Progress and Evidence in Educational Technology


[Sidebar.] Dave Moursund is Editor-in-Chief of The Computing Teacher and Executive Officer of ISTE. He has been teaching, writing, and speaking in the field of computer technology in education since 1963. In this new column, he offers answers to questions from readers.

Q. You have been involved in the field of computers in education/or a long time. What is the best thing that you have seen happen?

A. Computers have become sufficiently inexpensive and user friendly so they can be used by children. Children can learn many things about computers faster and better than adults. I believe that if adults (including teachers) provide appropriate guidance and don't get in the way too much, the long-term results will be a major improvement in our educational system. This is because computers help to create a rich, learn-by-doing environment in which children can explore, pursue their own interests, and take a greater ownership of their own learning.

Q. What are some of the areas where progress has been slower than you would have expected?

A. I will give two examples. First, my doctorate is in mathematics. I am sorely disappointed in the progress that has occurred in this field. Thirty years ago it was clear to me that the basic nature of mathematics education should be drastically changed by computers. The National Council of Teachers in Mathematics has strongly supported such changes. For example, the 1989 NCTM standards call for extensive use of computers. But relatively little change has occurred in the classroom. My feeling is that many math educators "just don't get it."

I also feel that the teacher education system has done poorly in rising to the challenge of computer technology. Most newly graduated teachers are computer-illiterate relative to the standards needed for working with current educational uses of computers.

Q. Can you provide solid evidence that computers make a positive difference in education?

A. This is a difficult question mainly because people are not satisfied with the nature of the three-part answer that I like to give.

It is common to divide instructional uses of computers into three categories. First, there is teaching about the field of computer and information science. Computer and information science has emerged as an important discipline. I don't believe that anybody doubts the need to have computer facilities for use in such teaching or the major strides that this academic discipline has made.

Second, there is the use of computers in instructional delivery—often called computer-assisted instruction. CAI includes drill and practice, tutorials, and simulations. In recent years, most CAI development has been focused in hypermedia environments that make use of graphics, text, sound, color, and animation. There has been a large amount of research on CAI. The meta-
studies (the studies of studies) provide solid evidence of the effectiveness of CAI in many different settings.

The third main use of computer technology in education is tool uses of computers. This includes word processor, database, spreadsheet, graphics, telecommunications, and so on. Many people who ask the original question are really only interested in computer as a tool.

A general answer is to note that such tool uses of computers have become commonplace in a wide range of job settings. Moreover, it takes quite a bit of education, training, and experience to become an effective user of these computer tools. Thus, the case for such computer use in schools is simple. These computer tools are a new "basic." Schools need to help students gain basic skills in reading, writing, arithmetic, speaking, listening, and tool use of computers as an aid to their becoming fully functioning, educated adult in our Information Age society.

However, even this answer is not very satisfying to many people who ask the original question. They want still more specific answers. "Show me that if I teach my students to use a word processor, they will be better writers." There has been quite a bit of research on this specific topic. For the most part, the results are inconclusive. However, this is no longer a particularly interesting question. It is now common in both higher education and in job settings to expect people to use a word processor. At the same time, we still expect people to communicate effectively in writing. Effective communication is the major issue. The tool—whether it be a ballpoint pen or a word processor—is not the primary determinant of writing quality.

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