

Educational Technology Classics

Computers in Education: Interesting, But How Relevant?

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For a society so adept in developing advanced technology, we have been grossly inept and negligent in concocting organizations and devising political and managerial innovations to apply technology effectively.

This is true particularly in education, where technological innovations, including applications of computers, stagnate without effective management and political planning. The status of computers in education is as follows:

- The vast majority of the developments in applications of computers in education have been most interesting indeed, but not too relevant to the major problems in education today.
- The technological developments in the field of computers in education are far outstripping the efforts to create an environment which is conducive to constructive change in public education, a fundamental prerequisite for the *effective* application of sophisticated technology.
- At hand is a crossroad in time when the computer will act as a catalyst for improving the quality of education, or will further institutionalize the existing system.

To illustrate my first point, I would like to compare some of the major problems in education today with the direction and emphasis of computer developments and applications in education thus far.

Politics of Education

How relevant is the computer to the major problems in education today?

This article appeared originally in the May 1969 issue of this magazine, as part of a special section on "Politics, School Management, and Innovation," Guest-Edited by Charles L. Blaschke, who at the time of writing was with the Institute for Politics and Planning in Arlington, Virginia, and served as a Contributing Editor of this magazine. He continues today as a Contributing Editor.

Aside from national issues of federal aid and "parochial" education, public education has traditionally been apolitical. Only now are grassroots politics emerging from behind "the closed doors" in education, especially on the local levels. As further decentralization occurs, it will increasingly become a major reckoning force for those concerned with introducing quality in education.

Community control. The heart of the "New Politics" is the control which the community and its citizens can exercise over their destiny. Regardless of the quality of education provided by the school system, communities, especially in large cities, are beginning to demand, sometimes irrationally, local autonomy—the right to hire and fire personnel, to set educational goals, and even to choose curricula and approve methodology. This political movement was best summed up by New York's Rhody McCoy: "Everyone else has failed. We want the right to fail ourselves."

Unionization. The growing unionization of teachers can be explained only in terms of politics. A major reason for union growth elsewhere was industrialization, which through automation affected job security and displacement. Education never felt this impact. In fact, education is the only industry in which the labor-capital ratio has actually *increased* over the last two decades. Moreover, it is unheard of for union negotiators to talk about "productivity increases of student learning" as a major bargaining point for wage increases. Education is not only the last of the manual trades, but unionization, increasingly so, is further institutionalizing this tradition.

School segregation and integration. As Congressman John Conyers viewed the Detroit riots in 1967, he allegedly commented: "The statistics are fighting each other." The statistics of school integration, once thought to be the panacea for equal education opportunities and often alleged as the reason for HEW's role in education, have not fulfilled expectations. In fact, suggestions have been offered by such liberals as Christopher Jencks, Paul Goodman, and Dean Theodore Sizer of Harvard to establish separate "parochial-like" school systems for blacks, or other forms of competitive education systems for the children of the poor. Both the far right and the not-so-far left are asking for a return to "separate but equal" rather than "compensatory" education.

Instruction. Goals and curricula became political issues only in isolated situations until recently. In both higher and elementary-secondary education, these issues plus methodology and pedagogy are entering the political arena. For example, if Individually Prescribed Instruction and quasi-track systems are utilized in their purest form most effectively and efficiently in elementary grades, due to the vast differences in learning characteristics and home environments of urban children, it would not be surprising at all to find almost all-black and all-white classes, or similar homogeneous groupings. Aside from racial issues, the concept of IPI is anathema to the 200-year-old mass education tradition. In our democratic, collective society, will a return to individualism initiated in the classroom tax our socio-political fabric even more?

Moreover, regardless of methodology, parents of school dropouts as well as social pushouts are increasingly demanding accountability of the schools their children

attend—"why did my son who has a diploma fail the Armed Forces Qualification Test?" (which one-third of a nation did in 1963); or "if you can't teach my son reading, at least tell me how he is doing on national achievement tests so I can," and so on. Semantic subterfuge and politically-inspired scapegoats no longer placate the militants, nor even mollify the majority.

The question I would raise here is whether the computer, or any sophisticated hardware and software system, has a role to play in alleviating the symptoms and, most importantly, the causes of this political upheaval in public education.

Management Problems

And now to the *management* problems. If I were the market planner who initially analyzed the market for computer applications in industry, and were to use the same perspective and framework of analysis in determining the market potential in education, without being unjustifiably cold and callous I feel that I would have to report the following to the corporate policy decision-makers:

Public education is a 200-year-old monopoly, without any competitors, for the most part, in the relevant market. The consumer of education has had little if any choice or sovereignty. And, largely because of this, public education has never been efficiency-oriented, nor is there any incentive to move in this direction.

Schools are input- rather than output-oriented, without any liability for quality control. Their rejects are the responsibility of Welfare and other agencies. It is not a process with defined objectives and goals.

Teachers appear to get rewarded for teaching, regardless of student achievement; principals, for minimizing inconveniences; and superintendents for purchasing textbooks, bricks, mortar, etc., for least costs. What is called *school management* is really "school keeping," concerned more with ADA, student-teacher ratios, years completed, percentage of non-whites, etc., rather than costs per unit of learning achievement.

Teacher dedication rather than the rewards of meritocracy appears to explain any success of the "system" thus far. Moreover, personnel policies do not appear to be based on learning efficiency. My report to corporate management, then might be summed up in terms of a question: Should we apply the computer and the new technology to make the existing system do what it does more efficiently, a market limited most probably by time, or should we use the computer as an enabling technology to foster change in the direction of an output-oriented system, *a new market which has to be largely created?*

Trends of Computers in Education

If I have correctly assessed some of the major problems of education, is the development and application of computers in education today directed toward their solutions? Let me first review the direction of USOE support as indicated by a brief compilation of projects funded through October, 1968. (Some of this information was presented by OE in the April, 1969 issue of *Educational Technology*.)

As of November, 1967, the most recent available detailed analysis of the gross figures indicated: (a) the average size

of the Title IV ESEA organization-administration projects was \$35,000; (b) of the funds categorized as going to CAI, only two projects, totaling \$380,000, were concerned with the managerial, political, and social questions relating to CAI; and (c) of the other 150 "computer in education projects" listed, only two were related to school integration, four to individualized student scheduling, and two to feasibility studies on the configuration of regional usage of computers for administrative functions.

It is interesting to note an apparent change in USOE policy. First, the emphasis on CMI systems' development appears to be increasing, at the expense of CAI. Second, at least one large-scale CMI system project, known as CUES, has the critical mass to produce useful and valid results. Third, to my knowledge, on February 20, 1969, USOE published an RFP seeking bids to conduct the first large-scale study on the management problems facing schools when they implement IPI and similar methodological approaches throughout their schools. Encouraging as this trend is, much higher priority should be given to seeking solutions to the managerial problems and other non-hardware barriers to effective innovation in public education—creating the environment conducive to innovation.

Improving School Management

Education must be perceived by school officials and the community alike as a "manageable process." In the education field, where a page of history is worth more to a would-be innovator than a hundred of logic, the "show me" attitude has to be satisfied with large-scale credible demonstrations of the new role of the computer and of the management process itself. For example, CMI projects, such as Project PLAN, or that conducted by System Development Corporation, are demonstrating forcefully, to parents and teachers alike, that different children do in fact learn different subject matter at different rates with different instructional strategies; to teachers, administrators, and union leaders, that the role of the teacher has to be changed to that of a manager; and that with minimal training this can be accomplished.

To demonstrate that the educational process can be managed, I recently assisted a community to develop a program in which a private corporation will manage a learning achievement center in math and reading for recent school dropouts. The contractor will be paid on the basis of student achievement. The performance "specs" were very simply stated in the "request for proposals," without restrictions on procedure, method, etc.

A. "Reimbursement will be made on objective-measured increases in student learning achievement per maximum time period."

B. "The instructional approaches will be non-labor intensive, utilizing to the maximum extent automated multimedia types of instruction such that the costs of expansion of the program will be relatively small and that operating costs will be constant or decrease over time."

Shortly after the "ice was broken" with this project, two other communities submitted proposals to use a very similar approach. Both are in the process of being funded. Programs like the above need not only expanded federal and state financial support but also political support to

rescind archaic and obsolete bureaucratic procedures which impede a more rational approach to improving learning performance and often preclude the effective application of computers where they are economically feasible.

Capital budgeting and program budgeting capabilities have to be *developed* and *applied* in state and local education agencies if the capital-intensive, sophisticated technology is to be utilized. This is one reason why computers are being used much more extensively in the Department of Defense training and education programs than in civilian counterparts. However, the newly-trained program managers must be able to develop not only output-oriented "software" but also high-quality "sense-ware" (common sense and political responsiveness) into their computer programs. For example, taxpayers should have the opportunity to get quick answers on the tax impact of various revenue alternatives for supporting educational program elements. To educate and garner political support, citizens and parents should have available, on an as-needed basis, information on the total costs (actual and real) and benefits (educational and potential returns on educational investment) of alternative educational programs.

To illustrate, in a recent study (see *Educational Technology*, June 30, 1968) an associate and I found that effective applications of the computer in New York City secondary education could be justified by large cost savings in the areas of record-keeping, testing, lesson planning, and other functions now provided by teachers; however, most of these functions are done by teachers today *after school hours*, a real cost amounting to some \$30 million, but considered a "free" resource by school administrators. Thus, cost savings would have to be in excess of \$30 million to justify the use of the computer to administrators, especially in light of union resistance to job displacement or salary reductions. The point is that if the community as well as unions were aware of this situation, they would be more likely to argue their case in rational rather than racial overtones.

I see numerous other ways in which the computer can be used as an enabling technology for constructive change in education:

- simulation models with political variables reflecting community political climates to determine which functions to decentralize in large urban systems and what decision-making information is needed at what levels;
- models based on the growing stockpile of hard data and research on what motivates teachers, so that eventually we can decentralize to the classroom level, whose "manager of the conditions of learning" will have incentives to "maximize" learning rather than depending on the existing information system accessible to the community which provides, among other things, progress reports on student achievement, the availability of school systems within governmental jurisdictions, the availability and prerequisites, costs, etc., of both employment and higher education opportunities for their children; and
- an informative system available to both school officials and union negotiators, which brings some rationality and

possibly reform to one of the most disruptive forces in urban education today.

Until federal, state, and local efforts are directed at these and other political and managerial problems, and possibly the unique capabilities offered by the computer are used in seeking their solutions, what is technologically feasible with CAI will not have much of an opportunity to be used effectively. Or, if applied prematurely without planning, harm might come to the movement.

To the Future

The computer has a definite role in promoting a general catharsis of the existing system and being the catalyst for educational improvement in our public education system. The question is *how* does *who* proceed?

First, industry has to be willing to be a staunch and dependable political ally for constructive change, independently, or, most probably, collectively. An associate commissioner of education during the heyday of CAI in 1966-1967 has explained to me the difficulty of getting representatives from the education industry to testify in favor of learning systems technology before Congress.

The federal government must, at the same time, get its house in order—developing cost-sharing guidelines, using sensible contracting procedures, and funding large critical-mass projects—and then managing them effectively.

There continues to be a need to provide discussions among the universities, governments, education, and industry. However, the market for educational technology, heretofore not much larger than the conference and symposia market on the subject, has to be largely created.

Moreover, if computers and sophisticated educational technology are to have a meaningful impact on the quality of public education, we need to create:

A. "Buffer" organizations between would-be innovative industrial suppliers and serious, imaginative school officials to minimize the political and marketing black eyes which could easily arise during experimentation with CAI, CMI, etc.

B. Disinterested, objective, and knowledgeable management groups which act as the "honest broker" between overzealous manufacturers and managerially deficient school officials and well-meaning but "politically hamstrung" USOE officials.

C. Catalytic groups which can lay political and other groundwork in the community, and assist schools in initiating action.

Astute commentators on the American scene, dating from de Tocqueville, have attributed creativity in public services to the independent sector—the voluntary groups, associations, and churches. There are few such "ombudsmen" and/or organizations for creative change in education who have the above characteristics and capabilities to assist schools to use computers and other technology most effectively in school management and instruction.

The creation of mechanisms which can—concurrent with the development of technology—direct attention to the political and managerial problems in education is a prerequisite to the effective and creative application of technology in education. □