

Chapter 3 Meeting Vital Needs

Donald L. Bitzer: For outstanding achievement in the field of electronics applied in the service of mankind, with particular note of his original contributions to educational technology in the development and application of the PLATO System of computer-assisted instruction.

—National Academy of Engineering, 1973 Vladimi K. Zworykin Award

In the previous chapter we viewed innovation from the perspective of individuals and their particular creations. To have a more complete perspective it will help to look at things the other way around, to see how individuals will creatively respond when they are made aware of important needs. These examples also will serve to illustrate innovation beyond that which results in products—hard artifacts. They are innovations that result in soft artifacts—services to meet important needs.

PLATO: CREATING OPPORTUNITY TO LEARN

Back in 1978, when most children had never seen a computer much less touched one, five-year-old Malik Edwards loved to sit at a com-

puter terminal in the Northside Child Development Center, a Control Data day care center in a depressed area of Minneapolis. Malik was doing second-grade math already—and loving every minute of it.

Teenager Perry Brooks hated math. That was in 1975, and he couldn't add or divide. Fortunately Perry was a student at Walbrook High School in Baltimore, Maryland. Commercial Credit, a Control Data subsidiary, had placed PLATO (Programmed Logic for Automatic Teaching Operations) terminals in the school, and Perry became interested in a consumer math course. He got so interested, in fact, that he finished the course in half the allotted time. That led to an income tax course and then a job as a tax counselor.

The technology that helped in the education of Malik and Perry began in the late 1950s at the University of Illinois, when a young Ph.D. engineering student, Donald Bitzer, heard loud arguments coming from a meeting room. A lot of people had gathered there to discuss how computers could be used to teach. Bitzer hadn't been invited, but his boss told him about the meetings.

"The engineers said educators didn't know anything about technology, and educators said engineers didn't know anything about teaching," Dr. Bitzer recalled in a 1982 interview. Bitzer's response was to tell his boss, "I think I know how to build a system that will teach."

That was the beginning of PLATO, a computer-based system that came to be used by educational institutions, industry, and government to help people learn. Three full-time people including Bitzer went to work developing PLATO. However, just finding the computer time to develop a program was a huge issue. Bitzer says he was lucky to get an hour a day, and even that wasn't guaranteed: "If the computer ran 40 hours without breaking down, it was a record." This slowed down development considerably.

A Control Data sales representative, Harold Brooke, always stopped by when he was in town to see how the teaching system was going. When he saw how progress was slowed by too little computer time, he told Bitzer Control Data could supply a 1604 computer. All the university had to do was pay the insurance. For \$150 a year, the university's PLATO team had a dedicated computer that also was the top computer on the market. The PLATO team was really in business then. "I don't think the 1604 ever went down. The machine performed," Bitzer said. In a half-page agreement, the university agreed to share what they learned with Control Data.

The collaboration, which began with that agreement, was, on the surface, little more than one more "education grant" by a computer vendor. But this was not one more computer vendor. It was Control Data. This modest yet aus-

picious beginning led to a full-fledged collaboration and the frame-breaking innovation PLATO. It was an early indicator of Control Data's remarkable ability to foster innovation beyond its walls.

Don Bitzer was not an educator per se. He did have a lifelong interest in education, and he was a teacher. But Don's love was research and using his academic discipline of electrical engineering to devise new things. He was not an employee of Control Data, but rather of the Illinois higher education system. His research and the laboratory in which he worked at Illinois was not in pedagogy, it was in military electronics. The lab was 100 percent dedicated to army, navy and air force electronics work. Some of that research work was related to the Naval Tactical Data System (NTDS) system that ERA-Sperry Univac supplied to the navy.

When asked if he always wanted to be an electrical engineer, Don responded: "Only since I was six years old." His uncle, a civil engineer, had early on showed him the fascination of solving engineering problems. He was an outstanding high school student and could choose among various prestigious colleges, including Princeton and MIT. He chose Illinois for the simple reason, as he put it, the school offered more "value-added." That is, the education process started with a far less "finished product" in its students and yet turned out outstanding scientists and business leaders. He figured he would flourish.

So in 1960 this newly minted Ph.D. was ready and eager for an academic career in engineering. He was, however, about to be touched by the innovative magic that so quintessentially characterized people associated with Control Data—even those who were its customers.

The inner city riots of the '60s lay just ahead as the decade began. But the disparities in opportunity that gave rise to them were already clear to those concerned with the social ills of large urban centers such as Chicago, Detroit, and Los Angeles. The failings of the traditional educational system were an obvious and significant factor. At the same time, proliferation of advanced technology in military and business operations greatly concerned the more thoughtful business and military leaders. How best to achieve the task of educating the necessary technicians and correct the shortcomings resulting from an inadequate public education system? Whatever the answers to these questions, it was sure to be a major economic burden.

Don Bitzer was directly involved in the use of advanced technology by the military, but he was also aware of the education problems in cities such as Chicago. This awareness intuitively led him to begin thinking of using computers and other advanced technologies to devise a new approach to training