

## **Roles of IT in Improving Our Educational System. Part 2: Compelling Applications.**

Moursund, D.G. (October 2000). Roles of IT in improving our educational system. Part 2: Compelling applications. *Learning and Leading with Technology*. Eugene, OR: ISTE.

Dave is compiling a list of potential compelling applications in K-12 education. Please forward examples to dmoursund@iste.org and tell Dave how their use is changing the curriculum content, instructional process, and assessment in your classroom.

When microcomputers first started to become popular in the late 1970s, most computer-using businesspeople viewed them with disdain. Microcomputers were underpowered and not particularly useful in solving the problems and accomplishing the types of tasks businesspeople faced. Instead, microcomputers were "toys" that might best be used to play games or solve inconsequential problems.

This attitude toward microcomputers was forever changed with the 1979 development of the first spreadsheet software. A spreadsheet running on a "toy" computer was a powerful aid to doing bookkeeping and accounting tasks. Moreover, the software made it relatively easy to incorporate formulas (for example, compound interest and payment schedules) to help solve a particular problem. Thus, the spreadsheet software could handle many of the types of real-world problems faced by businesspeople.

The spreadsheet had an additional feature, one that made it particularly compelling. A spreadsheet can be viewed as a type of mathematical model for a particular aspect of a business (such as payroll or inventory). With this computerized mathematical model, it is easy to ask "what if?" questions and get prompt answers.

### **Compelling Applications**

**Spreadsheet.** From the point of view of businesspeople, the spreadsheet was the first compelling application of a microcomputer. For this particular group of people, spreadsheet software has the following characteristics:

1. It is intrinsically motivating. (The user is intrinsically motivated to learn to use the software, because it is such a powerful aid to doing his or her job.) It empowers the user to solve problems and accomplish tasks that the user cannot readily accomplish without use of the software.
2. It is reasonably priced. Indeed, the worker's increased productivity far overshadowed the cost of both a microcomputer and the software. Thus, it was advantageous to businesses to provide such facilities to their workers who had need for them.
3. The time and effort needed to learn to use a spreadsheet is reasonable relative to the available time and capabilities of many businesspeople. One does not need to be a "rocket scientist" to learn to use a spreadsheet. In some sense, the compelling application embodies some of the knowledge of a field, so

that the user can more rapidly gain a functional level of skill, as compared to a person who is learning how to do bookkeeping and accounting tasks by hand.

It is important to make two points here. First, compelling is in the eyes of the learner/user. Intrinsic motivation makes an application compelling.

Second, a compelling application empowers its user to do things that are not readily done without the computer system. Spreadsheet models, along with formulating and answering "what if?" questions, are very powerful aids to representing and solving business problems.

I suspect that most of us have not thought much about how the spreadsheet and other business software have changed business education. Essentially every high school in the country has replaced its typewriter labs with computer labs. Students now learn keyboarding instead of typing. They learn to represent and solve bookkeeping and accounting problems using spreadsheets and other accounting software. They learn to develop databases, and they do "electronic" filing. The more-modern business programs are now including a focus on e-commerce, preparing their students to work in this rapidly growing aspect of business.

**Desktop publishing.** The Macintosh computer that first became available in 1984, with its graphic user interface, was woefully underpowered. However, it had a mouse, and it came with both word processing (allowing multiple typefaces and font sizes) and graphics software. With the aid of a relatively inexpensive laser printer, the user of such a system could do professional-level desktop publishing. Take a look back at the three components I used to define a compelling application. Clearly, desktop publishing is a compelling application for many people.

Think about what this compelling application did for mechanical drawing, engineering drawing, and graphic arts curricula at the secondary school level. And, think about the spill over into journalism courses (e.g., the school newspaper and yearbook). Indeed, we are now beginning to expect that all students develop a reasonable level of knowledge and skill in the design and layout work required in desktop publishing, even in elementary school.

## Two Key Questions

Now, I want you to think about two important questions.

1. What evidence do we have that business students in our secondary schools are getting a better education because of IT?
2. What are some additional examples of compelling applications that have had or have the potential to have a significant effect on our educational system?

The first question is important because it brings a new perspective to saying what constitutes an improvement in education. We no longer consider neat penmanship or speed and accuracy doing simple arithmetic to be major goals in business education. And although being good at spelling is still useful, its importance has decreased because of spelling checkers in word processors.

Nowadays, we want graduates who can think, and who can represent and solve the types of problems that are common to the academic areas they have studied. We want them to effectively use commonly available aids to represent and solve such problems, and we want them to be good at learning new aids as they come along. We want our graduates to have good interpersonal skills so they can work effectively with their fellow employees and with customers.

Our current business education program is much changed from the past. Relative to contemporary needs, our business curriculum from 25 years ago would be classified as "terrible." More than likely, 25 years in the future, our current business education program will be considered terrible. Because IT is such a powerful aid to solving the problems and accomplishing the tasks faced by businesspeople, we are trying to hit a rapidly moving target. (I hope you are saying to yourself: "Hmm. I wonder if there are other components of our educational system that are faced with similar difficulties because IT is changing so rapidly.")

The second question is important because it gets us started thinking about other changes that have already occurred in our educational system because of compelling applications. Moreover, it gets us thinking about whether there might be many compelling applications whose widespread use could lead to significant improvements in our educational system.

### **In Summary**

Compelling applications from business have been integrated into our educational system and have produced significant changes in this system. A person who learns to make effective use of these compelling applications is empowered. This person can solve problems and accomplish tasks that are deemed important in our society and than cannot readily be done without the use of IT.

Perhaps you are detecting a pattern? Consider the hypothesis that compelling applications from business are apt to be powerful change agents in the K-12 curriculum. Remember that the underpinnings of science are generating and testing hypotheses. You can add to your understanding of the science of teaching and learning by testing this hypothesis. Perhaps the hypothesis is not correct. Do you know some good examples of compelling applications in business that have not had an effect on K-12 education?

Now move your thinking outside the business curriculum. Spend some time thinking about the non business courses you teach or are familiar with. From your point of view, are there compelling applications that should be an integral component of some of these courses? Please send me your ideas about other compelling applications that have, have not, or could affect K-12 education.

### **Retrospective Comments (Unknown date)**

The terminology "Compelling Application" was suggested by a student in my 1999-2000 graduate seminar on IT in Education. We were discussing "Killer Applications" and noted that this is not appropriate vocabulary for educational software. (There had been recent shootings in schools.)

The general concept of Compelling Applications has proven to be an effective way of telling part of the story of IT in education. Many people resonate with the terminology and can suggest examples of software that they have found compelling.

The general concept was used as a central theme in a Preparing Tomorrow's Teachers to use Technology proposal that I submitted to the US Department of Education in March of 2000. This proposal was funded at the level of approximately \$425,000 a year for the three years beginning in June 2000.