

The Use of a Commercial ERP System: Teaching Business Systems to Computing Students

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Abstract

This paper describes the use of a commercial Enterprise Resource Planning (ERP) system in an undergraduate degree course. It will describe the process of deciding on which system to use, the implementation of several different ERP systems and the integration of the system into the curriculum of the course. The paper will also discuss the different pedagogical uses of the system, the different ways in which such a system can be implemented and the advantages and disadvantages of the different systems that were implemented. The paper will conclude with lecturer and student feedback on the process and application of employing such a large system into the course to enhance the teaching and learning of a business information system to computing students.

Keywords: Enterprise Resource Planning, information systems, computing education

1 Introduction

At the School of Computing and Information Technology (SCIT), Unitec Institute of Technology, New Zealand, an undergraduate degree course, Information Systems in Business (ISB), in the Bachelor of Computing Systems (BCS) is offered to the students in their second semester. This is a compulsory course at level 5 (first year degree level) and is intended to give the students an overview of business activities and how Information Systems support those activities. One of the major objectives of the BCS is to give the students the ability to apply any practical skills gained, and to this end it is important to use real world software, and there is also a very practical approach to all course delivery (i.e. there are both theory and practical lessons). The Information Systems in Business course follows this pattern, with a heavy emphasis on practical exercises to support the theory. It was therefore decided that using an real ERP software product would be advantageous to the student learning experience.

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Several systems have been evaluated over the years and this paper will discuss each of the systems chosen, the issues involved with the implementation and teaching of each of the systems including the student learning experience.

2 Background

When the ISB course was first taught nine years ago the balance between theory and practical was heavily weighted towards theory with the practical being centred on a wide range of small simulations and spreadsheet exercises. It was decided to try to bring more real world practical assignments into the course (Goodwill, 2001) and in 1999 the Faculty of Business was offered a free copy of SAP (valued at about \$4,000,000). After a minimal amount of lecturer training, SAP was introduced into the ISB course as a set of very short exercises. After the initial training and the implementation of SAP, lecturers teaching in other courses in the Bachelor of Computing Systems within SCIT and from other Schools in the Faculty decided it was too complex, and opted to not use it. The students also found that SAP was too complex and had difficulty in loading the software (Goodwill, 2001). There were problems with technical support, the complexity of support required, and insufficient training of the staff, and so at the time when the server needed replacing we decided to look for a simpler ERP system.

At this time, a new-to-New Zealand system, then known as BPCS-MAX was being promoted. It had several attractive features - it was designed for SME's, ran on a small Windows-NT server, was similar to the original BPCS (which was familiar to several staff), could be managed by the lecturers, and the simpler structure made it easier for students to use. The local manager of the vendor (SSA-Global) was very supportive and arranged the purchase at a reduced cost so that we could convert to using it in 2003. Very little staff training was needed, and more student exercises were developed than we had had with SAP. However, this system too reached a stage when it needed to be replaced, with the non-delivery of promised features being a big issue. Also, in the climate of declining student numbers, we had difficulty in justifying the on-going licensing cost.

The local SSA-Global manager had moved to a competing company, Technology-One. We discovered that they had a very suitable and right up-to-date ERP product, Finance-One. Support for educational use was demonstrated by their offer of the product at a very nominal one-off cost, and we converted to this new

system in 2006. The system is a very good match to the course content and even more exercises have been added. From our experience it is the easiest of the three ERP systems we had implemented for students to use, but there were still some issues with lecturer time for the development of more exercises.

3 Definition of an ERP System

An ERP is mainly a back-office system, providing operational support for activities in most, if not all, functional areas of a business. They also either provide support for, or even directly support front-office activities such as Customer Relationship Management and Supply Chain Management. The primary activity of an ERP is to support daily operational events, but while that is happening, a very large database is populated to provide the platform for an extensive Management Information System. Many processes can be partially or fully automated, and a wide range of inter-active tools can be supplied. They are a necessary tool in the move towards the paperless office.

“Enterprise Resource Planning systems integrate (or attempt to integrate) all data and processes of an organization into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a unified database to store data for the various system modules. ERP systems typically attempt to cover all basic functions of an organization, regardless of the organization's business or charter.” (Wikipedia, 2007)

“ERP systems themselves are an attempt to integrate applications and data within enterprises, that is, intra-enterprise integration. In theory, an ERP system is a single software program that serves the information needs of all users throughout an enterprise.” (Dunn et al, 2005)

It is this wide-ranging support for business functions and processes that make an ERP ideal as a demonstration tool to support the learning of business activities.

4 Why teach an ERP?

Anecdotal feedback for the SCIT Industry Advisory Committee fully support the teaching and use of real systems including ERP systems and to incorporate “real world learning” into our teaching and courses. Although there is never the intention to train students as specialists in any particular ERP system, we merely aim to expose them to as many information systems as possible during the course of their degree studies. Our intention was to ensure they were at the level of a support technician and to give them experience of a real system to support the theory.

One of the main reasons for the charity from the three vendors we have worked with is that they were keen to see graduates entering the business world with knowledge of their product. With SAP we found that there are very few users in NZ who were employing local graduates, and those users were bringing in

experienced support staff from overseas. The use of BPCS-MAX was expected to grow in NZ because of it's target market, but eventually they only managed one customer. However, Finance-One is already established in NZ as a popular ERP for SME's and government departments, and so there is already a need for support staff with knowledge of the product.

One of the more common comments we get from students about the ISB course is that “they do not have business experience and so do not understand what we are teaching.” (See Student Feedback later.) While some material can be demonstrated with spreadsheet simulations, and the use of smaller systems like MYOB, the concept of process flows across functional groups, integration, data sharing, validation at source, etc., cannot. Having a set of exercises that build on each other as we follow a process through the system enhances student understanding of these concepts.

Many educators have found the benefits of using an ERP system because of their application to a wide-ranging business processes, with comments like :-

“ERP systems are enterprise-wide and they claim to incorporate best business practices that replace separate functional systems and impact significantly on the existing processes and practices of business.” (Hawking et al, 2002)

and :-

“What an ERP system does provide is ‘real-world exposure’. Students can take a look inside and see how it is built. Also, students can take it for a test run. After a few years of a traditional stove-pipe business education, students still have trouble understanding how all the components of an integrated system fit together. The ERP system provides this perspective. Students also have access to the “best practices” business models available in ERP systems.” (Watson & Schneider, 1999)

Students tell us they often get tired of lecturer anecdotes about the systems they work with (or have in the past), or PowerPoint descriptions and images. They want hands-on experience of their own and need to be able to make mistakes and see why such a mistake happened. We believe they need to experience an event and reflect on what happened and why in a safe environment such as the classroom before entering the workplace and making the mistakes there which could have far reaching consequences.

5 Application of Learning Styles and Learning Theory

Over the years, the ISB course (and its predecessors) has suffered a poor retention rate and poor pass rates. (Goodwill, 2001) To some extent this can be related to a reluctance of the students to participate in what they see as a course not relevant to a computing career. Our Advisory Committee continue to tell us it must remain as a compulsory course, but just telling the students that is not a motivator. Our challenge has been to help the

students to see the relevance of the course, and the use of a large commercial system supports that.

Also, in an effort to better match the delivery of the course material to the student Learning Styles, we have for several years asked the students to participate in a simple online test (www.howtolearn.com) to determine their personal Learning Style Index (LSI). This is accompanied by material that shows them how to improve their study based on their LSI. This material has been collated, and has consistently shown that our students are predominantly Kinaesthetic, or learn while being active. As a result of this, an increasing number of practical exercises have been introduced, and the time on “lectures” trimmed back, with the proportion now at about two-thirds practical. The Finance-One exercises fit this approach, and both retention and success rates have gradually been lifted.

Our approach also fits into Kolb’s 1984 Experiential Learning model. It is interesting that at the time he wrote his book he was able to make the statement:-

“Indeed, the wider “real-world” environment at times seems to be actively rejected by educational systems at all levels.” (Kolb, 1984)

Today, “Real-World Learning” seems to be the catchphrase of modern tertiary educators. This has led to the development of many simulation systems that are available to support learning today.

Many tertiary lecturers will be familiar with Gibbs’ 1998 interpretation of Experiential Learning, and we have followed his guide-lines for many years:-

1. Learners are involved in an active exploration of experience.
2. Learners must selectively reflect on their experience in a critical way.
3. The experience must matter to the learner.
4. There must be scope for the learner to exercise some independence from the teacher.

Although these references may seem old, they have resulted in teaching methods that have been fine-tuned and proven since then.

For some more recent theory, we can look at student engagement:-

“Engagement occurs when students feel they can interact with the content and feel their lives are in some way “touched” or mirrored in the content.” (Anderson, 2002)

The deeper we can engage the student, and the more relevant the activity to what they perceive as their future need, the more likely the learning will result. Our goal is to set up an environment where they will want to become involved, will want to participate, and as a result both explicit and implicit learning will occur. Using a real-world product (Finance-One) with a real-world situation (the case study company), we intend that the student will come to see the relevance and become actively involved.

6 Pedagogical Use

Over the years a style for the use of the ERP has been developed. The current format involves some simulation of a real company, and is linked to a case-study company used in a formal assignment for the course. The use of a currently successful NZ company makes the exercises more realistic. (The choice of a currently successful company means there is more information about that company available in the public domain.)

The exercises build on each other, but also follow the flow of theory through the course. For example, the theory on Master Data is followed by an exercise that looks at the master data held in the demo company loaded into Finance-One, including the wide range of compulsory and optional data elements. The theory on Asset Management is followed by an exercise involving the creation of an asset record for the case study company. A theory session on Control Systems is followed by an exercise looking on the control systems available in Finance-One, which is really a revision exercise because these controls have been visible to the students as earlier exercises have been done.

All students were surveyed and from those who had used more than one ERP system the majority of students indicated that Finance-One had the easiest to follow interface.

Students often have to be guided to evaluate and reflect on what they have just experienced. To encourage reflection, there are a series of questions scattered through the exercises that they are required to answer – they are asked to note down their answers. During the class activity, the lecturer will ask the students to pause while some of these questions are discussed. The system is always available outside class time, and exercises can be repeated, and so more reflective students can repeat the exercises many times.

Despite the positive values to be gained from these exercises we have found that some students still have to be encouraged to even do the exercises (it is much more fun to use the class time to browse the internet!). For those students, completion of the exercises has been encouraged by including random questions about the exercises in a set of online quizzes (via Blackboard) – these are “open-book”, but the student needs to have noted down the answers to the worksheet questions. These quizzes are summative (a very small weighting) and do contribute to the course final grade.

Problems can be encountered when there is more than one lecturer involved in the course delivery. The lecturer developing the exercise gains in-depth knowledge of the system and it is essential that any other lecturers involved in the delivery of the course also gain this in depth knowledge. Spreading the development of the exercises among the staff is a good way of ensuring everyone has the knowledge to be able to trouble shoot students’ problems in class.

7 Choosing the ERP

A major requirement of any ERP is the functionality. There must be a set of modules or features that support business processes across a full range of business activities. Finance-One is a surprisingly close match to the prescription for ISB, with Payroll and some HR function being the notable omission at this stage. (These are available in the Australian version and we are waiting for the New Zealand version to be delivered.)

Cost is always a major consideration for any tertiary institution who are traditionally on a very tight budget and having a friendly and generous vendor is a big help. Technology-One are open to discussion from other tertiary institutes. However, one of the side-effects of their success in New Zealand is that the manager is always very busy implementing and supporting new customers!

The cost can be off-set if the software can be used for more than one course. In SCIT, there was a slow deployment to other courses as lecturers gained skills within the system.

One cost that must be met by the institution, is the provision of a suitable server. The system normally needs a high specification server (or servers) and Intel workstations in a commercial environment. As we were restricted on funds and could not afford a high specification server and Intel workstations we took a gamble that a dual-processor single server and Athlon work-stations would be sufficient. Students work at a slower pace than an experienced commercial user, and our class sizes are at a maximum of 25, and so there are only occasional times when response times are slow enough to be noticed.

Another issue is security of student data. We wanted to be sure that the system would be in the same state next time when they want to continue an exercise. The Finance-One system comes with three divisions in the database (Testing, Training, and Production), and more could be added – student logins belong to just one division, and so conflicting actions by another class are avoided.

Remote access to the server would be an advantage. In the modern era our students have remote access to most services. The first time through an exercise should be done with lecturer supervision (they do manage to mess up on the best of exercise worksheets!), but it would be better for the students to be able to repeat the exercises in their own time, from off-site. This feature was available with the BPCS-MAX, but some of the “advanced” features of the Finance-One client make this impossible. Finance-One does have an email client, but the functionality provided by this does not meet our classroom needs (and it needed an additional server), and so it has not been implemented at Unitec.

A major requirement is for the lecturer to have access to most of the Administration activities and the smaller systems allow for this. This is necessary for the creation of exercises and general management of the data and parameters. It must be possible to create new

users immediately in the earlier classes, when late enrolments arrive.

Finally, the lecturers must have a minimum level of training, usually provided initially by the vendor. To enable full knowledge of the system this needs to be followed by free time to fine-tune that training into the development of course exercises. Vendor certification would be an added advantage as it could then be formerly recognised as professional development. SAP has vendor certification but unfortunately neither of the other two offer any form of certification.

All three of the systems were evaluated by the authors based on solely on their experience with the three products, using a Software Vendor Evaluation Spreadsheet (Software Evaluation, 2004). The final scores of the evaluation are included in Appendix 1 and the full results will be published elsewhere in the NACCQ 2007 Conference Proceedings.

8 Student and Stakeholder Feedback

Anecdotal feedback, mostly in the classroom, in the form of a simple comment, such as “It’s good to be learning a real system” or “Now I understand!” has been gratifying. It also shows in the way the students move enthusiastically to the workstations to do the next exercise in the series.

Some positive comments have been collected in the formal Quality Control student feedback system, Sequel, such as:-

Sem-1 2004 – The integrated information systems or (sic) merge in businesses.

- Getting to know about different software the business uses.

- The usage of packages like MYOB.

Sem-2 2004 – I liked doing MAX and ERP exercises.

- How we got to create our own company with MAX from beginning to end.

- Match the real world application.

Sem-1 2005 – Application to business situations.

Some of the negative comments from the Sequel feedback is also informative:-

Sem-1 2004 - Difficult to understand MAX software. Need more practical in class.

- Include more practicals or practical learning or field classes.

- (need) A lot more hands-on work.

- (need) Less exercises. (!)

- (need) More interactive media.

Sem-2 2006 – (need) More interactive – practical work.

- (need) More practical work / Real world work.

A simple survey of student opinion was conducted in Semester 2 of 2006, which gave the following responses ...

- 74% considered that they had no business experience prior to the course, not even from student jobs.
- 89% considered “the exercises to be helpful in understanding the theory topics”, and supported this with comments like “Gives us a feel of the real business world. Can see the picture clearer by stepping in different types of roles.” *and* “Showing the way that information is passed throughout business.”
- A similar 89% would have liked even more Finance-One exercises to support other topics, with comments like “We didn’t do as many exercises as I wanted to fully understand the system.” *and* “I’d love that, more exercises would be very helpful. Really do!” *and* “Yes, more the better.”

9 Conclusions

The introduction of an ERP into the Information Systems for Business course enables us to provide an “experiential learning” environment for a course that was once seen as mostly theory. By using a commercial ERP we are able to apply modern learning theory into the classroom and combine that with practical exercises using real world software. It is easier to achieve student engagement in the learning process when the students can see the relevance to the workplace.

Student feedback over the past three years confirms that the students are seeing the relevance of this course to their future career aspirations. This is also reflected in the better retention and pass rates for the course.

Academic staff are also able to up-skill to a modern information system, and gain hands-on skills. It is another way that industry contacts can be made and maintained, to support and ensure that academic staff are current with the latest industry uses of technology.

Although there does need to be a small investment in infrastructure, and a bigger investment in lecturer time for training and the development of suitable exercises this is offset by the positive and “real world” experience of the students.

Unitec has recently adopted a new marketing slogan “Experience real world learning”. We believe that in the School of Computing and Information Technology we are delivering on this promise as our BCS degree students are experiencing “real world learning” and gaining a better understanding of the business environment in which they will be operating, both in their further studies and their future careers.

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Appendix 1

Final Scores					
Section	Description	SAP		BPCS-MAX	Finance-One
1	Overall Software Requirements	139		121	159
2	Administration and security	16		32	54
3	Reports	17		16	34
4	Web based Software	0		0	0
5	Vendor and Vendor Support	44		26	58
6	Your Own Additional data Section	0		0	0
7	Software and associated costs	15		39	60
	Vendor's Total Score	231		234	365

Adapted with permission from Software Evaluation 2004