The Installed Base


The idea of an installed base is well understood in business. The term is used to describe the nature of a company's market, production and sales facilities, and previous sales. For example, consider a computer company that makes three types of computers: A, B and C. Type A sells in the price range of $1,000 to $10,000; type B sells in the price range of $10,000 to $50,000; and type C sells in the range of $50,000 and up. The company has sold large numbers of each of these three types. It has separate production, sales and support staffs for each of these major product lines. This combination of products, staff and previous sales constitutes an installed base.

Now suppose that a technical breakthrough allows the company to produce a type B machine that could quite profitably be sold for just $2,000. What should the company do? If it begins to sell a type B machine for $2,000, it will capture a large share of the market for that type of machine; it may wipe out its competitors. However, it will also severely damage its own market for type A machines and its previous type B product line. Also, should the new machine be produced, sold and supported by the A product line staff or the B product line staff? These questions and their answers involve changes to the installed base.

This type of problem is routinely faced by high-tech companies. Decisions may be made based on competition, maximizing profits, and maintaining the overall strength of the company. For example, if there were no competition the company might suppress production of the new product or price it at about $10,000. It is clear that competition is a key force in the computer industry!

By now, you may be asking what does all this have to do with education? In the precollege computer education field, the installed base of microcomputer hardware is nearing two million machines and is still growing rapidly. For any particular school or school system, one brand and model of machine is apt to dominate. At any school, the installed base includes a particular combination of hardware, software, trained teachers, books and manuals, trained students, and so on. As with a company, an installed base represents inertia that resists change.

Now, suppose that a school or school district has funds to acquire additional computer facilities. Then inertia, following the line of least resistance, will likely lead to acquiring more of whatever facilities are already in place. This is now routinely happening. More and more I hear statements like, "We are a Brand X Model Y school. During the next three years we expect to purchase quite a few more Brand X Model Y machines." This is often said with considerable pride.

There is substantial "logic" to continuing to acquire more and more Brand X Model Y machines. No retraining of staff or students is needed. The current software, print materials, and curriculum materials can be used. Perhaps comfortable contacts have been established with vendors.
The trouble is, some of the new hardware and software becoming available is far superior to the older hardware and software. Thus, there is a conflict between wanting to protect one's installed base and wanting to take advantage of the technological progress that has been occurring.

In a company such as our hypothetical computer company, considerable thought goes into how to position a new product and when to introduce it. The new product we discussed might be sold initially at $8,000, and its introduction might be delayed until the type A and type B computers have had a 40 percent price decrease. During the interim, there can be appropriate staff retraining and modification of production facilities to accommodate the changes. Whatever the decision, there is careful thought about maintaining and improving profits, market share and the overall strength of the company. The decision is made by high-level administrators.

Now, how can/should schools respond to the issue of installed base versus rapid progress in new products? This is a difficult question, especially since competition and profit are not driving forces in education. The quality of education being received by students is difficult to quantify. What difference does it make if students use microcomputers based on technology that is 10 years out of date? How will students benefit from use of 16-bit or 32-bit microcomputers with a half-megabyte or a megabyte of memory and bit-mapped graphics, as compared with the more common 64K, 8-bit machines with lesser graphic capabilities?

The answer lies in a careful examination of the purposes for having computers in schools. These purposes divide into three major categories. The first type of purpose is to address specific educational problems. For example, computerized drill and practice may be used to address a problem of poor performance on tests of basic skills. If the educational problem is being adequately addressed by currently available hardware and software, there is little reason to change. If new computer facilities are clearly more cost effective in addressing a specific educational problem, there is solid incentive to acquiring the new facilities.

A second type of purpose is rather general. It can be described as a combination of "to keep up with the Jones" and to expose students to computer technology. To a large extent, almost any computer equipment suffices for this. Quantity, not quality, is the overriding issue. However, it can be an embarrassment to have to admit to using types of equipment that have not been manufactured or sold for many years. Thus, there is some pressure to have a recognized "name brand" of computers, and there is some pressure to own one or more "newer" computers. All in all, this second purpose exercises a greater influence on school purchase of microcomputer facilities than most of us would like to admit.

The third type of purpose is to provide a high quality education for continuing lifelong learning, and for work, play, and responsible citizenship in our (rapidly changing) Information Age society. A computer is a tool based on a combination of hardware and software. The computer tool aids human thinking, problem solving, and productivity. Thus, the computer tool is at the very heart of the underlying mission or purpose of our educational system.

I believe it is important that students receive their computer-related educational experiences in an up-to-date computer environment. Modern versions of the computer tool are far superior to older versions in their ability to aid thinking, problem solving, and productivity. This, then, is an appropriate driving force for schools to acquire newer, more powerful computer facilities.
As new hardware and software products come to market, they should be examined in two ways. First, can these new products help solve current educational problems in a more cost effective manner than current approaches to solving the same problem? Second, are these new products significantly better aids to human thinking, problem solving, and productivity than older products? An answer of "yes" to either question should serve as a strong reason for acquiring the new products. Computer education leaders should resist the inertia of the installed base.

Retrospective Comment 8/1/05.

In the May 2001 issue of Learning and Leading with Technology I published an editorial titled "Educational Innovator's Dilemma." This was based on the book: Christensen, C.M. (2000). The innovator's dilemma: When new technologies cause great firms to fail. NY: Harperbusiness.

Christensen's book presents a careful analysis of the problem that companies face when new technology becomes available. He gives a number of examples where companies made the decision to stick with the old, rather than to innovate and go with the new technologies. The typical consequence of such a decision was that the company eventually went out of business.

The editorial then discusses possible consequences of our public education system not appropriately adopting the innovation of educational use of computers. At the time I wrote the editorial, I had forgotten "The Installed Base" editorial published in November 1986. It is interesting to look back now, nearly 19 years later, and see that I had already begun to explore the ideas of the innovator's dilemma.

Our educational system has struggled mightily during the past two decades. Huge amounts of money have been spent to try to improve our educational system. Although there has been progress in many areas, test scores in the basics such as reading, writing, math, and science have not changed appreciably.

Spending on Information and Communication Technology in schools has increased, but it is still at a quite modest level (approximately 2% of total school budgets). We now have many times as many computers in schools as we had then, the computers are far more powerful, and many of the computers are networked to the Internet (and thus, can do email and access the Web).

In my opinion, we have made only modest progress in adopting and thoroughly integrating the computer innovation into our educational system. Interestingly, this slow rate of adopting the computer innovation has had only a modest impact on our public educational system. It has provide some fuel for school voucher programs and Charter Schools. It has helped the Home School movement. But these competitors of the traditional public school system enroll, in total, less than five percent of our precollege students.

Some Charter Schools are now providing most or all of their instruction via distance learning (online courses). This is a new innovation, and some public schools have adopted or partially adopted this innovation. It will be interesting to see how this plays out in the long run.

Here is some interesting data about private schools in the United States, quoted from the Council for American Private Education (accessed 8/1/050 http://www.capenet.org/facts.html.
November 2003 -- More than six million students--11.5 percent of the nation's elementary and secondary school population--are attending private schools in 2003-04, according to a report released this month by the U.S. Department of Education’s National Center for Education Statistics (Projections of Education Statistics to 2013, table 1).

According to the report, "Enrollment in private elementary and secondary schools increased 18 percent between 1988 and 2001, and is projected to increase 7 percent between 2001 and 2013." By way of comparison, enrollment in public schools "increased 19 percent between 1988 and 2001, and is projected to increase 4 percent between 2001 and 2013" (p. 6).

This data suggests that the public schools have been holding their own in competition with the private schools.