Computers and Human Intelligence


This year's editorials all focus on one specific problem—the inability of our educational system to adequately deal with the worldwide Information Age changes.

When people talk about the Information Age, they are usually thinking about computer-related technologies such as computer hardware and software, hypermedia and multimedia, and so on. However, the Information Age is also fueled by progress in any area that relates to the processing and use of information. For example, progress in the cognitive sciences, including brain theory and learning theory, is a significant factor in our Information Age.

All of the previous articles in this series have focused on computer-related technology. This article focuses on Howard Gardner's theory of multiple intelligences. Gardner's ideas are analyzed for how they relate to uses of computers in education.

**Theory of Multiple Intelligences**

Howard Gardner is a cognitive scientist who has written about 30 books. One of the best known is *Frames of Mind: The Theory of Multiple Intelligences,* first published by Basic Books in 1983. In this book, he argues that each person has at least seven distinct categories or types of intelligence. Gardner thinks of intelligence as being able to solve problems and to create (make, perform, etc.) a product. A person may be quite talented in one intelligence area and have little talent in another. Each person has their own profile of intelligences. The seven categories proposed by Gardner are:

1. Linguistic
2. Logical/mathematical
3. Musical
4. Spatial
5. Bodily-kinesthetic
6. Interpersonal (knowing others)
7. Intrapersonal (knowing oneself)

Gardner and others have noted that the great majority of problems that are presented to students in school, and the products they are expected to create, tend to fall into the Linguistic and the Logical/mathematical areas. These two intelligences play a dominant role in our educational system.

**Solving Problems and Creating Products**

Gardner's definition of intelligence focuses on solving problems and creating products. Products include art, dance, music, poetry, and so on.
There are many tools that people use as they solve problems and create products. A musician may use both musical notation and musical instruments. A sculptor may make use of both hand and power tools. A mathematician uses paper, pencil, mathematical notation, and the work of previous mathematicians.

Thus, it is clear that when we talk about a person having a high level of intelligence of a particular type, we take it for granted that the person has access to tools that are used to solve problems and create products in that intellectual area.

**Computer-Aided Intelligence**

This leads us to consideration of computer-related tools. Think of these tools in terms of how they help a person to solve problems and create product. That is, think of them in terms of their ability to enhance or facilitate intelligence.

There are a variety of ways to do this. In a class that I recently taught, I provided my students with the following table:

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<td>Interpersonal</td>
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<td>Intrapersonal</td>
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The exercise was for each student to give their opinions on the extent to which computer-related tools contribute to each type of intelligence. The rating scale is from 1 (very little) to 3 (a medium amount) to 5 (a great deal).

Such ratings are subjective and also dependent on individual rater's knowledge of the range and nature of computer applications. Thus, there is no one set of correct answers.

However, all of my students agreed that computers add substantially to Linguistic and Logical/mathematical intelligence. There were lesser levels of agreement in the other areas.

**Educational Implications**

This is very interesting! Computers add considerably to intelligence in the areas that are particularly important to success in school.

Let's translate these insights into a simple-minded example. We encounter a student in school whose greatest levels of intelligence lie outside the Linguistic and Logical/mathematical
categories. The student does poorly in school. School does little to enhance the student's natural abilities in the other intelligences. Perhaps the student eventually drops out of school.

Now consider an alternative. The student is provided with good access to computer facilities and instruction in their use as an aid to solving problems and creating product in the areas making use of Linguistic and Logical/mathematical intelligence. The student and the educational system agree on goals for appropriate levels of performance. Simultaneously, a great deal of the student's schooling focuses in areas where the student is more naturally gifted. The student experiences success and finds that school is relevant. Perhaps the student stays in school and eventually becomes an artist, dancer, or musician.

Howard Gardner and his associates are developing schools based on his theory of multiple intelligences. It seems clear that all schools could benefit by understanding this theory and its implications for individual students. It seems clear that this theory provides guidance in finding appropriate educational uses of computers.