

Technology and Institutional Change: Why Some Educational Institutions Use Technology and Others Don't

Claudio de Moura Castro

The costs of information technology are falling at a rate of 20 percent per year. Yet, institutions vary widely in the degree that technology is used for education. Computers are present in the majority of schools in the developed world, but this does not necessarily mean that they are being used for education purposes. This strongly suggests that introducing technology into educational institutions is more a sociological experiment than a technical issue. The hurdles have to do more with the internal logic, prejudices, values and expectations of the institutions. Fear of computers is becoming a thing of the past. However, changing teaching/learning methods to take full advantage of simulations, tutorials and other educational software is not easy, especially for those institutions that are reluctant to transform their classrooms and their systems of teaching.

The Power of National Organizational Culture

Countries differ in the way their education institutions work, reflecting national organizational cultures and traditions. For instance, in the United States, what happens in one school district may not take place in another—and even individual institutions within the same district differ. One institution might be chock-full of computers and the next has close to none. One may use the computers creatively; another lets them sit idly. By contrast, European schools are synchronized to the tune of powerful ministries of education. If France decides to have 100,000 computers, they will be purchased from the same vendor and equipped with the “official” software. Japan did close to nothing until recently, but it seems to have changed its mind and we should expect a massive and obedient introduction of computers in the near future. Of course, if the programs are poorly designed, all schools will suffer. The same holds true for good programs. In those countries, individual initiatives that go against the grain of the “Plan” have difficulty flying.

Related to this are the relative merits of *incremental* versus *critical mass* styles of use. The US style has been mostly incremental (with many exceptions). The implicit rationale is to bring more and more computers and hope that more and more teachers will find ways to use them. The risk is that—as discussed below—supply does not generate demand and the computers remain idle, underutilized or poorly utilized. The alternative is to concentrate a critical mass in some institutions and ensure that they will use competently the machines and establish some good models (as Israel and Singapore are doing). The good examples will then be replicated. The risk is that replication may not take place. The judgement is still out on the relative merits of either alternative.

Technophobes and Technophiles

Perhaps even more important to explaining the use of computers, is to consider the attitude of different types or categories of educational institutions towards computers, depending on their *ethos*. Some institutions are technophobes while others are technophiles.

Institutions that teach about technology tend to use technology in the process of teaching. Vocational and technical schools are the first and most eager adopters of technology. Technology begets technology. These institutions are the technophiles. Policies to introduce technology in these schools are mere policies to buy equipment. This is all that is needed. Once the equipment arrives it is quickly installed and armies of teachers and students start immediately playing with it. When it breaks, they rejoice at the chance of

tinkering with it. This is true for modest vocational schools up to the prestigious MIT (where some engineering courses are moving to browsers).

Enterprises, particularly those that produce services and merchandise with high technological content, tend to use technology in their training programs. Perhaps they are the most avid and systematic customers for new teaching technologies. Firms like IBM spend gigantic budgets on training and have little reluctance to have their conventional training migrate to computers, satellites, browsers and teleconferencing.

By contrast, academic institutions are far more likely to be technophobes. Teachers fear computers and all the misconceptions associated with them. The task of bringing technology to them is arduous and results are slow to come.

However, there are no hard and fast rules here. Schools that have had to use technology to deliver their courses tend to get used to the idea of using technology as a learning tool. A good example is the Monterrey Technological Institute (Mexico) that had to use technology to deliver its courses throughout its multiple campuses. This imposed familiarity led the institution to increasingly use computers and other technologies in its teaching.

Computers in Schools and Computers in Education: The Nouveau Technophobes

The discussion above misses one critical issue: there is a difference between computers in schools and computers in education. The traditional technophobes hated and feared computers, whether they admit it or not. They demurred, they did nothing to help and if computers came and were installed, they found one thousand solutions for not using them.

But the old technophobes are becoming a relic of the past; being replaced by the *nouveau* technophobes. This new breed loves computers, buys them, brings them to schools and uses them. But it does not use computers in education. Computers become better typewriters, better calculators, better tools to communicate irrelevancies, better ways of keeping grades and managing the school. They may be a convenient way to find references (through the Internet) or to exchange notes with colleagues. But computers remain at the periphery of the education process. Even word processing, that has a great education potential, becomes merely a more convenient typewriter. This is essentially what is happening to a vast proportion of US schools, stuffed with computers and attended by students who have computers at home.

Another powerful and understandable tendency is to teach how to use computers and productivity tools. These are useful and needed skills for future jobs. However, this is still not using computers in education but rather using education to learn about computers.

Indeed, most schools decided that they like computers; they are fashionable, bring status and help in administration. The challenge is no longer bringing computers to schools but bringing them to education. They remain at the margin of the teaching and learning process. Teachers type the exams on computers. Students type their papers on computers. This is about all that computers do in education even in some of the most prestigious schools, and in the most over-equipped schools of the United States.

The *nouveau* technophobes forego the fascinating possibilities of using computers in education. From the maligned but useful drill and practice of teaching mathematics or languages, to the new generation of intelligent tutorials, to the “as if” exercises, to the intriguing and entertaining simulations, to the experiments and explorations of nature, there is an endless range of possibilities and not less ample supply of innovative software. But by and large, these are the least explored uses of computers in technophobe institutions. Ironically, they were the first uses conceived for computers in education.

Status and Technology

One would imagine that high status educational institutions being closer to the technological leading edge would tend to use it for their teaching. This seems not to be the case. Prestigious teachers are too involved in their research, too obsessed with the publish-or-perish pressures to devote much time to teaching. The temptation is to keep using the same class notes scribbled in worn out yellow pads. It is not so much that they reject technology but that they are not willing to devote much time or attention to the teaching end of their careers.

By contrast, institutions where the faculty is not under pressure to publish and where teaching is a more central endeavor, tend to more easily move to the use of computers, starting with the ubiquitous PowerPoint. In the United States, community colleges that deal with academically weaker students—and where there is a commitment to bring teaching content closer to students—are the leaders in the creative use of computers, videos, browsers and all the panoply of available technologies. Some of them sport classrooms connected by fiber optics to other schools, where students can attend courses offered in different campuses. Surely, the argument is not that all or most community colleges are particularly creative but that they tend to be more creative than the regular universities.

The traditional universities are reluctant to transform their classrooms. They do not see much to be gained. Their increasing offer of distance education courses does not seem to affect mainstream teaching. It remains an enclave, perhaps managed by extension departments. By contrast, open universities are progressively moving to the use of browsers, the Internet, video technology and whatever else is available. On the other extreme, new institutions such as the University of Phoenix and Jones University, lacking tradition and even disdaining traditional means, are more than willing to experiment with whatever technology is around. They see in technology a means to bring something better to students who do not have access to conventional high quality education.

Lessons?

What do we want? Quick results? More bang for the buck in the short run? Then we should invest in the technophiles. They will put technology to its fullest use. They will become showpieces of what technology can do for education.

Do we want to invest in the long run? Do we have the time, patience and money to insist and insist? Do we want to bring new instructional technology to the mainstream of education? If that is the case, we may want to invest in the technophobes.

But the strategies and the people needed to do one or the other are different. Engineers and technoprophets do well in dealing with the technophiles. For the technophobes, the problem is not at all dissimilar to the well-known problems of introducing innovations in organizations. Technology is the least important worry.

Perhaps starting with the technophobes is not a good idea. The sequence of failures and false starts is demoralizing and expensive. Actually, it may backfire, by creating a bad image and frustration. With the technophobes, perhaps the best strategy is to concentrate resources in a few experiments and learn from them as much as possible. The bottom line is that introducing technology into educational institutions is not a technical issue but a sociological experiment. The hurdles are not technical but have to do with the internal logic of the institution, with built-in incentive systems, with values, with expectations, and with prejudices. It is not a chapter in the science of technology but in the art of institutional change.