TEACHING HARDWARE CONCEPTS IN A MANAGEMENT INFORMATION SYSTEMS COURSE

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Abstract

A basic knowledge of computer hardware and software is necessary to understanding information technology management issues such as individual productivity, total cost of acquiring and implementing information technology, compatibility with existing information infrastructure, asset management, and change management. This paper describes an activity-based assignment focused on giving students practical information about the acquisition of microcomputer hardware and software. Student teams used the Internet to locate and evaluate specific hardware systems offered for sale online. Each team presents their findings to the class, which generates an often heated discussion about technical specifications, pricing, service warranties, merchant reputation, and ease of use of merchant web sites. Students readily see the practical aspect to the active learning exercise described in this article, and they are generally enthusiastic participants.

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Introduction

This exercise is conducted in a senior-level introductory MIS course that is part of the School of Business core, including students with majors in Accounting, Business Education, Management/Marketing, and Economics/Finance. In addition, some Computer Information Systems and Computer Science students take this course. Class size generally ranges from 15 to 25 students. The class is taught in a microcomputer lab with Internet access. The instructor station has the ability to project onscreen from its own monitor or from any student monitor. While the exercise can be completed without this feature, this ability greatly enhances the exercise.

Background

A number of researchers have found support for the notion that activity-based learning improves students' comprehension and performance in a course. Bonwell and Eison (1991) describe active learning as activities that "involve students in doing things and thinking about the things they are

doing." They advocate exercises that actively engage the student in the learning process and in reflecting on the learning process itself leads to a deeper understanding than if the student simply passively accepts the material. Johnson and Moorehead (1998) noted that when engaged in an active exercise within a team, students don't put their minds into neutral as they might during a lecture. Shell and Kleen (1992) argue that in order for students to develop higher order thinking skills, they must perform their own analysis and synthesis rather than read or hear the analysis and synthesis of others.

Students have different learning styles and may have more success in mastering the material when an activity matches their learning style (Meyers and Jones, 1993; Stewart, 2002). Activity-based learning provides students with alternatives to listening to lectures or reading materials.

In their study on student evaluations of teachers, Serva and Fuller (1999) found that active learning was a "significant predictor of student perceived performance" and the fifth most important dimension of teaching (after class organization, fairness in grading procedures, and relationship with the instructor, and use of media). They found that an effective use of communication tools in the course was the fourth most important dimension of teaching to students. They recommend that teaching evaluation methods should include how the instructor uses media to present information and whether the instructor incorporates active learning modules into the course.

Leidner and Jarvenpaa (1993) found that how technology is used in a classroom is important to effective learning. They found that students engaged in higher order thinking skills rather than just memorization when technology was used as in analysis and discussion rather than just a tool to project media for the class.

How the Exercise Fits Into the MIS Course

Students often have a difficult time with complex technical specifications for computer hardware and software. Yet a general understanding of these specifications is necessary for a business person to be a savvy purchaser of computer systems. The MIS course exposes students to hardware and software concepts throughout the course in a variety of ways, including lectures, textbook, material on web sites, tours of computer facilities, and the shopping exercise described in this paper. These approaches are used over time to make use of repetition and reinforcement to improve long-term retention of the concepts.

Early in the term, basic hardware and software concepts are introduced as two of the main components in a framework for information systems. These concepts are also presented as components in an open model of general systems theory. As an example, students are asked to list input, output, processing, and storage devices as they apply to different parts of that model.

Later in the term, students are assigned a chapter from the textbook that covers hardware and software concepts. The main components in a microcomputer processor and storage systems and basic types of software necessary to operate the computer are then covered in lecture. Links to web sites that explain hardware concepts through text and graphics or define specific terms are

available in a Blackboard course web site as supplemental material. In addition, students are either given a tour of campus computing facilities or offered a video of such a tour.

The Shopping Exercise

I reinforced these concepts and the need to have a basic understanding of them in an active learning experience. I devote an entire class period to the exercise, dividing the students in to groups of four or five, depending on the length of the class period. Each team has the task of searching for a specific type of computer system to purchase online and reporting their findings to the class. Sample types of computer systems in the assignment include a low-cost desktop for use by a junior-high student, a moderately priced laptop for use by a college student, an expensive multi-media system with a dual monitor for use in editing graphics and animation, and an expensive, high-end computer to be used as a server. I often assign the server to a group that has computer science students in the team.

Each team gets a set of general criteria, such as type of computer, intended use, and price range. A list of sample merchant and shopper services web sites is available in Blackboard. However, I allow the students to select their own sites to use in the exercise. Inevitably, some students enthusiastically volunteer their own favorite shopping sites.

The teams have about 15 minutes to find one or two systems they will recommend. After the exercise begins, I wander the room to observe, answer questions, and offer assistance where needed. During this time, I encourage students to express their own preferences with respect to microcomputers. I frequently observe students helping each other. I remind them to include appropriate software and to look for shipping costs and service/warranty information. I point out that some really low-priced desktop systems may not include a monitor and that refurbished systems may be an option. For the server system, I remind them to look for multiple processors, cooling fans, redundant power supplies, and other requisite fault-tolerance features.

Students typically find a variety of prices and considerable variation in system specifications. I project each team's best option onto the class screen. A team will frequently find two or three systems. I project as many on the screen as time allows. I go through the specifications for these systems, defining terms and pointing out practical reasons for price differences and performance implications.

An active class discussion on the merits of particular systems or vendors usually erupts. Students who were already familiar with these concepts are able to share their knowledge. Students who were not familiar with these concepts appear to be excited to get practical tips they expect to use in future purchasing decisions. In fact, a student will occasionally chastise me for not doing the exercise earlier in the semester because he or she has already purchased a computer. One student commented "I am in the process of getting myself a notebook, and today was very helpful in showing me what do I need to look for. I might have more questions I need to ask you before I make the purchase. I just wanted to say thank you for all the information that you have taught."

I conclude the exercise by reviewing the steps the students took and summarizing the main points of the discussion. I use the variety of configurations and prices to point out the value in being a knowledgeable consumer, both in their personal lives and in a business setting.

At various points later in the semester, I refer to this exercise and relate it to managing technology and managing change in a corporate business environment. Examples include discussions about purchasing decisions, total cost of ownership, security, and managing change with respect to replacement and upgrade decisions. The exercise is also useful in discussions about standardizing system configurations for reasons of price, maintenance, and technical support. I reinforce the topic by including relevant questions on a review sheet, quizzes, and exams.

Conclusion

The strategy outlined in this article allows me to introduce technical terms and concepts in practical, everyday ways along with understandable reasons for needing to know them. Repetition over time reinforces learning. This approach helps students transfer the material from short-term memory to long-term memory. Shopping for computer systems is an effective way to teach technical hardware and software topics. Students readily see the practical aspect to the active learning exercise described in this article, and they are generally enthusiastic participants.

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