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Introducing a Small and Medium Enterprises Syllabi Design: An Enterprise Systems Hands-On Approach

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Abstract

There is increasing attention to the importance of Enterprise Systems (ES) and Information Systems (IS) for Small and Medium Enterprises (SMEs). The same attention must be addressed in IS graduate curriculum. Studies reveal that despite healthy demand from the industry for IS management expertise, most IS graduates are ill-equipped to meet the challenges of modern organizations. The majority of contemporary firms, represented by SMEs, seek employees with a balance of business process knowledge and ES software skills. This article describes a curriculum that teaches Information Technology (IT) and IS management concepts in a SMEs context. The curriculum conceptualises a 'learn-by-doing' approach, to provide business process and ES software specific knowledge for its students. The approach recommends coverage of traditional content related to SMEs'' operations, strategies, IT investment and management issues while providing an increased focus on strategic use of enterprise IT. The study addresses to an extent, the perennial challenge of updating IS curriculum, given the rapid pace of technological change.

Keywords: Enterprise Systems, Small and Medium Enterprises, Higher Education.

INTRODUCTION

There are various pedagogical approaches to Information Systems (IS) education. Some institutions and its academics adopt a strictly theoretical approach, emphasizing on IS management practices and processes, IS implementation challenges, critical success factors and IS investment strategies, while others adopt a more *hands-on* tactic, adopting E-learning techniques or incorporating cutting edge technology such as ES software and mobile devices as the key teaching medium (Strong et al. 2006). Often, to see a balance of the two—how IS actually facilitates the completion of business processes, is atypical.

Contemporary organizations seek graduates who are capable of meeting challenges that go beyond the initial IT implementation, where the challenges post-implementation range from highly technical maintenance requirements (i.e. software skills) and business process oriented software skills (Markus and Tanis 2000; Davenport 2000). However, Markus (2005, p. 288) cautions academics of the "perennial challenges" of updating and maintaining the relevance of IS curricula. For one, she warns of the need for new approaches to develop educational innovations to accelerate the pace of teaching material and curriculum innovation. Academics must consider their syllabi approach carefully to maximise resources for teaching and student learning. These considerations extend but are not limited to the rationale of the course, number of students, appropriateness of technology, amount of technological support, the duration of the course and student demographics.

This article presents a curriculum that provides graduate students with hands-on experience with a real-world enterprise system to reinforce the textbook theory and principles of IS for Small and Medium Enterprises (SMEs) with real-world practice. The purpose of this paper is to recommend a set of preliminary considerations for designing SME syllabi. The course is further enhanced with developing an experiential learning environment and team-based activities. This article is written for academia intending, designing or already teaching SME related syllabus using E-learning techniques, incorporating an ES designed for SMEs.

The paper is divided into two related parts. The first part investigates related ES and E-learning literature. Consolidated studies illustrate how academics adopt and attempt to marry business process oriented and software oriented approaches. We summarise issues pertinent to the beneficiaries or serviced 'clients': students. Given the

issues and challenges, the second part of the paper proposed a SME course design that incorporates ES into established syllabi. Concurrently, the paper summarizes preliminary considerations for designing an ES syllabus, in an SME context. Furthermore, these considerations established reflects an approach that the authors are taking to re-conceptualise ES teaching using new and innovative packaged systems and with a business process oriented approach. To achieve this, the adopted approach comprises of critical SME teachings that fall into both *business strategy* and *technical* streams. The approach is currently undertaken and monitored at UniS—a leading Australian tertiary institute. Implications and contributions of this article are twofold. For academia, these considerations form an activity checklist and guide that academics can use when designing an SME and ES related course. For knowledge, the article presents a learn-by-doing approach for curriculum innovation.

USING ENTERPRISE SYSTEMS IN HIGHER EDUCATION

Over time, Enterprise Systems (ES) have become a critical backbone for many companies' business processes. Amidst downsizing and reorganisation by companies in the early 1990s (Brady et al. 2001), the ES market thrived and there were little choice or debate about how to spend sometimes up to millions of dollars to implement them (Schwartz 2007). Management and IT organisations alike became convinced that packaged software proved to be a more effective way (than a best-of-breed approach) to satisfy the growing necessities of an increasingly competitive business environment (see Markus et al. 2000; Davenport 2000). Vendors such as SAP and Oracle dominate the market for large packaged suites while packages like Microsoft Dynamics NAV (previously Navison), SAP Business One, and MYOB on the other hand cater more for SMEs that generally have a considerably smaller IS investment than larger firms.

It was reported that one of the academics at Louisiana State University claimed a small group of IBM Global Services consulting managers literally got down on their knees at a conference, clasped their hands and yelled, *"We want your students"* after hearing about the student's exposure to the SAP R/3 system in the classroom (Strong et al. 2006 p. 732). In fact, it has been reported that students who pursue ES-intensive coursework command higher starting salaries than those who do not (Corbitt and Mensching 2000; Borquez, et al. 2005). It is fair to say that graduates intending to pursue an ES related career, they must develop a profound appreciation for the way business is conducted in process-centric, networked organizations. Despite the critical need of companies for ES-savvy employees, students still rarely encounter an ES during their university education (Strong et al. 2006). The challenges universities face in integrating an ES into a curriculum (Cameron 2008) and in achieving educational benefits and producing top graduates as a result of such implementations differ from those of business organizations, but are no less difficult.

Despite a strong demand for *'business process experts'* from the industry, studies including Scott et al. (2002), Kim, Hsu and Stern (2006) and Rosemann and Maurizio (2005) reveal that most IS graduates do not possess necessary business process knowledge of IT applications such as ERP packages. Moreover, Boyle and Strong (2006) identified that ES adopting organizations seek graduates who possess: (i) ES technical knowledge, (ii) technology management knowledge and (iii) business functional knowledge. They also discovered that many ES-teaching approaches do not produce graduates with such skills due to the weaknesses in teaching approaches. A review of literature suggests that these approaches tended to have either, (1) favoured certain modular functions of the ES (e.g. Strong, Johnson and Mistry, 2004), (2) favoured certain business process (e.g. Leger, 2006; Draijer and Schenk, 2004) or (3) distanced ES concepts from ES software practice.

Table 1: Reflections of ES Teaching in Colleges

University/ Graduate Level	Software	Reflections
California State University at Chico (mostly undergrad)	SAP	Bootstrapping approach; No particular incentive for faculty members to do be part of ES teaching teams
Louisiana State University (both undergrad and post grad)	SAP	Practitioner motivation and interest; Fit/Supported by established business curriculum; Courses include hands-on on business process integration and management, Strategic enterprise systems applications, process planning and control, business intelligence
Queensland University of Technology (both undergrad and post grad)	SAP	Integration of IT, engineering and business curriculum; Focus on modeling, analysis and design elements; Distance from detailed functional knowledge
Bentley College (both undergrad and post grad)	SAP	Alignment of ES with strategic focus, resulting in internally-funded projects around its design and use
Worcester Polytechnic Institute (mostly undergrad)	Oracle	focus is on decision-making in an integrated,data-rich environment provided by an ES, rather than on learning the ES itself

Despite strong demand for ES related courses, there are limiting factors to how academics can teach ES and ultimately how much ES training students can get from our classes. We look at some reflections and lessons (see Table 1) from colleges[1] adopting ES. It has been reported in Strong et al. (2006) that the general strategy at California State University was for one faculty member (or sometimes a pair) to develop a course idea and initially offer it as a special topics course. If there is sufficient demand generated for the new course, it will ultimately be added to the official college catalog. This bootstrapping approach thus prescribes starting small and building upon prior achievements. At California, the success of the course relies heavily on the degree of altruism of the faculty as there is no particular incentive for faculty members to emphasize skills training, hence reverting to more orthodox academic elements such as frameworks, analogies, conceptual models, and theories. At Louisiana state university, it was reported that success of its ES course is attributed mainly to an established business curriculum, practitioner interest and hands-on courses. Even with belt-tightening by employers, and the demand for ES students, Louisiana subsequently pushed towards the university competency center to significantly bring down costs of curriculum development. Queensland University of Technology found more value in distancing from teaching detailed functional knowledge, and focus on elements that add value to understanding application of theory to practice.

COURSE DESIGN

Given the challenges of incorporating ES into information systems syllabi outlined above, the authors propose a course design that would deliver ES value to an established IS teaching area. The course is designed to facilitate students' learning of the proliferation, implementation, adoption and use of ES in SMEs. The course is currently adopted at UniS- where one of the authors currently works- a leading Australian tertiary institute. The approach of the course design is to divide the content into two distinct yet related streams over a 13-week program (see Figure 1). The approach reinforces the textbook theory and principles in the business strategy stream with real-world practice in the technical stream, to provide students with an experiential learning environment, cutting edge technology, and team-based activities .The business strategy stream of the course will cover the contextual nature and characteristics of SMEs that make up the considerations for the selection of suitable software to support its' business processes. A set of recommended readings and published case studies (see Table 2) encapsulates the academic content. To deliver practical content, the unit further involves the learning of Microsoft Dynamics NAV. A case scenario that describes operations of a case firm, with emphasis on its core production, sales and financial processes are attached to contextualise students' hands-on experience with the software.

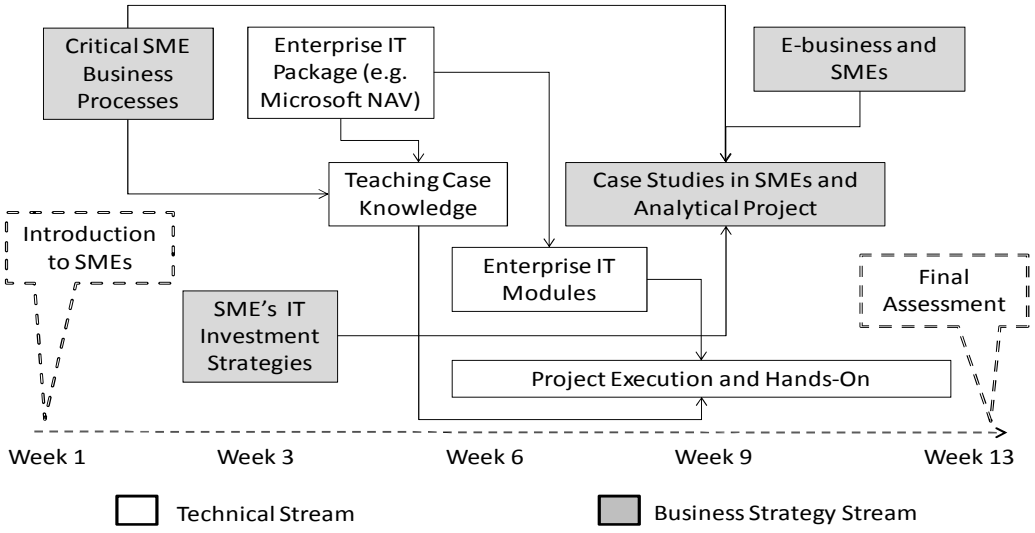


Figure 1: Course Design: Technical and Business Strategy Streams

The course objectives are (1) To appreciate the nature of SMEs and their contexts, (2) To understand and explain the role and nature of information (I), information systems (IS) and information and communications technology

[1] Colleges were part of the early SAP University Academic Alliance. The SAP University Alliance (UA) program in the U.S was started during the 1996/1997 academic year. In 1997, LSU became a member of the U.S. program, while QUT joined the Australian program. Bentley joined the SAP UA in 1998. WPI joined the Oracle Academic Initiative in 2000 (Strong et al. 2006). The program provides university faculty members access to SAP business suite family of solutions necessary to teach students how ES can enable integration of business processes and strategic thinking (SAP 2010). Source includes and covers issues in Innovation with Teaching Series (Markus ed. 2005) and Strong et al. (2006) in Communications of the AIS Journal

(ICT) in SMEs, and the use of I/IS/ICT to achieve organisational objectives, (3) To evaluate the applicability of extant IS theories, models and practices to the SME context, (4) To understand the ways in which Information/IS/ICT can transform the internal and external operations of an SME, (5) To demonstrate an ability to understand the decision making, evaluation and benefits realisation processes in relation to IS/ICT investments in SMEs and (6) To experience a real world ES and its applicability for common business processes.

The teaching approach and strategy help to produce graduates who (1) are capable in their chosen professional areas (e.g. able to employ and deploy I/IS and IT appropriately in the context of SMEs) , (2) are entrepreneurial (e.g. in their ability to appreciate the "transformatory" power of IS/IT in SMEs and to recommend appropriate IS/IT solutions in SME contexts) , (3) able to operate effectively in work and community situations (e.g. an ability to work independently and collaboratively in groups) and (4) are aware of environments (e.g. those that typify SMEs, and adapt their professional behaviours accordingly).

Table 2: Course Outline and Resources

Weeks	Study Topic	Some Recommended Readings	Laboratory Activities
1-3	Definitions of SMEs, information and IS in SMEs, IS/ICT strategy for SMEs	Levy and Powell (2000; 2005*);	Organizational setup of case study firm including logistics, sales and financial
4-6	Strategic context of IS/ICT investments, business transformation, and ICT innovations and challenges in SMEs	Levy, Powell and Yetton (2001); Thong (1999)	Introducing critical business processes: purchasing, pay, process sales orders and collection
6-8	Guest Series: Enterprise IT package vendor/ consultant and Enterprise IT client	Content ** provided by lecturers and guest speakers	Completing a sales process: machines setup, production order, shipping, payment and reporting
8-10	E-business and SMEs, future trends, case study presentations	Mehrtens, Cragg and Mills (2001); Stockdale and Standing (2004)	Presentation of case study project

*Book Source: Levy and Powell (2005), prescribed course textbook

Outlining the SMEs Business Strategy Stream

This section outlines the key topics covered in business strategy stream of the course. We demonstrate that on top of generic business processes, IS principles and management theories, the context unique and yet salient to SMEs are central in this curriculum. Starting with a broad description of the SME context; Students are introduced to the definitions and characteristics of SMEs[2] and explained how they are integral sources of revenue, employment and product innovation for the economic growth of Australia. According to the Australian Bureau of Statistics (ABS 2001), an SME is defined as business employing less than 200 people. On average, they comprise over 95 percent of any economy (Kotelnikov 2007). The few other defining characteristics of SMEs are: (a) Independent ownership and operations, (b) Close control by owners/managers who contribute most, if not all the operating capital and (c) Principal decision-making by the owners/managers (ABS 2001). This is the foundation for all students who enrol in the SME course. Thereafter, students are taught how Information and Communication Technologies (ICTs) can help SMEs create business opportunities and combat pressures from competition (Levy and Powell 2005; Kotelnikov 2007).

On the above premise that IS strategy and adoption is uniquely different SMEs; Students are introduced to a range of ICT currently available to and invested by SMEs to conduct their business. Kotelnikov (2007) separates the ICT into the following categories: (1) Basic Communication- the minimum ICT capability that any business should have, (2) Basic Information Technology - PCs accommodating word processing functionality, accounting and other business practices, (3) Advanced Communications – technologies providing the means for people to communicate and network with one another and (4) Advanced Information Technology – Generally consists of advanced packaged suites such as ES that consolidates a range of business applications for an organization's core of business processes (McAfee 2006). We focus on the last category of the classification.

[2] SMEs are generally characterized by a smaller workforce and lower turnover. As of July 2006, close to 140 million SMEs in 130 countries employed 65 percent of the total labour force (World Bank, 2006). A number of sub-categories are also defined within this sector: (1) Non-employing business – sole proprietorships and partnerships without employees, (2) Micro business – businesses employing less than five people, (3) Small business – businesses employing five or more, but less than 20 people and (4) Medium business – businesses employing 20 or more people, but less than 200. (Australian Bureau of Statistics 2001)

Building from ICT adoption, we focus on how daily operations of SMEs unfolds and what else might influence the use of advanced ICT. For example, referring to the work of Tornatzky and Fleisher (1990) and Thong (1999), we examine the strategic, technological and organizational barriers to adoption and innovation with ICT. *Strategic* barriers relates to the SME management. The *technological* barriers of ICT adoption relates to the perception of the complexity of ICT. Furthermore, we adopt the teachings of Levy and Powell (2005) and their many studies on SMEs to investigate the strategic context of IS/ICT investments, business transformation, and ICT innovations and challenges in SMEs. This would help students understand why SMEs are generally reluctant to pursue or allocate adequate resources for technological innovation. Some of these factors include but are not limited to a lack of SME demand for advanced ICT systems, failure of business-oriented owner-managers to recognise the value in installing an advanced ICT system and a general lack of product availability for the SME market. Case studies such as Mehrtens et al.'s (2001) and Stockdale and Standing (2004) are also adopted and referred to study auxiliary but important trends of SMEs for example SMEs participation in e-marketplaces. These theoretical concepts around SMEs are also reinforced through a series of guest lectures where they (invited practitioners) provide students the unique opportunity to experience first-hand real world experience of how SMEs operate through invited practitioners. They can include software vendors, technical consultants and representatives from SMEs adopting ES.

Incorporating ES into SME Syllabi

To incorporate ES into SME syllabi, academics need to consider several factors. In the following sections, we discuss a series of considerations made while implementing the case-based hands-on approach as part of the technical stream of the course (see Figure 1), and their implications. Recapping, the study material was developed for a course offered within the Faculty of Information and Communications Technology at a leading Australian tertiary institute—UniS. The course offering typically includes over 50 undergraduate and graduate students in the current semester. The teaching plan entails at least one hour computer lab sessions, where students engage in a modular Enterprise System (that is Microsoft Dynamics NAV). All students in this course receive access to the NAV system. Every student assumes the role of an employee of a simulated case organization where each student deals with day-to-day procurement and order fulfillment business transactions.

Microsoft Academic Alliance

UniS became part of the Microsoft Academic Alliance in October 2009, following shortly after the announcement of the course setup. The program, created by Microsoft provides its' members access to a broad community of educators that are dedicated to incorporating Microsoft Dynamics Suite into business, engineering and information technology curriculum. The alliance is similar to the SAP university alliance program, which has reached many countries and institutions, offering hosting services, curriculum support, faculty training and collaboration amongst its members. Members of the Microsoft Dynamics Academic Alliance (DynAA) receive donated software for the classroom, technical support, and access to online training. The alliance promises its members that its students would engage in hands-on, practical learning experiences that powerfully affirm and complement the member institution's business course curriculum. Members also receive the tools and support necessary to dramatically enhance business, management, accounting, and finance, marketing and sales curricula while operating within budget constraints (Microsoft 2010). The membership therefore provides the unique opportunity to provide our students with a deeper understanding of how businesses actually operate using a fully integrated ES for SMEs.

In addition, the alliance introduced business *mentors* for the program. Everall, Sanders and Hamil (2008) suggested the practice of using *business support advisors* from business incubators, enterprise start-ups and consultancies to enhance the effectiveness of e-learning tools and training resource skills to business advisors. Similarly, though we believe technical skills and knowledge relating to the NAV software is important, a pedagogical approach to end user training is essential. Before the initiation of the program, we (the coordinators) attended several client-training workshops organized by a local certified SME software provider. Program coordinators were able to experience first-hand, the teaching skills and ability of real work business advisors to facilitate changes for their small business clients. Furthermore, business mentors acted in an advisory capacity during the development of the *case-based exercise* to supplement the program.

Incorporating a Case-Based Exercise

Leger (2006) suggests a carefully constructed business scenario (i.e. a teaching case) to deliver both functional and process aspects of an ES. Although the teaching case approach has been employed in academic curricula for a long time, a teaching case designed to provide a technical view-point using organizational, functional and process viewpoints is atypical in SME and ES curricula. The challenge for educators is to select or design a case study that (1) is substantive enough to reflect a real situation; (2) is stimulating enough to invoke discussion and

subsequent learning (Hackney et al., 2003); (3) demonstrate the practicality of the theoretical ES teachings and (4) allows the students to assume a particular role that mimics real world.

Table 3: An Excerpt from the Training Document

An order of 100 tour bicycles (item no: 1001) has just arrived for CXX Ltd. from customer JH. To produce a tour bicycle, you need to first produce a routine bicycle (item: 1000). There are work machines and centres that are allocated to produce other specific parts of the bicycles. To produce 100 touring bicycle, it usually takes 3 weeks...CXX Ltd. wants to become the market leader for city and recreational bicycles in Australia for some time... The CXX Ltd. design department usually designs the parts, which are then manufactured exclusively for CXX Ltd. by the supplier. By having several locations in the UK, the company is able to offer a high level of service to bicycle dealers. Thus, it is even possible for dealers to rapidly replenish out-of-stock items from a warehouse in their area. Furthermore, this helps them maintain close relationships with customers. CXX Ltd. has used the ERP solution, Microsoft Dynamics NAV, to support its company processes. At the time, the choice was based on the fact that CXX Ltd. identified with the innovative nature of the product....

The case study exercise and the training document[3] were created from scratch by the article authors with supplementary material from Microsoft Academic Alliance faculty content for the purposes of immersing students into role-based exercises. In the exercise, the assuming of a role in a case organization enables students to initiate business transactions and experience business relationships between vendors, clients and customers. The philosophy of an accompanying training document is that explanations to the students should be straightforward while emphasizing the learning that can be gained through their descriptions and analysis of the common core business processes (see Figure 2) they are completing. A practical assessment to demonstrate the successful completion of the each critical process is useful for motivating students to adopt the exercise design. We adopt screenshots to provide us proof of completion for important transactions within the exercise. Table 3 above illustrates an excerpt from the teaching case and training document.

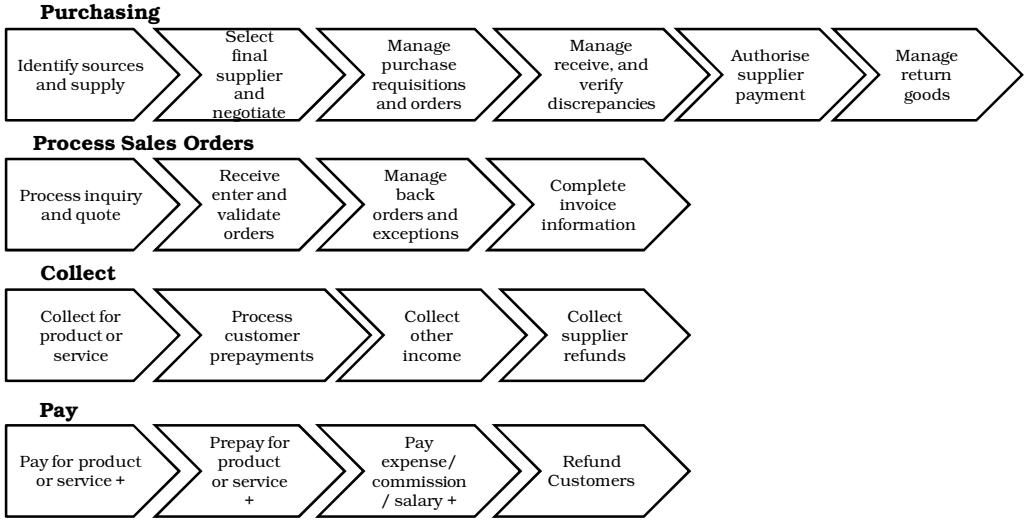
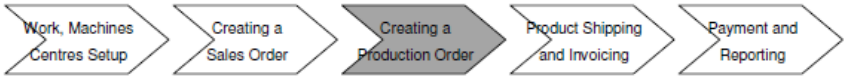


Figure 2: Common Core of Business Processes Incorporated into SME Syllabi

The training document facilitates both technical knowledge and business process knowledge. The document first describes the background of the case organisation and how have the ES (that is NAV) brought in, changed the face of operations in the case organization. The training document also gives additional material (e.g. vision and goals of the firm, bill of materials for production, shortcuts and vendor and customer lists) to help the student complete his/her tasks, just like the users in the real world. The teaching case material is then divided into 5 related phases: (1) Work and Machine centres setup, (2) Sales Order creation (3) Production Order creation, (4) Shipping and Invoicing and (5) Payment and Reporting. These five phases covers the span of common core business process in Figure 2. At the completion of each phase, students are required capture outputs as their evidence of completing the exercises. Once completed, users were required to submit these outputs and their analysis as deliverables using a standard template. Completing the phases of the exercise requires the negotiation of four interrelated tasks (1) Understanding overview of the business process, (2) functional navigation, (3) data entry and tasks and (4) Capturing the outputs and deliverables. Figure 3 provides examples of the typical execution steps from the actual training document.

[3] Source: Microsoft Dynamics NAV Hands-On Exercise Notes- Available from first author on request.

Step 1: Overview of Business Process



Tasks and Data Entry

C. ***Production Order:*** We can generate a production order directly from sales orders. So we decide to generate a new production order for the quantity requested. The new production order will be generated in the state Firm Planned Production Order in order to proceed immediately to production execution.

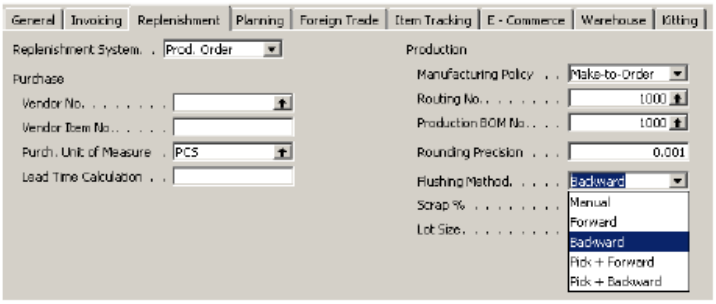
Step 2: Functional Navigation

B. Flushing method for items, work and machine centres

Navigation: Manufacturing → Product Design → Items

2. Select Item → List or F5. We double-click on item 1001 and in the Replenishment tab we change the Flushing Method to Backward. Select Backward from the dropdown list: . We must do the same change to all items involved in the production of item 1001.

Step 3: Data Entry and Tasks



3. Click on the drop down list for the Production BOM No. field and review the list of items used for the production of item 1001.
4. Record the list of items and work machines and centres on a piece of paper.
5. So in each and every item we must make sure that the Flushing Method is set to Backward. Repeat steps 2 for each of the items listed in the Production BOM No. field list.

Step 4: Capturing the Deliverables

32. These are the total detailed costs including both resources and raw materials (value entries). Export this screen to Excel and calculate the totals for the resources and the materials.

33. Finally we can generate the statistics of the production by selecting Order – Statistics or by pressing F9. Screenshot this page. Check the Material and Capacity Cost figures with those you calculated in Excel.

Figure 3: Completing the Business Process: A Four-Step Process

Setting up the environment

In this section, we consider three important aspects of setting up an experiential learning environment for students: duration of laboratories, technical support and reputation of product. Firstly, we look at the appropriate duration of each tutorial. Considering the amount of time students accumulate in logging into the system and referring to the workbook to aid in completing the execution tasks in Microsoft NAV, we urge educators to allocate at least 45minutes to an hour for each sitting over a 6 week period. This hour would consist of the tutors explaining the process, roles assumed, student's login, execution and summary of tasks. Secondly, while lecturers and tutors must be trained to perform error checking and provide support, establishing a network of technical support staff in the university, resources allowing, is recommended for the duration of the exercise. Lastly, the software students would use to execute the business processes would be Microsoft NAV 2009, the latest version of the popular Dynamics suite from Microsoft and a leading integrated business management solution. As such, we urge educators to incorporate software that are new and aligned with industry practice to make them more "recruitable". Consistent with Rosemann and Maurizo (2005), feedback suggests that students generally have a positive impression of large software vendor.

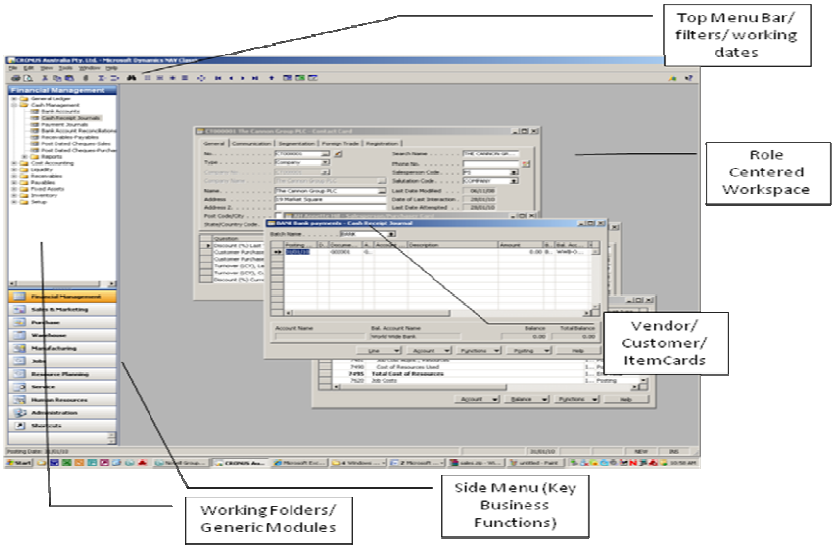


Figure 4: Main Navigation Pane and Work Window of Microsoft Dynamics NAV 2009

An ES designed for SMEs

Microsoft Dynamics NAV is a business management solution and an integrated ES that delivers functionality for all aspects of operational and financial activities of SME (Microsoft 2010). It promises to support essential business functions in six areas of an organisation, finance, logistics, sales and marketing, management, production and project management. Its new web service architecture also allows integration of key information from Microsoft Dynamics with other business applications. Its other reported advantages includes close visual and functional ties to Microsoft Windows Vista and Microsoft Office, multiple currencies and languages support and low cost of ownership (Microsoft 2010). These characteristics of the software also make it an appropriate teaching tool for an SME syllabus. Figure 4 shows the main navigation pane and work window of Microsoft Dynamics NAV 2009. Features such as role centred workspaces, generic modules in working folders, card based interaction and close functional ties with Microsoft software makes it an intuitive learning tool.

Table 4: Module Functions & Utilities (reproduced and adapted from Hilletofth 2008)

Module	Functions and Utility	Rollout
Financial Management	General Ledger	✔
	Receivables & Payables	✔
	Consolidation	✔
	Multi Currency	✔
Distribution	Order Processing	✔
	Pricing for Sales & Purchasing	✔
	Inventory Costing	✔
	Shipment & Delivery	✔
Manufacturing	Production Orders	✔
	Bill of Materials	✔

✔ :Phase 1 (Semester 1,2), ✘: Phase 2 (Semester 3,4)- Available from Author on Request

To complete the core business processes and transactions highlighted in Figure 2 and Figure 3, a number of modules, functions and utilities are required. Table 4 lists the available functions and utilities of Microsoft NAV 2009. Given the possibility of upgrades, the authors believe that list is not exhaustive at the time of publication of the article. The ticks in column three of Table 4 shows the number of functions and utilities used for this phase (one) of the exercise.

CONCLUSION AND FUTURE WORK

This article presents an IS curriculum design for tertiary institutes that seeks to successfully adopt and marry business process oriented and software oriented approaches. This curriculum provides both undergraduate and postgraduate students with hands-on experience with a real-world enterprise system to reinforce (with real-world practice) the textbook theory and principles of IS for SMEs. The purpose of this paper is to establish a set of preliminary considerations for designing SME syllabi. The course is further enhanced with developing an

experiential learning environment and team-based activities. This article is written for academia intending, designing or already teaching SME and IS related syllabus using E-learning techniques and incorporating an ES designed for SMEs. We encourage fellow academics to adopt this teaching practice when using similar approaches to incorporate ES into higher education of broader IS topics (such as SMEs in this case). The adopted approach comprises of critical SME teachings that fall into both *business strategy* and *technical* streams. Further, the paper demonstrates the aptness of using Microsoft NAV 2009, a relatively new packaged systems to teach key SME business and ES related concepts. Implications and contributions of this article are twofold. For academia, these considerations form an activity checklist and guide that academics can use when designing an SME and ES related course. For knowledge, the article presents a learn-by-doing approach for curriculum innovation.

System Quality		
Features and functions (SQ5)	NAV includes necessary features and functions	Adapted from (Gable et al. 2008)
Level of integration (SQ9)	All data within NAV is fully integrated and consistent	Adapted from (Gable et al. 2008)
Information Quality		
Formatting (IQ4)	Order Fulfillment outputs generated from NAV appears readable, clear and well formatted	Adapted from (Gable et al. 2008)
Conciseness (IQ5)	Order Fulfillment outputs generated from NAV is concise (to the point)	Adapted from (Gable et al. 2008)
Impact		
Learning (II1)	I have learnt much about Order Fulfillment through NAV	Adapted from (Gable et al. 2008)
Awareness (II2)	What I completed in NAV has increased my awareness of Order Fulfillment	Adapted from (Gable et al. 2008)
System Use		
Frequency (F1)	I spend X number of hours per week, on the system completing my tasks	(Cheung and Limayem 2005)
Exploration level (DP5)	I have explored additional system features in NAV beyond the given specifications.	New Scale

Table 5: Selected Measures for Gauging Student Satisfaction

At program level, the official student feedback survey[4] conducted by the central strategic planning unit of UniS, indicates positive scores across all categories (in semester one, phase one). From the results, we anticipate similar positive responses to the curriculum in subsequent semesters but predicting the success of the approach in the longer term, in the views of the authors is still premature. Antonucci et al., (2004, p241) suggests that little research has been published that measures the effects on student understanding of course material and their broader knowledge of business issues. In subsequent phases, we will use an additional survey to (1) track the student's reactions to the system, tasks and instructions and (2) evaluate the learning outcomes, at either an early stage or latter stage of system interaction or both. For this purpose of canvassing the student's reactions to ES curricula, we use a set of measures including ease of use of the system, ease of learning with the system, understandability of reports generated from the system, un-expectancies encountered, adequacy of instructions and so on. A survey of the current course design will be conducted after phase one of the course roll-out and then again at phase two. The four dimensions and measures (see Table 5) represents an overarching measure of student satisfaction. A phased evaluation is currently conducted at UniS to verify its appropriateness and impact.

[4] Survey results available from the authors upon request: Full Unit Level Report, Semester 1, June 2010, Prepared by Evaluation Services Strategic Planning & Quality Unit, UniS

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