The Thrill of High Technology; The Agony of Educational Reality in the Classroom

Dr. David R. Evans

Available at: https://works.bepress.com/david_evans/28/
THE THRILL OF HIGH TECHNOLOGY;
THE AGONY OF EDUCATIONAL REALITY
IN THE CLASSROOM

David R. Evans

Intoxication with high technology is increasing. It began with radio and then television and the potential that these mass media had for delivering uniform high quality content to students throughout a country, particularly one without sufficient qualified teachers and supporting educational materials. As the pace of technical innovation quickened, we progressed to programmed learning, to satellite transmission covering whole regions of the world simultaneously, and now we are well into the micro chip revolution which promises a computer for every classroom or even every child.

With each new technology the scenarios for its applications to solve the educational problems of the developing world multiplied rapidly. Donor agencies eagerly embraced each technology and helped to fund pilot projects and sometimes large-scale applications, convinced that this technology would prove to be the breakthrough which would cut the Gordian knot of educational development. Whatever the technology, the potential benefits to education were claimed to be enormous. Such claims were a strong enticement to supporting the latest technological application to education and sufficiently large to quell suspicions that perhaps it wouldn't really work that way.

Think back through the technologies of the past 30 years: the fanfare of the discovery of the possibility; the speculation about its potential impact on education; the pilot models; the enthusiasm for widespread adoption as reasonably priced models appeared on the market; and the inevitable discovery of the limitations followed by disappointment and disillusionment with the reality when the technology was used in real classroom settings.

Reminisce for a moment. What is the earliest technology you can remember? Is it dustless chalk for an erasable board, flash cards, filmstrips, 16 millimeter film projectors, reel-to-reel tape recorders, overhead projectors, reading machines, ...? Can you remember the enthusiasm of the promoters of each of these, the claims of the marvelous changes they would cause in the classroom? Do you remember the demise of these technologies? You don't, because old technologies don't die, they are replaced by a new technology which drives out any thought of the old and its fate. Hope springs eternal with each new technology and each new class of teachers and administrators.
As each new technology rises and falls, its life in the United States and Europe is followed at a distance by the same cycle in the developing countries. Each new technology finds a champion in one of the development agencies and becomes the focus of a technical assistance project. As the activity level of the development agencies has increased, the time lag has shortened until today we find technologies being introduced in the Third World shortly after they make their first appearance. While the capability and willingness to apply new technology to development problems has increased, so too has the rate at which each new idea is abandoned after its introduction and trial.

Some of these efforts have been very substantial, with careful planning, large investments of resources, and willing acceptance by local educational systems eager to make the new technology work. Unfortunately, the results have been largely disappointing, a failure to capture to any meaningful extent the promised benefits of the technology. Merely mentioning the names of countries to professionals in the field is sufficient to conjure up memories of the demise of significant projects: American Samoa, Alaska, Guatemala, Ivory Coast.... While not every case can be judged a failure, even modestly successful examples are notable exceptions to the general experience.

Does the glory of the technological promise ever escape from the agony of the reality of untrained teachers in primitive schoolrooms with no educational resources? What have we learned from 30 years of technological development and application? Should we ever be hopeful that even some of the promise can be realized in the context of educational applications?

The Importance of Being Humble

Perhaps the most important lesson we can learn is to admit that we don't know how to effectively apply technological innovations to large-scale educational development problems. That is not to say that we don't have any understanding of what is needed for effective use of technology in education just because we do not know many things. And under special limited conditions we can make educational technology highly effective. We do know many of the principles involved in effective application. But we continually overestimate our ability to create and maintain these conditions in the context of school systems in either the developed or the developing world. Or, we succeed in making a system work on a pilot basis only to discover that the costs are far too high to make large-scale applications cost effective.
Look at the schools in the developed world. Where do you find any large-scale use of educational technology? If you visit a typical American school today, what educational technologies would be commonly found? Would there be educational radio, language laboratories, computers, educational television? With a few noteworthy exceptions, the answer would be no. The most common technologies remain the blackboard, the textbook, the mimeograph machine, and, perhaps, the film projector.

Now, think quickly through the technical assistance projects of the past decade or so. What educational technologies were we working hard to introduce into the educational process in developing countries? They were educational radio, educational television, satellite transmission of television broadcasts, and computer-based instruction. The technologies which we have worked so hard to transfer to the developing world are not used in schools in our own countries. We are promoting technological solutions which are not appropriate at home and with which, in fact, we have little practical experience. We expect the developing countries to do things we can't and won't do in the developed world!

Despite this situation, our approach to the use of technology in education has been the same as in agriculture or urban development, areas where we are transferring technologies which we already do use extensively. We can't transfer experience which we don't have. Once we admit this to ourselves, we may be in a position to work with colleagues in the developing world to find realistic applications of technology to educational problems.

What Was the Question, Anyway?

Too often we have been part of a phenomenon which can accurately be described as educators with technological solutions roaming the world looking for problems. We all know that the right approach is to start with the problem, not with the answer. Rather than picking up the latest technology at home and creating an artificial scenario about how it might be used, let's begin with a real situation in a developing country's educational system.

The third theme of this conference is collaboration. Here is a strong reason to collaborate: if we don't collaborate effectively with the users of the technology, our solution won't work.

Let's begin, on site, and collaborate to define carefully the educational problem we wish to tackle. Having defined the problem, we must look carefully and realistically at the context in which the technological solution must survive. What organizational, managerial,
and staff capabilities will we be able to find or create with a reasonable amount of training? What infrastructure will be available to support the technology? How will the technology be maintained? How reliable will it be? These are all fairly standard kinds of assessments. However, those assessments are usually made by external experts whose task is to support the introduction of the new technology and their assessments are often much too optimistic.

Equally important are the more subtle human factors. What kinds of changes will the new technology require in the traditional local ways of doing things? The most successful innovations are natural extensions of these ways. Central broadcasting of radio or television education programs for use in schools is a good example. The benefits are clear and the potential improvement of instruction substantial. But what kinds of human and organizational changes are required? In addition to all the effort required to produce and broadcast the material, there are less obvious organizational factors needed. Each school, every classroom, and every teacher must be ready and waiting, with the receiver turned on and the kids prepared, at the same time everywhere in the listening area. Anyone who has ever spent time in rural schools in a developing country knows how unlikely this is! I don't say it is impossible, but it is a large step from current practice to the needed standards of preparation and punctuality.

The prospect of designing new technological applications in direct response to jointly articulated needs is exciting. Let's try to use technology in ways it hasn't been used elsewhere, design the solution on location. Combinations of centrally broadcast radio and extensive use of local audio cassette recorders can provide a good solution to many problems. Central broadcast makes good material widely available. Use of cassettes gives individual teachers options for timing, pace, and sequence of lessons. Such technology is locally available, readily understood by users, inexpensive, and easily repaired or replaced.

Or, consider applications of the microchip. One's first thought is microcomputers and computer-based education. But wait...that is following the old path of sending the developing nations technologies we don't really know how to use at home. Consider instead such hand-held microelectronic learning aids as "Speak and Spell." Relatively small investment makes possible production of ROM chips programmed with material for use in a developing country. Then consider innovative ways to use them in schools, within current organizational contexts, with only minor changes in classroom procedure. Development of such technology should and could take place in the country of application, working directly with educators and educational institutions of that country.
A very different pattern of innovation would result. While engineering would still emanate from centers of scientific research, which now includes many Asian countries, applications would be developed directly in the Third World. On-site solutions have a much greater chance of success. Dissemination would follow naturally. Fairly soon, I suspect, the developed nations would discover that they could learn from the experiences of the developing countries. Technology transfer would begin to reverse. Rather than resisting or feeling threatened, those of us in the developed world should welcome the revitalization and enrichment such interaction would bring. In my opinion, this pattern would demonstrate true collaboration from which all would benefit.

Technology as a Human Problem

What can we conclude from this brief excursion into the world of educational technology? We can put up satellites, build ever smaller, more powerful, and more portable receivers of information, and create a myriad of micro chip-based devices capable of manipulating information. But none of this technology is directly useful in solving educational problems. The challenge in making successful use of technology lies not in the technology and its associated hardware, but rather in the utilization of the information available through the technology by human beings in human organizations. Educational problems are human problems, not merely technological challenges.

To some extent this can be thought of as the distinction between hardware and software, the difference between putting up a broadcasting station and producing the programs to broadcast. But the difference is greater than that. Both of those tasks are still handled by professionals, often expatriate ones, and not by ordinary educators who are going to have to make use of the results in the classroom. The real challenge comes at the school level where the information received via technology must be utilized to promote learning. This is the level which has received the least attention from specialists, and it is the level where the whole process is most likely to break down. Resources and professional expertise focus first on hardware, then on centrally produced and controlled messages, and last on issues of local utilization. The exceptional projects which have had greater success will, I think, be found to have broken out of this pattern by emphasizing utilization at the level of the learners.

The need to be humble extends to the group of consultants and
professionals sent to assist in technology development projects. These people have been trained in the developed countries and naturally bring with them standards of professional excellence derived from applications in those countries. But this very professionalism can often result in blindness to local conditions, reluctance to hear what local practitioners are saying about conditions at the point of utilization, and exclusion of nationals who haven't had the same level of professional training. Not only does this raise issues of control and access, but it often guarantees no more than limited success for the project because programming and technology are created to meet international standards of excellence developed for use in settings with quite different needs and infrastructures. Professionalism should be defined by a commitment to process, participation, and genuine collaboration, not by rigid adherence to a set of international standards relating to hardware and types of programming.

The potential of the latest high technology is dazzling, and too often blinding. We shouldn't deny the glory possible from interactive video or megabyte laser disk storage devices, but we can avoid the agony of failure only if we balance the search for the all-powerful solution with a firm commitment to the principles of effective problem solving. Appropriate high technology is technology which can be effectively used at the level of the learner under practical conditions. Collaboration means working together to create new solutions to problems defined at the source by the users, not transferring answers from one setting to another. Professionalism is a commitment to listening, sharing, and jointly solving problems using whatever level of technology seems most likely to work under local conditions.

We do have some knowledge and useful experience to bring to the problem solving process. We do have a good deal of technical skill and an ever increasing set of powerful devices. What we need most to develop, though, is a sense of humility about the limits of our abilities.