Skill Requirements of ERP Graduates, *Journal of Information Systems Education,* Vol.17, No.4, pp.403-412.

Bradford, M., Vijayaraman, B.S., and Chandra, A. (2003), The Status of ERP Integration in Business School Curricula: Results of a Survey of Business Schools, *Communications of the AIS,* Vol.12, pp.437-456.

Buckley, R.M., Peach, E.B., and Weitzel, W. (1989), Are Collegiate Business Programmes Adequately Preparing Students for the Business World?, *Journal of Education for Business*, Vol.65, No.3, pp.101-105.

Closs, D. and Stank, T. (1999), A Cross-Functional Curriculum for Supply Chain Management at Michigan State University, *Journal of Business Logistics,* Vol.20, No.1, pp.59-66.

Davenport, T.H. (2000), Mission Critical: Realizing the Promise of ES, Harvard Business School Press, Boston, MA.

Duplaga, E. and Astani, M. (2003), Implementing ERP in Manufacturing, *Information Systems Management,* Vol.20, No.3, pp.68-75.

Fedorowicz, J., Gelinas, U.J., Jr., Hachey, G., and Usoff, C. (2004), Twelve Tips for Successfully Integrating Systems Across the Curriculum, *Journal of Information Systems Education,* Vol.15, No.3, pp.235-244.

Fedorowicz, J., Gelinas, U.J., Jr., Hachey, G. and Usoff, C. (2005), Integrating SAP Across the Business Curriculum, In Managing Business with SAP: Planning, Implementation, and Evaluation, Idea Group Publishing, Hershey, PA.

Guthrie, R.W. and Guthrie, R.A. (2000), Integration of Enterprise System Software in the Undergraduate Curriculum, *Proceedings of ISECON 2000,* Philadelphia, Vol. 17.

Haag, S., Baltzan, P. and Phillips, A. (2006), Business Driven Technology, McGraw-Hill Irwin, New York, NY.

Hammer, M. (1999), "Up the ERP Revolution", *Information Week*, (Feb. 8), p.186.

Hajnal, C.A. and Riordan, R. (2004), Exploring Process, Enterprise Integration and E-Business Concepts in the Classroom: The Case of petPRO, *Journal of Information Systems Education,* Vol.15, No.3, pp.267-275.

Mandal, P., Wong, K.K., and Love, P.E.D. (2000), Internet-Supported Flexible Learning Environment for Teaching System Dynamics to Engineering Students, *Computer Application in Engineering Education*, Vol.8, No.1, pp.1-10.

Porter, L. and McKibbin, L. (1988), Management Education and Development: Drift or Thrust into the 21st Century?, McGraw-Hill, New York, NY.

Sager, J., Mensching, J., Corbitt, G., and Connoly, J. (2006), Market Power of ERP Education – An Investigative Analysis, *Journal of Information Systems Education,* Vol.17, No.2, pp.151-161.

Strong, D.M., Johnson, S.A., and Mistry, J.J. (2004), Integrating Enterprise Decision-Making Modules into Undergraduate Management and Industrial Engineering Curricula, *Journal of Information Systems Education,* Vol.15, No.3, pp.301-313.