Statement of Purpose: Mission not Impossible

The text below is from the Teaching Company's first workshop, conducted in March 1982 at Concord Academy for Independent School Teachers in Massachusetts. This speech has been presented to so many different teachers that perhaps even the jokes are growing stale.

In almost every fashion possible, the world is going crazy with computers — technology, applications, education, games, and businesses. Consider technology and this quote from Russ Walter:

> The longer you wait to buy hardware, the lower the price will be; every year, computers get cheaper. A general rule of thumb is: If you wait two years, it will cost half as much. More precisely: suppose you do comparative shopping now, and buy the cheapest hardware that adequately handles your job; if you do the same comparative shopping two years later, you'll find that the cheapest adequate model then costs half as much as the cheapest model available today.

This price reduction is not some kind of wild idea of mine. Practically every year, since computers began in the 1940's, The total hardware price has been dropping 30% a year. If you take a dollar, and deduct 30% of it, you get 70 cents; if you then deduct 30% of 70 cents, you get 49 cents. So after two years, you're spending 49 cents instead of a dollar. And there's no sign of that trend stopping.

An interesting comparison with the airline industry serves as a wonderful illustration of this rate reduction. Both industries grew up in the late 40's-early 50's, and without question, airplane technology and service to the consumer in 1983 has advanced considerably since its infancy in 1950. However, if the airline industry had kept pace with the computer industry in the last thirty years, you would be able to travel today from New York to London on a plane with 10,000 other passengers, get there in one second, and it would cost you all of one cent.

Computers, memory, printers, disk drives — in the past ten years, the advancements have been incredible. Seven years ago, at Wooster School, we purchased a Wang computer system with 8K memory, 1 floppy disk drive, 1 terminal, and 1 matrix printer — all costing $14,000. We developed software for the registrar, Development Office, Business Office; we even did the school's scheduling with 8k memory. We didn't even have word processing.

Just one year ago, my wife and I purchased an Apple for our home. For $2400 we got a system that easily surpasses the "coal burning" Wang that we purchased for the school. And now, just one year later, our own system has been replaced by a more efficient, more powerful Apple 2e. The technology is simply going crazy. It serves as the best illustration of exponential growth. Consider memory storage — the device that holds your information, whether it is a file on your alumni, a computer program or a letter you are composing on your word processing software: Twenty to thirty years ago, a computer needed equipment the size of this room to store the equivalent of one short letter. Today, a Wang computer can store about 150 pages of double spaced text in its memory — which, by the way, is the size of a fingernail. Scientists are now developing a "bio-chip" — a mini computer made of organic molecules rather than silicon. It turns out that the circuitry in such a chip is unimaginably minute — much smaller than in today's

most advanced microprocessors. “One such chip, perhaps activated by microlasers, could hold all of the information ever recorded by mankind in a cube one two hundredths of an inch across — the width of two human hairs.” The only problem—as my wife reminds me frequently—is who’s going to type all that stuff in?

Implications of these rapid advancements are phenomenal. Consider these thoughts of some technology experts:

> Anyone who insists on ignoring computers in this day and age does so at his or her own peril.
> —Joseph Dakin, The Electronic Cottage

> More and more companies can be described...as people huddled around a computer. Put the computer in people’s homes and they no longer need to huddle.... It is worth recognizing that if as few as 10 to 20 percent of the workforce...were to make this historic transfer over the next 20 or 30 years, our entire economy, our cities, our ecology, our family structure, our values, and even our politics would be altered almost beyond recognition. It is a possibility, a plausibility, perhaps — to be pondered.
> —Alvin Toffler, The Third Wave

> By 1990, this automation will have grown to where 50 percent of the labor force will be required to have some degree of knowledge about computer usage. This is up about 10 percent from today’s figures. Much of that growth will be in the under $5,000 computer system which, I estimate, will top $5 billion by 1985.
> —Jean Yates, Senior Analyst for Gnostic Concepts

> The development of the electronic computer has profoundly and irrevocably changed the scientific world. In so doing it has simultaneously created numerous opportunities for the application of mathematical ideas and methods to the solution of traditional scientific problems and made possible the exploration of research areas in mathematics and science either previously unattainable or undreamed of. We are, in consequence, living in one of the great times of intellectual history.
> —Bellman, Cooke, & Lockett, Algorithms, Graphs & Computers (1970)

And on and on we could go: laser technology, teleconferences, controlling all the appliances in your house with a micro, chips inserted in the human eye to enable blind people to see, farmers using computers to control their irrigation systems, computers that allow severely handicapped people to communicate for the first time, computers that may well make quadriplegia a thing of the past.

Okay, enough, so what? How does all of this connect to education and the independent school world?

Well, if 50% of the labor force in 1990 will need to know about computers, who's going to teach them? How do they learn? What do they learn? Who are their examples and role models? And most importantly, what kinds of attitudes, stereotypes and associations will they pick up in their computer education?

Will computers be presented as a narrow, technical subject, full of excess vocabulary and technical details, in the way that mathematics at its worst is sometimes taught. Or will it be presented in the broad context of artistic, aesthetic, and intellectual achievement?

Or perhaps computer programming will become the exclusive domain of short boys wearing glasses, to quote a favorite phrase coined by a former high school student. Will it turn out that most boys learn how to program while most girls learn how to use the word processor?

Or perhaps the computer will become the glorified secretarial tool and the administrators will make no attempt to understand how the thing works, but will expect — unreasonably — that the staff people will be able to get a report on any information in any format — all within two minutes? "What do you mean we can't just type in a name and get the alum's record. What? We have to enter an ID number? You mean we just spent $80,000 and this is all it can do?"

And what about the obvious militarism that is so pervasive in video games or even in some of the computer language — killing files and having system bombs, for example.

And what about computerized instruction...will it be as dull, dry and tedious as so many math and science textbooks. Or will it be just glorified — and expensive — flashcards? In ten years will we be able to turn off students to intellectual endeavors via our computers as well as through our presentations?

Or will computer education become a class issue? One frequently mentioned problem: middle and upper class kids in the suburbs learn how to program at school and have their own home computer systems, while inner city kids interact with the computer only at school and only with remedial software that drills them on basic math facts and diagraming sentences.

Well, I hope the answer is clear, but if not, then to prepare for the quiz in a few minutes, let me give it to you. It must be the goal, the mission, perhaps even the essential concern of the educational world over the next ten years to address these questions, to devise appropriate curricula, to define and formulate computer literacy, and to present computers in the broadest context of civilization and its intellectual growth, to inculcate positive attitudes in all students, tackling the issues of sexism, elitism, and classism that might well plague the computer curriculum. And to the extent that you believe the independent school world has a special leadership role in education, then it is even more incumbent on all of you to proceed in the 80's, to get involved, to lead, to do it right and to do it well.