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Abstract

ERP systems have become so widespread that they are difficult to ignore, if academics want their teaching and research to be relevant. Moreover, ERP systems provide a rich environment for classroom learning and students have a high interest in ERP courses because of the strong demand in the marketplace for ERP knowledge and skills. While there are many advantages to using ERP systems in the IS business school curriculum, there are also several pitfalls. In particular, ERP's complexity results in a steep learning curve and high dependence on resources and support. This study assesses the congruence with five theoretical learning models of using SAP R/3 both in training centers and in a business school classroom. Finally, two lessons learned offer a start in capturing best practices for ERP effectiveness in the classroom.

Introduction

SAP R/3 is a commercially successful enterprise software package. However, its sheer size and degree of integration have resulted in extreme complexity, which is a leading cause of problems in both the classroom and corporations. Complexity drives the high need for training, learning and resources such as support. However, there is a scarcity of quality textbooks and curriculum materials. In addition, the learning barrier results in frustration for students and users, and a shortage of expertise and a high dependence on consultants in the corporate world. Nevertheless, the rewards for scaling the learning curve are high due to the strong demand for R/3 skills. To provide insights on how to improve R/3 effectiveness in the classroom, this paper's objective is to assess and compare SAP training and R/3 university learning in terms of five theoretical learning models, which have been proposed as relevant to enhancing management education (Leidner and Jarvenpaa 1995). The paper summarizes the assessment in Table 1, and concludes with two lessons learned on how to cope with R/3 complexity. In particular, educators should avoid information overload and provide a strong bridge between concepts and hands-on exercises.

Theoretical Learning Models

Critics of R/3 education in universities argue that universities should not be training centers. By highlighting the differences in training and education, this analysis has implications for improving R/3 effectiveness in the business school classroom. Leidner and Jarvenpaa (1995) proposed potential for the objectivist, constructivist, collaborative, cognitive information processing and sociocultural learning models to enhance management education. The following section assesses the congruence with these five theoretical learning models of using SAP R/3 both in training centers and in a business school classroom.

Objectivist Model

First, the objectivist model's goal is to transfer objective knowledge from the instructor to the students. It corresponds with the traditional classroom, "informates" down, and assumes the instructor has all the necessary knowledge, provides the stimulus and is in control of the material and pace. However, in order to have the class learn together, pressure is exerted on slower groups to catch up and faster groups to wait. The presentation is rarely interrupted but is absorbed uncritically. Although it is an efficient and appropriate method of transferring objective knowledge, engagement is typically low. Also, there is a high risk of information overload, especially with complex content such as ERP, which requires both procedural and conceptual knowledge. Training centers focus on procedural knowledge since their goal is to ensure competence in using the software. By emphasizing conceptual as well as procedural content, universities provide a better bridge than training centers do, to hands-on R/3 exercises that could otherwise easily become robotic.

Constructivist Model

The second method of learning is the constructivist model. This model is also referred to as learner-centered education (Norman, D.A. and Spohrer 1996). In this case, the center of focus and control of learning material and pace shifts to the student, while the instructor provides support more than direction. Engagement and motivation are usually high. There is less risk of information overload when students control their pace. For the majority of the time in the SAP training session, the pairs of students set their own pace as they work through the computer-assisted instruction (CAI). The instructor answers questions but does not intrude. Nevertheless, it would be difficult to argue that students construct new meaning, which is the goal of constructivism. Indeed, Leidner and Jarvenpaa (1995) classify CAI as fitting primarily with the objectivist model. On the other hand, in the university classroom, students construct new meaning

and "informate" up while leading case discussions and doing project presentations.

Collaborative Model

The third method of learning is the collaborative model. In the collaborative model, prior knowledge and experience can be shared to enhance interpretation and learning, and engagement is typically high. However, one member of the dyad could dominate the “hands-on” action and leave the other member a passive participant (Leidner and Jarvenpaa 1993). Similarly, the shared mental model might be the dominant partner’s view. At SAP training centers, following the instructor presentation for the unit of instruction, the hands-on training is in pairs, encouraging collaboration and interaction. Usually however, CAI is on an individual basis because of advantages such as less embarrassment (Reinhardt 1995), no need to compromise on the pace of learning, and fewer distractions. At the university, although hands-on exercises are individual, group projects and case analyses require extensive collaboration.

Cognitive Information Processing Model

The fourth method of learning is the cognitive information processing model, which assumes the importance of individual’s learning styles, suggesting the need for individualized instruction (Leidner and Jarvenpaa 1995). While individualized human instruction is not practical in either environment, at the university, individual feedback is given in class discussions, and grading of homework, quizzes and projects. Another assumption of this model is that media cater to a variety of learning styles and it is considered a secondary fit with CAI (Leidner and Jarvenpaa 1995). For example, SAP's CAI tool offers audio clips, video clips and screen cams to attract selective attention. Similarly, the university 's course offers a variety of learning media ranging from the Internet, to videos, books, demonstrations and guest speakers.

Sociocultural Model

The fifth method of learning is the sociocultural model. In this model, diversity caters to the heterogeneity of learners, in terms of prior knowledge, and social and cultural background (Soloway and Pryor 1996). In the university classroom, there is enough flexibility to adjust the course to the students from a diversity of backgrounds - typically there are several international exchange students and students from other schools on the campus. For example, the semester project is a chance to tailor learning to students' backgrounds and interests. Although the SAP training does not directly accommodate the sociocultural view, the German origins of the software and the multinational focus on global implementation of currencies and other aspects of the business, validate diversity of user environments. The lunch break at some SAP training centers is a multicultural learning experience, as participants exchange international implementation experiences over German food.

Table 1
Assessment of Learning Models in R/3 Training and University Learning

Learning Model	SAP R/3 Training	R/3 University course
Objectivist	CAI, instructor presentations	Lectures, quizzes
Constructivist	Set pace but no new meaning	Student presentations -> new meaning
Collaborative	Hands-on in pairs	Group projects
Cognitive Information Processing	CAI multimedia	Variety of media, individual feedback
Sociocultural	Lunch at SAP training center	Adjust course to student backgrounds

Discussion

The SAP training relies fundamentally on computer-assisted instruction (CAI), and as such fits primarily with the objectivist learning model, and secondarily with the cognitive information processing model. Nevertheless, constructivism is applicable to some extent since the CAI is a learner-centered approach with learners controlling their pace. Also, working as dyads suggests collaborative learning to a limited degree and the international context addresses socioculturalism. Implications for SAP are to redesign the learning materials. Instructions to switch between users would avoid dominance by an individual. Confining presentations to the start of class would avoid the pressure on groups for a uniform pace. An implication for research is to examine the context of training materials use instead of just the software in isolation. The issue of how to switch control effectively between instructor and learner and between two learners in a dyad merits further study.

In contrast at the university, the R/3 course uses a greater and richer variety of learning media and is more balanced and more closely aligned with each of the five

learning models. A university course using R/3, has several advantages over R/3 training at SAP centers. First, the hands-on is spread over a 15 week semester instead of concentrated into 5 days, the length of a typical level two training class. The longer time span gives students more time to contemplate what they are doing and gives instructors the chance to complement the procedural hands-on activities with conceptual lectures, reading, discussions and group projects. While lectures are primarily objectivist, relatively unstructured group projects are collaborative and learner-centered. The learner sets the pace, has control and constructs new meanings as suggested by the constructivist model.

Second, the university course is more adaptable than the training course. The university instructor has more opportunity to get to know her students than the SAP training instructor. Realizing the students' backgrounds and prior knowledge, the university instructor can adapt the course to the students, and cater to the group's sociocultural and cognitive information processing needs more effectively than the training centers.

In summary, although the training center does provide some conceptual information, higher level learning is much more limited since the focus is on the procedural aspect of gaining software skills. The rush to complete hands-on exercises in all day classes causes information overload that confines learning. In contrast, the university environment provides time to construct new meaning and a better balance of learning situations tailored to students' needs. All five of the theoretical learning models apply in the university situation and technology facilitates "informating" up as well as down.

Lessons Learned in the Classroom

In conclusion, following are the two main lessons learned on coping with R/3 complexity.

1. Avoid information overload by using multiple theoretical learning models.
2. Hands-on exercises can easily become robotic; provide a bridge to conceptual material.

An implication for management education is to examine theoretical learning models as a mechanism to effectively adapt commercial software training tools to the academic classroom. For example, avoid information overload by using individual feedback and multiple media as suggested by the information processing model. Prevent hands-on exercises from being too procedural by providing a strong bridge to conceptual material. Finally, the complementary nature of the objectivist and constructivist models provide opportunities to informate up as well as down and for collaboration and construction of new meaning. Often technology has fallen short of transforming education. While it is premature to claim that R/3 in the classroom has transformed business education, the potential provides an exciting challenge for educators.

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