Experiential Learning with an Open-Source Enterprise System

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Abstract

The benefits of experiential learning using commercially available ERP systems have been shown; however, the costs associated with integrating and maintaining such systems in the classroom can be a barrier for academic institutions. This paper presents the results of a study where we provided hands-on experiences with an open-source ERP system, OpenERP, to students in an IS course. Learning was measured before and after exposure to the system and increases in understanding, engagement, and learning were found. However, an increase in interest in learning was not found. The results suggest OpenERP may be suitable as a supplement to traditional pedagogy, rather than using commercially available systems. We hope that increased knowledge of such freely-available systems will help to reduce the barrier to integrating ERP systems into the curriculum. Future studies might consider extending the use of the OpenERP system to a fully integrated IS course or to other business courses.

Keywords

Enterprise systems education, enterprise resource planning systems, ERP, curriculum integration, experiential learning.

Introduction

Integration of enterprise systems, also referred to as enterprise resource planning (ERP) systems, into graduate and undergraduate business courses has been widely reported (Bradford, et al., 2003; Rosemann and Watson, 2002; Strong, et al., 2006; Winkelmann and Leyh, 2010). Most of the 20 articles published between 2000 and 2011 in the Journal of Information Systems Education on ERP teaching methodology used an ERP system provided by the market-leader in the enterprise IT field, SAP, and none reported using an open-source system (Ayyagari, 2011). However many academic institutions cannot afford commercial ERP systems, such as SAP for teaching purposes. Even with educational discounts, the maintenance and training costs put these systems out of reach for most academic institutions (Hawking and McCarthy, 2004). The costs are even more difficult to justify when systems are only used in select courses as opposed to throughout the entire curriculum. To our knowledge, few Canadian universities provide any experiential learning on ERP systems. These programs rely on passive learning where students are unable to fully experience the capabilities and organizational impact that ERP systems provide. Passive learning, such as through lectures, has been shown to be inferior to experiential learning (Kolb and Kolb, 2005).

The benefit of hands-on, experiential learning using ERP systems is shown in many situations. First, learning to use an ERP system has been identified as an important IT skill (Kim et al., 2006). Sager et al. (2006) found that students with ERP education earned more than students without. Secondly, advances in pedagogical approaches place emphasis on learning-by-doing (Auster and Wylie, 2006; Bok, 1986). Finally, computer-mediated learning is known to be superior to traditional instructional modes (Alavi, 1994).

In this study we provide hands-on, experiential learning opportunities on a freely available ERP system to undergraduate business students as part of a core course in Information Systems (IS). We propose that if positive learning outcomes are demonstrated, the main entry barrier to integrating ERP systems into the curriculum can be diminished - that of cost. There is evidence that it is the skills that are important rather than the actual software package used (Strong, et al., 2006). The experiences of five universities that have taught with commercially available ERP systems have demonstrated that "… recruiters have said that the particular package [ERP system] does not matter; it is the [enterprise system] concepts learned by students that are valuable to companies and that knowledge is transferable," (Strong, et al., 2006, p. 747).

This paper presents the results of a study on learning outcomes resulting from student participation in hands-on tutorials with an open-source ERP system. This system was selected and configured so that students could gain hands-on experience using a realistic system. This active, experiential learning was expected to increase student understanding, engagement, learning, and interest in learning about enterprise systems. This paper first provides background on experiential learning, and then the research setting is presented. This is followed by the research design and a discussion on how learning outcomes were assessed and analyzed. The paper concludes with a discussion and recommendations for future work.

Experiential Learning

Recently there has been much focus on experiential learning in higher education as a means to improve learning outcomes. Experiential learning theory continues to be one of the most influential theories of learning (Vince, 1998). According to Kolb and Kolb (2005), "Judged by the standards of construct validity, experiential learning has been widely accepted as a useful framework for learning centered educational innovation, including instructional design, curriculum development, and life-long learning" (p. 196). Experiential learning has been described as a "more effective and long-lasting form of learning" that "involves the learner by creating a meaningful learning experience" (Beard and Wilson, 2006, pg. 1).

Experiential learning is a philosophy of education based on what Dewey (1938) called a "theory of experience," emphasizing reflection of experiences and defining learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41). Experiential learning theory describes the learning process as a four-stage cycle that includes: (1) concrete experience, (2) reflective observation, (3) abstract conceptualization, and (4) active experimentation. Kolb and Kolb (2005) argue that the learning process for any skill requires the ability to move through the experiencing, reflecting, thinking and acting cycle. They suggested that it is important to create learning spaces that promote these experiences for learners. Incorporating a hands-on activity with an ERP in the curriculum is one way of creating a new learning space for students. Watson and Schneider (1999) argued that there are significant opportunities to enhance an IS program through experiential learning with ERP systems. After two years of experience working with ERP systems in the classroom they proposed that hands-on exposure for students strengthens the student's learning experience. However, they noted that the benefits were not achieved without significant costs. Watson and Schneider (1999) participated in the ERP University Alliance program which provides an academic entity with a completely functional ERP system for research and teaching at reasonable or no cost. However, the authors noted "significant time, effort and money resources [were] required to ensure success," (p. 39). They experienced start-up costs including hardware, software and training, and annual maintenance and support (i.e. upgrades and training).

In this study we set out to examine how a university could implement hands-on learning experiences (i.e. provide experimental learning opportunities) to students without significant costs of time, effort or money. For example, in a situation where incorporating the ERP system throughout the curriculum is not possible, how can an instructor give students some hands-on experience with an ERP (i.e. one lecture in an introductory IS course) and still experience positive effects on learning outcomes from this limited exposure to an ERP?

Research Setting

This Canadian university offers two four-year undergraduate business degrees with approximately 1600 total students. Both degrees require a core course in IS. This course is typically taught in multiple sections of 40 to 50 students by different instructors and is the only IS course that most students will complete. As such a course, the range of topics is broad, including both managerial as well as technical subjects; enterprise systems is only one of over a dozen different topics. The university funded a course improvement project aimed at introducing hands-on ERP systems experience into the curriculum. This paper discusses the efforts for the IS course.

The OpenERP System

Using a commercial ERP system was ruled out based on cost. This meant that an open-source approach was required to develop a simple ERP system, sufficient for the intended use in the target course. The system had to fulfill a number of criteria:

1. cheap to procure;
2. reasonably quickly installed and configured;
3. include all required features;
4. easy to configure and easy to understand for non-IS majors;
5. stable with appealing user interface, and;
6. web accessible allowing use with existing infrastructure.

While there are a host of options for open source ERP systems, few satisfy all criteria. After a review of options and different system trials (installing, configuring, evaluating), the OpenERP system (formerly TinyERP) was selected. OpenERP satisfied all of our criteria. First, it is free to install and use (criterion 1). Furthermore, when compared to SAP the software is more easily configurable (criterion 2), easier to use (criterion 3), has faster out-of-the-box configuration (criterion 4), and provides more information visibility (criterion 5) (Delsart and Van Nieuwenhuysen, 2011). Finally, OpenERP can be hosted and accessed online (criterion 6).

OpenERP is backed by a large developer community providing a large number of business application modules on the OpenERP Apps website. Users install the modules that are needed and add more at any time. Since OpenERP is free to download and use without registration, it is not possible to determine how many academic institutions are using this product. However, OpenERP is also provided as a freely available online supported version to educators. Educators must register for this free service and according to their website almost 100 institutions are using this educator's version (OpenERP, n.d.).

When comparing OpenERP to SAP, based on the common business applications covered (e.g.,. sales management, purchase management, accounting and financial management), SAP was found to provide more of the standard features within these business applications; however OpenERP provided over 75%of the features for all but two of the business applications - payroll management and manufacturing management (Delsart and Van Nieuwenhuysen, 2011). Therefore, OpenERP appears to provide a suitable teaching alternative to SAP. However, a search for "OpenERP" in the academic literature only found one study. Ayyagari (2011) using OpenERP to teach ERP skills in an undergraduate IT course. The Ayyagari (2011) study indicated that it is possible to configure and integrate this system in a classroom setting; however, it did not measure or evaluate learning outcomes. nt."]

Positioning of Experiential Learning in the Course

While there have been many studies that have proposed ways of integrating ERP systems into the curriculum, a 2003 survey of 94 colleges and universities found "no consensus on the best way to integrate ERP software into courses" (Bradford et al., 2003, p. 448). A review of literature since 2003 found that a consensus still does not exist. Different approaches to integrating ERP systems into the curriculum have been proposed, for example, simulation games (Hopkins and Foster, 2011), creation of a foundation course through blended learning (Daun, et al., 2006; McCarthy and Hawking, 2004), or participating in arrangements with ERP vendors (Strong, et al., 2006, p. 747). The consensus that does exist is that most academic institutions have chosen to adopt commercially available ERP systems

(Ayyagari, 2011); however, as noted previously in this paper, these systems come with a cost that is too high for many academic institutions[1].

The OpenERP system was configured for a theoretical company manufacturing bicycles and selling bicycle parts. The product itself is easy to understand and the parts are familiar. Key information (e.g., chart of accounts, warehouses, pricelists) along with suppliers, customers, bill-of-materials(BOM) and automatic replenishment rules was developed. The experiential learning exercises focused on the sales and procurement processes with selected elements of manufacturing presented as well to highlight the ability of ERP systems to integrate different aspects of a business.

To allow students to appreciate the range of integration that ERP systems allow, students were asked to process a sales order using the ERP system and identify how the information of the sales order affects other aspects of the company such as accounts receivables, inventory, shipping, sales person compensation and commissions. Following an instructor-led demonstration of the system, students were given a handout which consisted of the step-by-step process required to sell a product to a customer, with each step accompanied by a written description of the process and a screen print of the OpenERP screen required to carry out the process (see Figure 1).

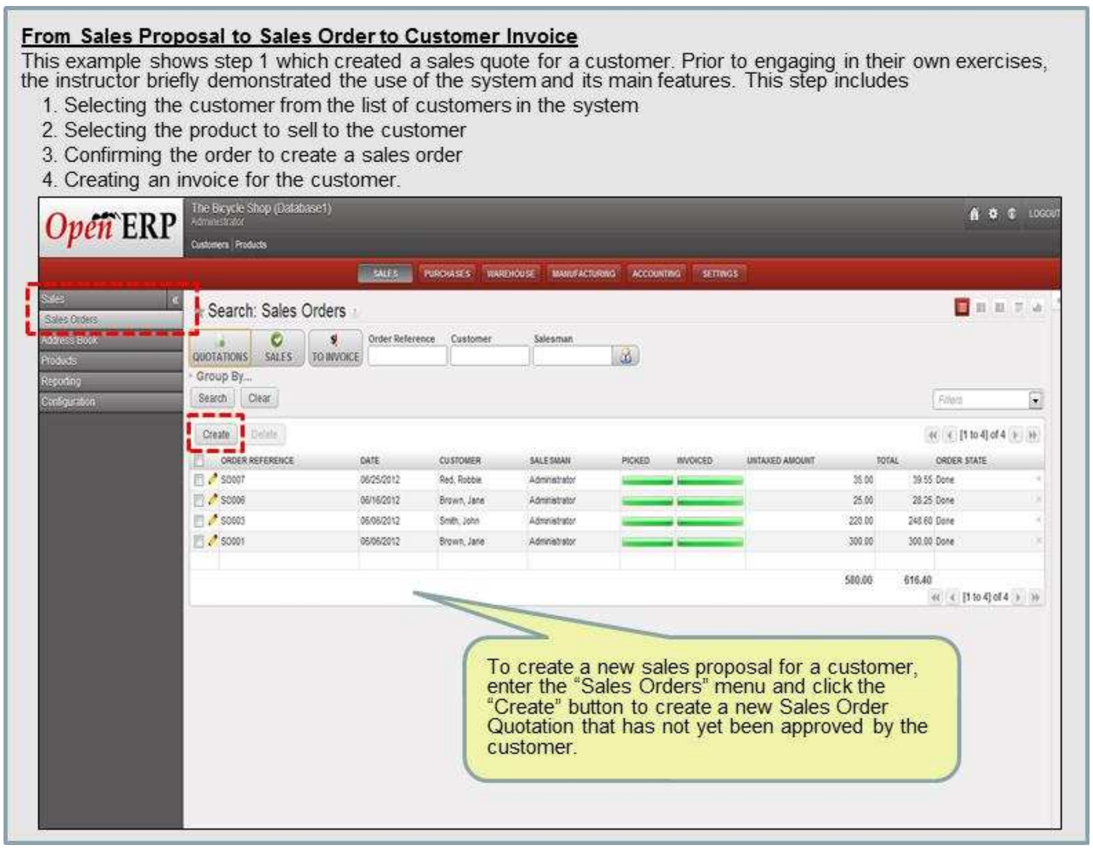

Figure 1 – Excerpt from the OpenERP Tutorial

Research Design

This study tests a number of research hypotheses to investigate the learning outcomes as a result of hands-on experience with the OpenERP system. The intended learning outcome is an improved

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[1] Even though there may be no acquisition cost for academic use, there is often a requirement for teaching staff and computer support staff to take expensive courses with the vendor. There may also be significant hardware or system hosting costs. Further, the complexity of the systems requires a significant investment of time to prepare teaching exercises.

understanding and appreciation of the capabilities and importance of an ERP to business operations, with an emphasis on operating processes. In contrast to passive learning, the active and experiential learning that is enabled by working with a realistic software system is hypothesized to:

H1. increase student understanding

H2. increase student engagement

H3. increase student learning, and

H4. increase student interest in learning.

To address the above hypotheses, an experimental pretest-posttest design was followed. Subjects consisted of students enrolled in four sections of the IS course. The experiential exercise was scheduled to take place within a few weeks of being introduced to the enterprise systems through a lecture and assigned readings. The exercise session began by asking students to complete the pretest questionnaire; students were then given a demonstration of the features of OpenERP and of a typical sales process (approximately 35 minutes). This was followed by students being given a handout of the steps of the sales process, which they were instructed to follow to sell a product to a customer. Students were given approximately 20 minutes to complete this sales process in OpenERP. Finally, students were asked to complete the posttest questionnaire.

Evaluating Learning Outcomes

To understand the impact that the ERP experiential learning opportunity had on students, we measured the learning outcomes. Some studies have evaluated learning outcomes as a result of integrating an ERP system into the curricula; however no standard measures were found in the literature. Noguera and Watson (1999) measured student performance by the scores on a posttest, and used self-efficacy and user satisfaction measures. Wagner et al. (2000) compared the self-reported knowledge of a test and a control group. Nelson and Milet (2001) performed a comparison of self-reported knowledge at the beginning of semester and at the end of the semester, and collected comments from the standard course and teacher evaluation instrument. Davis and Comeau (2004) measured perceived utility of various features of the course and self-perceived learning outcomes. Rienzo and Han (2011) and Alshare and Lane (2011) used the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT) respectively. Tyran and Springer (2012) measured the self-perceived knowledge and some team-based measures.

In this study, we use a combination of instructor-evaluated and self-reported measures to measure understanding, engagement and learning. Where possible, we use instruments which have been previously tested and developed (see Figure 2).

To measure student understanding, students were asked four questions before and after the exercise and we evaluated whether students' understanding had improved (Q1 – 4). We also asked students to self-report their level of understanding (Q5a-d).

Engagement was measured on the after-exercise questionnaire based upon Webster and Ho (1997) and Webster and Ahuja's (2006) measures (Q6a – Q6g). "Engagement is the feeling that a system has caught, captured, and captivated user interest," (Webster and Ahuja, 2006, p. 662). Users are engaged in a system when it "holds their attention and they are attracted to it for intrinsic rewards" (Jacques et al. 1995, p. 58). Webster and Ahuja (2006) found that engagement is linked to how successfully a user can use a Web site. They found that higher engagement leads to higher performance and intention to use the system in the future (Webster and Ahuja, 2006). Engagement is an appropriate measure for our study as we propose that the students' engagement allows them to learn more about ERP systems. Engagement is one of the principles of experiential learning – to actively engage students in the learning process. We also asked students whether they found the exercise useful (Q6h).

Student perception of their learning was measured based on self-reported learning items adapted from Hiltz (1988) and Alavi (1994). Alavi (1994) found three scales to measure self-reported collaborative learning: perceived skill development, self-reported learning, and learning interest. Since we are studying individual learning instead of collaborative learning, we excluded perceived skill development from this study as we felt the questions (i.e. more confident in expressing ideas, learning to value other points of view, etc.) were not applicable to measuring individual learning outcomes. We measured self-reported learning (Q6i-k), learning interest (Q7a-c), and we added two additional items to measure self-reported learning: helped me to interrelate important topics and ideas in ERP systems (Q6l), and helped me to learn basic concepts of ERP systems (Q6m).

As control variables we included questions about how many of the 24 previous classes the respondent had attended (Q8), and whether students are fluent in English (binary, Q10).

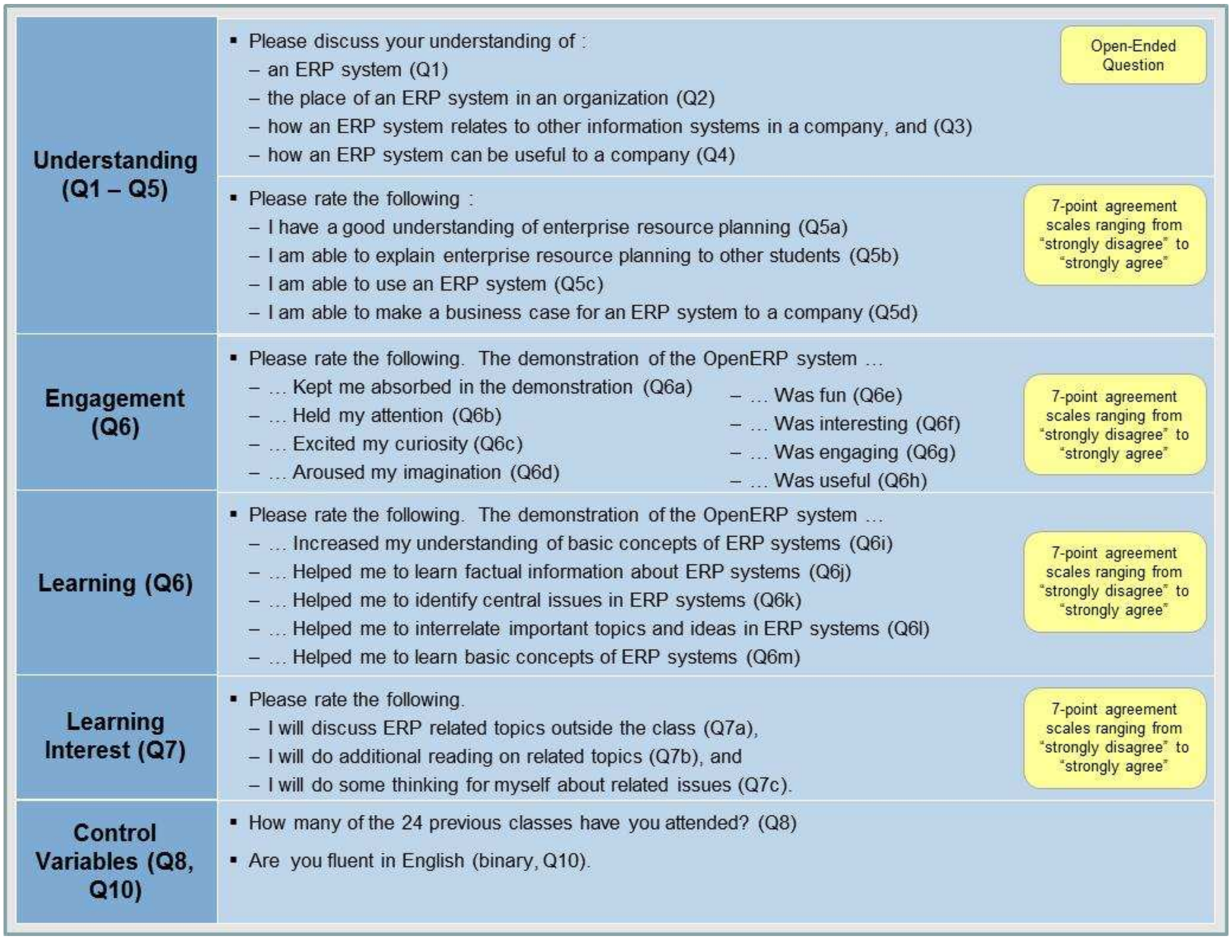


Figure 2 – Learning Outcomes Measures

Data Analysis and Results

From a total of 185 students enrolled in the course, 82 responses were received. While this is a response rate of approximately 45%, all students that participated in the experiential exercise responded to the questionnaires. Of these, 71 provided information on both the before and after questionnaire, 5 provided responses only on the before questionnaire, and 5 only on the after questionnaire, and one provided responses only to questions other than Q5a-Q5b. Participants were instructed not to provide a response for Q1-Q4 if their after-demonstration response was no different than their before-demonstration response.

Quantitative Results

Significant differences (ANOVA) between the two course sections were observed for only some of the questions Q5a-Q5d but only for the after questionnaire. Specifically, subjects in section 2 scored significantly higher ($p < 0.05$) than students in other sections on Q5b and Q5c on the after questionnaire. No significant differences in the control variables were observed between the course sections. Despite some significant differences, we conduct the further analysis on the combined data set for two reasons.

First, the differences were found only on two of four questions relating to the same underlying factor ("understanding"). Second, the sample size for section 2 was only 15, which would severely limit the insight one could derive from separate analyses on this section.

The median proportion of classes attended was 1 (all classes) (min=0, max=1, mean=.85). The histogram in Figure 3 shows the distribution.

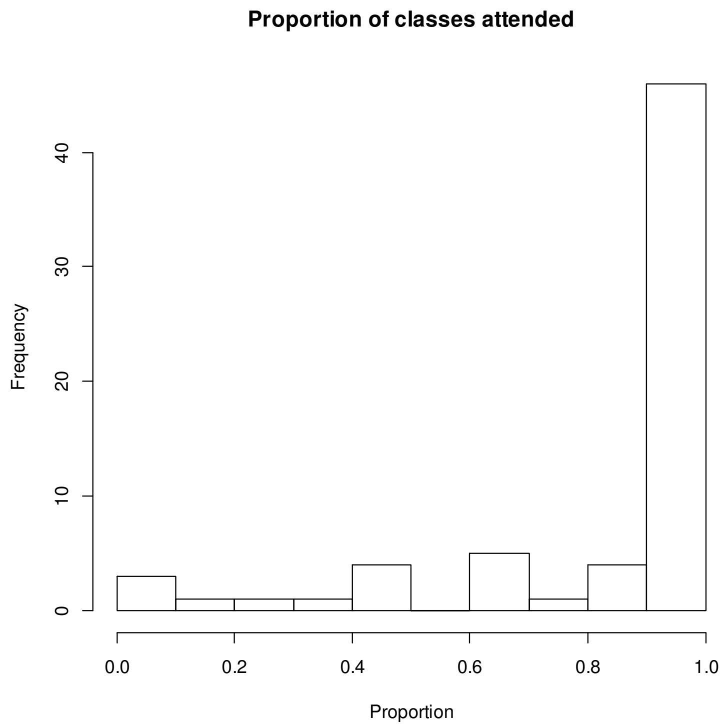


Figure 3 – Distribution of Classes Attended

Principal components analysis for Q5a-Q5d (pretest) showed two distinct factors (eigenvalues 2.098, 1.314, 0.811, 0.500) which together explain 87% of the observed variance. As seen in Table 1, the two factors are also evident in the item correlation matrix, and consist of Q5a and Q5b for the first factor, and Q5c and Q5d for the second.

	Q5a	Q5b	Q5c	Q5d
Q5a	1			
Q5b	.8389	1		
Q5c	.3045	.2956	1	
Q5d	.4493	.5095	.6222	1

Table 1 – Correlations between Measures for Understanding (Q5) - Pretest

Principal components analysis for Q5a-Q5d (post-test) showed no such distinct factors (eigenvalues 2.4796, 0.8250, 0.6918, 0.5142), with a single factor explaining 81% of the observed variance. This is also evident in the item correlation matrix shown in Table 2.

	Q5a	Q5b	Q5c	Q5d
Q5a	1			
Q5b	.8044	1		
Q5c	.7616	.6479	1	
Q5d	.7593	.7574	.7633	1

Table 2 - Correlations between Measures for Understanding (Q5) - Posttest

Given the conceptual difficulties in attempting a pre-post comparison with different numbers of factors, we decided to use two factors for both pre- and post-test, despite the indications of one factor for the post-test. We note that this may be justified by the question content, which, for Q5a and Q5b emphasizes the understanding or *comprehension* of the concept ("understand", "explain"), whereas Q5c and Q5d emphasize the *application* of the concept ("use", "making a business case"). Thus, we call the factor comprised of Q5a and Q5b "understanding" and we call the factor comprised of Q5c and Q5d "ability to apply". For factor scores in the subsequent analysis, we use the means of the two questions within each factor. There was a significant difference (t-test, $p < 0.05$) between the pre- and post-test scores for understanding (pre-test mean 2.59, post-test mean 4.11) (Figure 4).

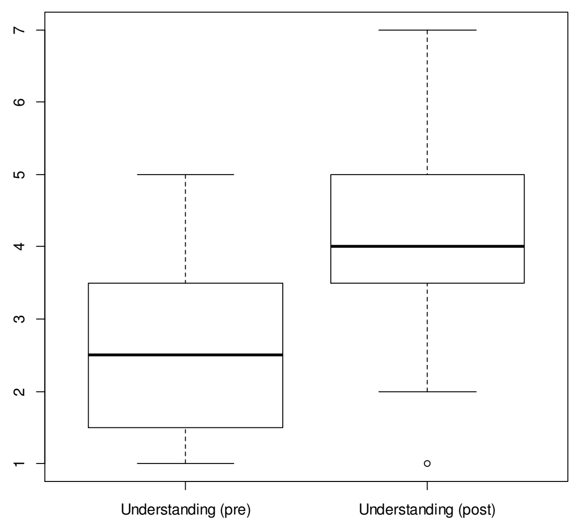


Figure 4 –Difference Between Pre and Posttest Scores for "Understanding"

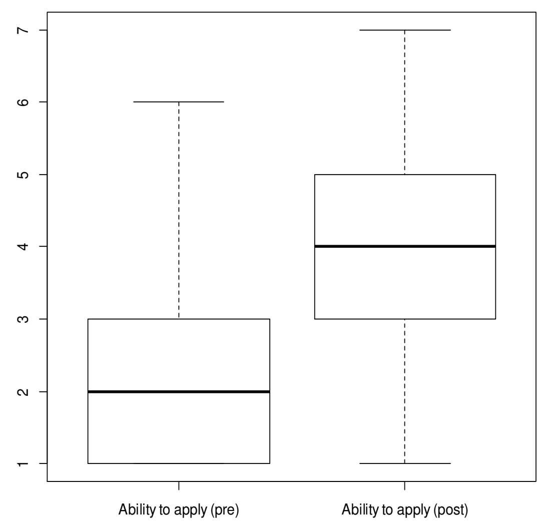


Figure 5 –Difference Between Pre and Posttest Scores for "Ability to Apply"

There was also a significant difference (t-test, alpha=0.05) between the pre- and post-test scores for ability to apply (pre-test mean 2.21, post-test mean 4.05) (Figure 5).

Next, we examined the engagement (Webster and Ho, 1997; Webster and Ahuja, 2006) (items Q6a-Q6g), perceived learning (Alavi, 1994) (items Q6i-Q6m) and perceived usefulness (single item Q6h). These items (Q6) were asked only on the after demonstration questionnaire. An ML factor analysis suggested a six-factor solution, but a principal components analysis on Q6a-Q6m suggested a two- or three-factor solution (five highest eigenvalues 3.936, 1.883, 1.240, 1.026, 0.965), which is also visually suggested by the scree plot of eigenvalues (Figure 6). A two-factor solution explains 75.0% of the observed variance; a three-factor solution explains 81.0% of the observed variance.

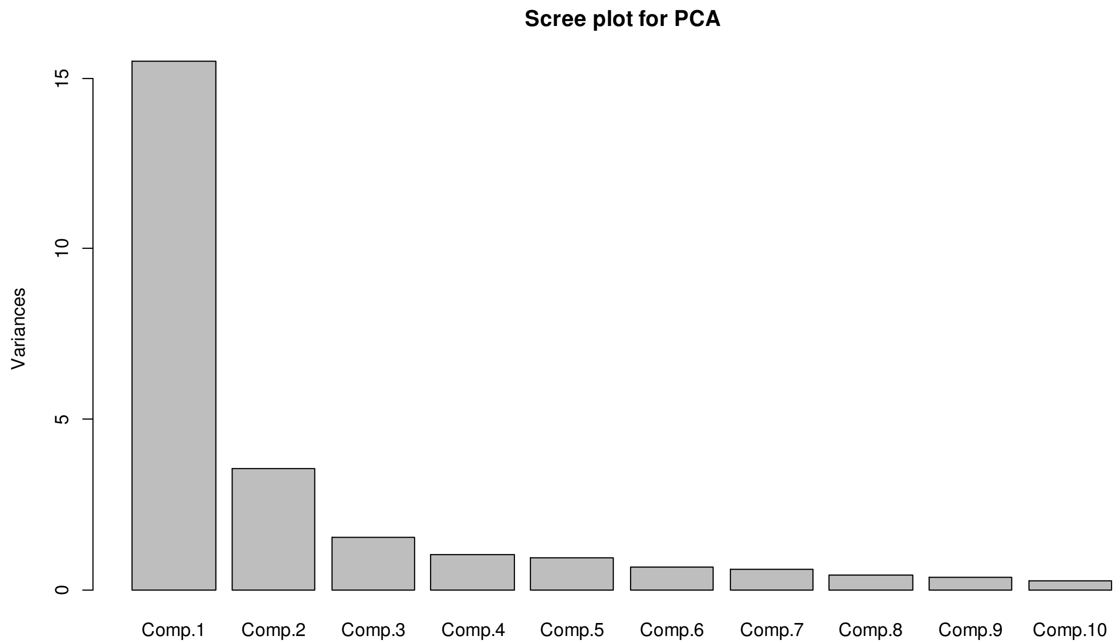


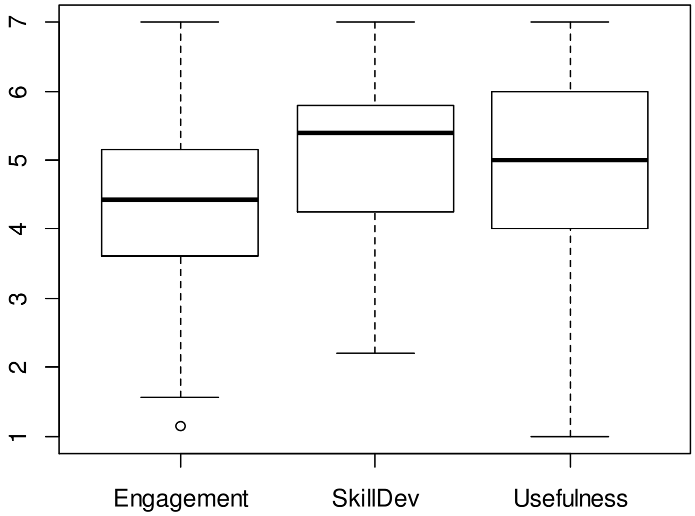
Figure 6 – Scree Plot for PCA of Self-Reported Engagement and Learning (Q6)

The loadings of a maximum-likelihood solution with two factors suggest that the questionnaire items load as theoretically expected with loadings > 0.6 (and mostly > 0.7) with cross-loadings below 0.4 and mostly below 0.3. Question Q6h was a single item about the perceived usefulness of the demonstration.

	Factor 1	Factor 2
Q6a	.794	.294
Q6b	.857	.184
Q6c	.837	< .100
Q6d	.758	.242
Q6e	.804	.318
Q6f	.775	.429
Q6g	.797	.361
Q6h	.709	.467
Q6i	.216	.882
Q6j	.168	.919
Q6k	.283	.654
Q6l	.318	.610
Q6m	.258	.735

Figure 7 – Factor Analysis for Self-Reported Engagement and Learning (Q6)

Because of factor score indeterminacy, we used the mean of the items for each factor for further analysis. The descriptive information and a boxplot are shown in the following figure.

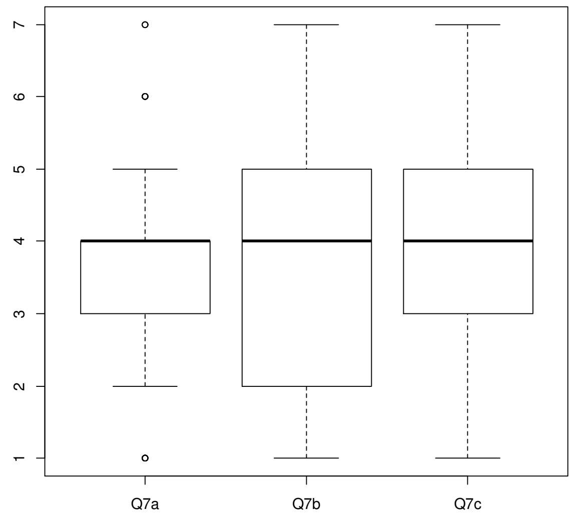


	Mean	**SD**
Perceived Engagement	4.331	1.276
Perceived Skill-Development	5.117	1.105
Perceived Usefulness	5.074	1.456

Figure 8 - Descriptive Statistics and Boxplot for Self-Reported Engagement, Learning (Skill Development) and Perceived Usefulness (Q6)

The results indicate that the demonstration was engaging to students (mean significantly higher than scale mid-point, t-test, $p < 0.05$). Furthermore, the demonstration was perceived as improving skill development (mean significantly above scale mid-point, t-test, $p < 0.05$) and useful (mean significantly above scale mid-point, t-test, alpha=0.05).

Like Q6, Q7a-Q7c were asked only on the after demonstration questionnaire. Thus, we report descriptive results in Figure 10. These results indicate moderate learning interest (Alavi, 1994) (around the scale mid-point) for the first two questions, whereas the last question shows good motivation levels. T-tests show the differences between Q7a and Q7c and between Q7b and Q7c to be significant ($p < 0.01$) whereas the difference between Q7a and Q7b is not significant. The difference is not surprising, as the first two questions asked students whether they would take some action, whereas the last question only asked whether they would "think about" the topic.



Question	Mean	SD
Q7a	3.556	1.55
Q7b	3.654	1.59
Q7c	4.000	1.55

Figure 9 – Descriptive Statistics and Boxplot for Learning Interest (Q7a-c)

Qualitative Results

Questions Q1-Q4, which were used to measure *improvements* to understanding, were open-ended questions that required students to describe their understanding of an ERP system, its place in a company and how it can provide benefits to a company.

To analyze the responses to these questions, the improvement in understanding for each question between the pre- and post-intervention questionnaire was rated on a 3-point scale, where 0 indicated no improvement, 1 indicated some improvement and 2 indicated significant improvement. The two investigators independently rated a set of 31 responses, which yielded a low agreement of 0.49 (Cohen's Kappa inter-rater agreement). Considering the lack of agreement, the raters discussed the rating scheme and their interpretation, and jointly rated all responses, discussing and reconciling any disagreement.

A t-test on each question's responses showed a statistically significant improvement in understanding on all questions ($p < 0.001$). To identify a possible impact of the different sections from which students were drawn, ANOVA analyses were performed with each of Q1-Q4 as a dependent variable. The section did not have a significant effect on the improvement in learning for any of Q1-Q4 ($p>0.05$). The following table reports the mean and standard deviation of the improvements for each of the four aspects:

Question	Mean	SD
Q1	.5854	.6658
Q2	.4390	.6106
Q3	.2195	.5217
Q4	.3536	.5957

Table 3 – Mean and SD for Increase in Understanding

Summary of Results

The results can be summarized as generally in support of our hypotheses and expectations as to the value of experiential learning for the OpenERP system. Table 4 shows that, with the exception of student interest in further learning, significant learning outcomes have been achieved.

In addition to the data in Table 5, we note that students also perceive the experiential learning aspect as useful (Q6h) and we note that H3, increases in student learning, are primarily reflected as skill development. While we expected Q7a to Q7c to show the same results, only Q7c was significantly higher than the scale mean, so that we do not consider H4 as supported.

Hypothesis		**Support**
1	Increase student understanding	Yes (Q1-Q4), Yes (Q5a-Q5d)
2	Increase student engagement	Yes (Q6a-Q6g)
3	Increase student learning	Yes (Q6i-Q6m)
4	Increase student interest in learning	No (Q7a-Q7c)

Table 4: Summary of Hypotheses

Discussion and Future Research

This study reports on the benefits of experiential learning to teach undergraduate business students about enterprise systems. We measured changes in student learning of an open-source ERP system, OpenERP, using an experiential, hands-on exercise. We found increases in student understanding, engagement, and learning. However, we did not find an increase in student interest in learning. Students showed a good level of interest in thinking about ERP systems in the future, but not in discussing or doing additional readings on the subject. Since students received limited hands-on experience with the ERP system in this study, perhaps more exposure to the system would help raise student interest in learning.

The results of this study suggest that OpenERP may be a suitable ERP system for integration into the classroom, rather than relying on only commercially available enterprise systems, such as SAP. It is hoped that increased knowledge of such freely-available ERP systems will help to reduce one of the main entry barriers to integrating ERP systems into the curriculum, that of cost. Another benefit of using an open source enterprise system such as OpenERP is that the configuration of the ERP system can freely be made available to other interested academic institutions. With almost 100 institutions currently using the online supported OpenERP, but with only one academic study found in the literature discussing its use in the classroom, this paper makes a contribution by reporting on the learning outcomes associated with the integration of OpenERP into an IS course.

The intended use of OpenERP in our context is as a supplement to traditional lecture-based instruction, rather than as a replacement. This means that the learning does not solely take place based on the experiential component. While we acknowledge that 55 minutes of experiential learning is relatively short, given the extensive capabilities of enterprise systems, even this brief experience had a significant positive effect on learning. Moreover, given that typical courses provide only about 24 hours of instructional time for a semester, providing one hour of experiential time to a single topic in a broad introductory course is often as much as is feasible.

Furthermore, the intended use as a supplement to traditional teaching methods that requires little up-front investment of money, time and other resources makes the OpenERP system a better choice than commercial systems, which, while perhaps free of direct monetary cost, may require significant vendor-delivered training or setup time. On the other hand, we acknowledge that popular commercial system may generate more student interest, due to students being able to advertise this experience on their CV.

A limitation of the study, due to the short experiential time of 55 minutes, is the fact that we were unable to explore the long-term effects of experiential learning. Beard and Wilson (2006) suggest that experiential learning is a "more effective and long-lasting form of learning". Hence, longitudinal studies would be useful for investigating the long-term learning outcomes. This was not possible in our situation as we were not the course instructors and thus did not have the ability to follow up on the experiential component later in the semester.

In summary, this study makes two contributions. First, we have demonstrated the benefits of experiential learning, even with a brief time period for the experiential aspect. Second, and more important to the practice of teaching enterprise systems, our study shows that open-source systems, while not as featurerich as their commercial counterparts, can be easily used as a supplement to traditional pedagogy that requires neither an upfront commitment of resources, nor a top-down introduction to the wider faculty curriculum, but can be used by instructors on an ad-hoc and per course basis. In fact, Ask et al. (2008) call for more light-weight demonstration environments and our effort with OpenERP can be seen as answering their call.

Future studies might consider extending the use of the freely-available OpenERP system to a fully integrated blended approach throughout the course, based on conceptual learning in the classroom and hands-on learning in the lab. In addition, the OpenERP system could be integrated into other courses, such as accounting, operations management or business process management.

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