



Reflections^{EDUCATION} on the Way Life Used to Be

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Looking back on my teaching experience in the early 1980s, I remember having a number of tools at my disposal, some of which were even considered “cutting edge” for the time. There were film-strip projectors and 16-mm films with projector, reel and all. VCRs existed; we all tried to figure out how to keep the 12:00 from blinking, thereby exposing our technological ineptitude. Videodiscs were a craze in the late 1980s; this technology sought to provide teachers and students with a plethora of snippets for presentations and projects.

A favorite tool of mine was the overhead projector that allowed you to write on acetate with a wax pencil and have your writing projected onto a screen behind you. The pedagogical benefit of this technological development was to allow the teacher to view the students

while writing information on the projected acetate. Being able to write while facing the class rather than having to write on a blackboard with your back to the class was truly an improvement. Joel Mokyr, an economist at Northwestern University and the author of *The Lever of Riches*, would identify such a technological change as a micro innovation that applies an existing technology to a particular problem and improves the process. In this case, the application of the overhead projector to classroom instruction provided a more engaging teaching experience for both the teacher and the student.

During the 1980s, research on left-brain and right-brain dominance and its implications for teaching and learning were infiltrating teacher workshops and professional development curricula. In 1983, Howard Gardner’s research on multiple intelligences was introduced to the public through publication of the treatise, *Frames of Mind*. In fact, the 1980s saw a proliferation of books on the topic of education and education reform.

The growing interest in the plight of American schools and American education was propelled in large part by publication of *A Nation at Risk*, a seminal report that defined the scope of the American “problem” and served as a catalyst for education

reform. *A Nation at Risk* compared current student educational attainment and mastery to past achievement levels and assessed current achievements in light of emerging needs. In 1991, the Secretary of Labor's Commission on Achieving Necessary Skills published a report that codified the skills and competencies students would need in order to be effective in the economy of the 21st century. The *SCANS Report* was followed in 1995 by the *Third International Measurement of Math and Science Study (TIMSS)*. *TIMSS* compared American student competence in math and science with results for students in other nations.

In response to these somewhat dire reports and non-complimentary comparisons, there was a clamor for education reform. Several movements emerged out of the recognition that American education was indeed in crisis. I will address two of these movements here: accountability and constructivism.

Inputs, Outputs, and Throughputs

In the 1980s, the emphasis began to change, first in conversations and then in legislation, from how much money and resources were being allocated to education, or *inputs*, to what were the demonstrable results of student achievement, or *outputs*. When talking about "effective" education, one could no longer talk only about budget allotments and full-time equivalents (FTEs); one had also to talk about student achievement, competency, and mastery. The management term "accountability" began being used as a criterion in judging educational goals and objectives, and a proliferation of state-level standardized testing soon followed.

If the mission of public education is to provide a free and serviceable education to all who enroll, how do you demonstrate that the education provided is serviceable? For the past 15 years, in the interests of accountability, state departments of education, education think tanks, college professors, and school-level administrators and teachers have been hammering out what constitutes a "proper" curriculum framework and a "fair" test for all.

Ideally, a "fair" test allows students to demonstrate competence and mastery of the agreed-upon "proper" curriculum and covers the content necessary for pur-

suing a post-secondary education and/or entry into the information-age economy. Through fits and starts, education research has developed various possible curriculum frameworks and tests that educators can compare and evaluate in order to begin identifying "best practices." The value of these approaches is increasingly being recognized — outputs, it would seem, are here to stay.

A Field Experience

At the same time that the public was inundated with disheartening data and reports that seemed to impugn the entire education field, individuals, organizations, universities, and communities were beginning to visualize, develop, and implement changes in teaching processes.

I had the opportunity a few months ago to observe a middle school class performing a science experiment, taking water samples at a local aquifer in Maine. They used GPS and camera peripherals to identify their location. They used keyboards and styli to capture their observations. They used a probe to record their sample. Each student had his or her own handheld device to power the peripherals and capture all the data. They shared the peripherals since there was one for approximately every four students. After the students had collected their individual data, they came together to share their observations with one another. Back in the classroom, the individual data were recorded and aggregated for further analysis. Notably, the teacher and students were not merely talking about science; they were actually doing it.

This type of "constructivist," problem-based learning experience is a relatively new *throughput* in the educational process. The focus of instruction is centered on the students and their ability to make meaning out of their experiences. Active participation on the part of the students and trained teachers comfortable in this form of educational pedagogy and style of instruction are crucial to its success. This convergence of teaching and learning has been made possible both by the power of technology and by a broadening of the educator's thinking about "effective" education. It provides an inkling of hope that we may, in fact, be able to "leave no child behind." It may enable us to move away from an education system based on social sorting to one that provides equal access. As a relatively new approach to throughputs, constructivist, problem-based learning has great potential.

A Moving Target

Clearly, the criteria for making judgements about an "effective" education have changed over time. No longer are we talking about a bell curve of success in which a certain percentage of students fail, a certain percentage are average, and a certain percentage excel. Today, there shall be "no child left behind," says the subtitle of the newly passed Elementary and Secondary Education Act.

We are also no longer looking only at local or even national comparisons; the scope is now global. And we are dealing with new demographics since the 1980s. Hispanics are now the largest minority in the United States, for example, and the percentage of foreign-born citizens is up markedly since the 1980s. Together, these factors compound the charge of providing an

effective education and create a major challenge to the country to revisit, refocus, revamp, and reenergize its approach to education.

A Moving Experience

I find it somewhat unnerving that the young middle schoolers I mentioned earlier had in the palms of their hands a device that was hundreds of times more powerful than the Apple GS desktop computer I was using when I left the classroom in 1993. As I watched them nimbly connect, use, and direct the handheld and its various peripherals, it struck me that this generation has truly “grown up digital,” as author and consultant Don Tapscott claims. In 1993, if I wanted to show clips of a film or reshoot a film segment in order to discuss it further, the

technology was often too unwieldy or was simply not available to me. Today, students can record, edit, revise, calculate, graph, and present on one machine. They demonstrate little fear of technology and are generally more familiar with various technological devices than their teachers. Clearly, one hurdle to overcome in achieving widespread use of constructivist learning is the ability of teachers to understand and comfortably use new technology themselves.

In 2002, after approximately 20 years of education reform, we have only begun developing the tools that will let us reach the objectives set out in *A Nation at Risk*, the *SCANS Report*, and *TIMSS*. But from a research point of view, progress has been made. The increased application of directed research into the education field has enabled educators to better assess levels of student competence in English and math. We are identifying a baseline that can be used to evaluate when and where true progress is occurring. And the effective infusion of active learning technology into the learning process could turn out to be the type of throughput that will produce the wanted outputs and further justify the inputs.

Answers to Exercise One

New Products of the 1980s...Where Would We Be Without Them?

1980: 3M's Post-it Notes, cordless telephone, Rollerblades

1981: IBM personal computer, NutraSweet, Microsoft MS-DOS

1982: Diet Coke, *USA Today*

1983: Trivial Pursuit board game, music CDs, Lotus 1-2-3 software, cellular phone network, computer mouse

1984: Desktop laser printer, Chrysler minivan, Apple Macintosh computer, CD-ROM

1985: Microsoft Windows software, Pagemaker software, Nintendo entertainment system

1986: Microwave pizza, nicotine chewing gum, digital audiotape

1987: Disposable camera, Prozac, soybean milk, Macintosh II computer

1988: Disposable contact lenses, Rogaine hair restorative, Doppler radar

1989: [Nothing listed]

Source: *Pride and Prosperity: The 80s*, Time-Life Books, 1999.

Answers to Exercise Three

Public Picks to Commemorate the '80s and '90s

In the next column are the American public's choices for postage stamps to commemorate the 1980s and 1990s in the USPS Celebrate the Century series.

The 1980s

The space shuttle program

The Broadway musical *Cats*

The San Francisco 49ers

U.S. hostages come home from Iran

Figure skating

Cable TV

Vietnam Veterans Memorial

Compact discs

Cabbage Patch Kids

The Cosby Show

Fall of the Berlin Wall

Video games

E.T. The Extra-Terrestrial

Personal computers

Hip-hop culture

The 1990s

Seinfeld

The Gulf War

New records in baseball

Computer art and graphics

Improving education

Extreme sports

Jurassic Park

Virtual reality

Special Olympics

John Glenn returns to space

Recovering species – peregrine falcon

Cellular telephones

The World Wide Web

Sport utility vehicles

The blockbuster film *Titanic*

Web Update

The correct URL for Connecticut History Online is <http://www.cthistoryonline.org>. (The URL listed in our last issue was that of the beta testing site.) Be sure to check out the “Journeys” section, which features photo essays on Connecticut women at work, the textile industry in Connecticut, the Connecticut maritime trades, Connecticut goes to the beach, and much more.