

# Technology and the Humanities

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Fourteenth in a series of  
perspectives on employing  
technology to address the  
major unmet needs of society.

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# Technology and the Humanities

Many interesting technologies are important to various branches of the humanities. One is laser beam holography, which is making an important contribution to the visual arts by reproducing strikingly realistic three-dimensional images. Another is image enhancement by computer, which is being applied in the field of religion to enhance photographs of the Shroud of Turin. This piece of linen is imprinted with the faint image of a man and believed by many to be the burial cloth of Jesus. The enhanced photos will be scanned for details obscured by centuries of stain.

There are many technologies that are interesting and of value but are not vital to significant improvement in individual living. Urgently needed is more technology that reaches individuals, that enriches their lives and that helps them take more control over their destinies. And equally needed are more technologies which increase participation in the resolution of value issues, especially those relevant to community living. There are too many disadvantaged and handicapped people in our society who are being denied the right to enter mainstream America. There are too many people in mainstream America who are distressed and troubled, and there are millions of people groping for more meaningful living.

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Vast amounts of existing and emerging technology could be, but are not being used to address these humanistic needs. Clearly, traditional ways of using technology are not working well enough and change is long overdue. One important change is that business must assume a much greater share of responsibility for addressing our major unmet societal needs, as opposed to the present practice of relying primarily on government.

Major societal needs such as those of the disadvantaged, the handicapped and the troubled are massive; and massive resources are required to address them adequately. This requires cooperation among all sectors of society with leadership by business, because business is in the best position to marshal the required technological, management, professional and financial resources.

In truth, most of our past investment has been made in physical technology, and too little in human technology. Consequently, as mentioned earlier, the great need today is technology as an enabler or provider for the individual and as a developer to help those like yourselves engaged in efforts to advance humanities.

### Education

In turning to specific programs, I will start with education by noting that progress in understanding and benefiting from the humanities is slowed because education is falling far short of meeting our needs. Witness the growing constraints on quality, accessibility and availability of curriculum caused by steeply rising costs of education. Equally serious is the large number of youth drop outs and those lacking basic skills in our country. Overseas, there are three-quarters of a billion illiterate people, and the number is increasing.

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The only practical way to make significant progress in meeting this massive and urgent worldwide need is through the use of advanced technologies, primarily those represented by television, audio/video tapes and discs, telephone, cable and satellite transmission coordinated in a network learning system with computer-based education. For 17 years, Control Data has been engaged in cooperative programs with many other organizations and individuals to develop such a system, called PLATO® computer-based education (CBE).

The PLATO system is computer controlled, and the main method of delivery is computer-aided instruction with integrated terminals using a TV type of screen with touch input and video and audio peripheral devices. Its many advantages include nearly limitless memory, versatility, patience, privacy and delivery of uniformly high quality. A single student can interact with another student or instructor or conferences can be held.

PLATO CBE has been proven cost-effective in many fields including vocational training and teaching basic skills – areas of critical importance to developing countries and the disadvantaged in our own country. Basic skills courses cover the range from grades 3 to 8 and courses are under development for 0-3 grades. Present basic skills courses have proven to be very effective. On the average, individuals

have advanced an extra grade level in reading in about twenty-one hours and two grade levels in mathematics in twenty-five hours of work at the terminal. Vocational training courses are equally effective and courses in many subjects are available. Secondary education and adult continuing education are also beginning to benefit from computer-based education.

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Let me take, as an example, its use in teaching a second language.

*Language:* As background, I will quote from a recent paper by Charles Frankel entitled “Why the Humanities?”

He wrote, “The humanities are that form of knowledge in which the knower is revealed. All knowledge becomes humanistic when this effect takes place, when we are asked to contemplate not only a proposition but the proposer, when we hear the human voice behind what is being said. And the humanities sink into pedantry when they lose this quality. They no longer give us *knowledge with commitment*.”

Sadly, here in the United States, too many of us are unable to hear the human voice behind what’s being said by our international neighbors.

Teaching languages is a complex process and learning them is one of the most demanding fields of study, because languages are the “human voice” mentioned by Charles Frankel.

Now, with computer-based education, we have a new tool with important advantages over traditional methods. The most important advantage relates to individualized instruction. A one-to-one relationship between student and teacher is recognized as the very best setting, but the cost is too high. With the PLATO system, this is no longer true. The cost is already lower and will go down further. The PLATO system offers a one-to-one relationship with all the known advantages of individualized learning. And with PLATO, the student does not depend on the mood and qualifications of a particular teacher on a certain day.

Other social features in the PLATO learning methodologies include competency-based learning in which the variable is the time taken to learn and the constant is completeness of learning. PLATO appeals to those who feel threatened by the competency of others or by the teacher in group learning situations. PLATO appeals to those who, for whatever reason, doubt their ability to learn as rapidly and as well as their

peers. The key in this respect is the privacy of PLATO. Equally important, learning is brought to the person virtually without regard to that person's location when he or she wants the learning, not when the class is scheduled.

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#### Cultures

PLATO computer-based education also has an important role in culture. Tribal Indian cultures and the rural community way of life are examples.

*Tribal Culture:* A good starting place to consider tribal culture is to note that the appallingly high rate of drop-outs of Indian children from city high schools before graduation is attributed to the lack of Indian culture in the curriculum. Problems apparently begin when Indian children gain some awareness of their heritage and then are forced to ignore that heritage when all their school courses relate only to the white man's history. With a curriculum that is already constrained by escalating costs, traditional education is unable to meet this cultural need.

Computer-based education, with its multimedia capability and enormous storage capacity, will eventually meet the history needs of Indian children and other minorities.

Tribal culture, itself, is threatened as Indians struggle to exist on reservations, many of them living in poverty, chemically dependent, with grossly inadequate health care and far too few opportunities for a livelihood.

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Preservation of a culture is a far greater and broader challenge than simply providing education in history and customs. It involves the urgent needs for better health care and more opportunities for gaining

a livelihood in the setting of the reservation. But these can be met and more technology is starting to be used for these purposes.

*Health Care:* In health care, Control Data has worked for five years with tribal leaders on the Rosebud Indian Reservation in South Dakota to apply computer technology and managerial resources to dramatically improve health care delivery. Five years ago, one woefully understaffed, small hospital was responsible for the care of 8,500 Native Americans. Those who required care had to travel up to 130 miles on dirt road, with little or no transportation, to get it. Today, Control Data's medical van travels the reservation providing care to 900 residents per month, with significant improvement in the health of the tribe. In addition, four clinics have been established and Indian paramedics have been trained.

Substantial progress has been made, but there is still urgent need for further improvement at Rosebud and even more at most other reservations where health care isn't only poor but is shamefully poor.

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The next phase of the program is to teach tribal Indians self health care aimed at the avoidance of illness, using PLATO computer-based education. This is a gargantuan task, but it is the only possible way to achieve the needed improvement in Indian health.

Control Data is committed to a large-scale cooperative effort to help bring about the necessary change in health care through training, not only for American Indians, but for all. And the dedication and the resources of other companies and the government to achieve that long-range goal can be marshalled.

*Small Scale Enterprise:* Providing adequate career opportunities on an Indian reservation is even more challenging. The main way lies through small scale enterprises – small farms, small-scale food processing and various types of other businesses – all on the reservation. Given viable small-scale enterprise to provide decent livelihoods on the reservation, better health care and appropriate education, Indian tribal culture will be maintained, almost as an automatic by-product.

Let me digress here and talk for a minute about small scale enterprise. There is growing evidence that environmental degradation, dwindling national resources, energy, rising food costs, decreasing industrial

innovation, persistent unemployment and underemployment and other major problems of society can be more effectively solved by small business than by big business. The technology of starting and building small businesses is well understood, and it is being taught. And there are millions of other technologies that can help small enterprises prosper. With the help of the computer, these technologies can be made accessible and their application taught to the owner/manager of most types of small enterprise.

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To help explain, I will briefly describe Control Data's small farm program and how it will grow to a national, even international, scale.

The basic premise is that the proper selection of existing and emerging technologies, along with appropriate training, will help small family farms to reduce the cost of food, make a significant contribution to food production, do it in more environmentally acceptable ways and provide a decent living for the operators.

Control Data in cooperation with a number of universities and other organizations has undertaken a small farm program to prove the premise. Computer technology is the centerpiece of the implementation.

A data bank of agricultural technology which is consistent with high production per acre, low capital investment and decreased consumption of fossil fuels is being assembled. Optimized selections of crop, livestock, equipment and other technology are made by computer for each small farm. Comprehensive computer-based education and training programs will enable individual farmers to efficiently apply the technologies.

Because of the vast range of agricultural technologies required to implement the approach over the widespread geographies encountered on nationwide and international scales, a consortium has been formed called Rural Venture, Inc. It is composed of business, the church, farm cooperatives and foundations.

While these efforts are in early stages, it is clear that the necessary technologies can be assembled. That through the use of the computer, the technologies can be selected and optimized for small farms, that individuals can be trained to successfully apply those technologies, and that, ultimately, it will be done anywhere in the world.

Through cooperative efforts and use of the computer, results similar to those in small-scale agriculture can be obtained in most types of indus-

trial small-scale enterprise. Technologies can be aggregated into sets in each field, and the successful application of those sets of technologies can be taught by computer-based education either in starting or growing a small business.

*Rural Way of Life:* The implications of successful small scale agricultural and industrial enterprise include the means for preserving and enhancing the family farm and small rural community way of life that has been steadily eroding for the past fifty years. Not only will family farmers and small town residents have the chance for a higher quality of life, but millions of young people will have the choice of a career in small-scale agriculture or in a business in a rural community.

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Progress in expanding rural small scale enterprise can be much faster if legislation is enacted to remove the discrimination against the small farmer vis-a-vis his large farm neighbor, that is inherent in present government policies. These problems are being recognized, and I am confident that appropriate legislation is in the offing.

#### **Individuals**

Next, I will talk about technology for helping individuals to cope with personal problems such as chemical dependencies, interpersonal relationships, personality maladjustments, lack of motivation and dissatisfaction with the system.

Obviously, the most productive approach is a creative attack on causes rather than treatment of the symptoms. But the sad truth is that little attention is being paid to fundamentals such as: Education of the young to avoid chemical dependency rather than its treatment; education on how to stay healthy instead of how to recover from illness; giving people a second chance for a basic education instead of repeatedly jailing those who lack it; preparation of needy people for careers rather than simply finding them a menial job, which has little or no prospect of permanence. The technology for a creative attack on the root causes has more accessible, higher quality and less costly education as its cornerstone, and as explained earlier, it is available with

computer-based education. As soon as appropriate course materials are developed, dramatic improvements will be made.

Education, although the cornerstone, must often be accompanied by other technologies. Let me illustrate with three programs for helping people cope with personal problems.

*EAR:* One program is called EAR which is the acronym for Employee Advisory Resource. This service is available to all Control Data employees and to the employees of other organizations that subscribe to the service.

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EAR appears deceptively simple. Its use, by a troubled employee or family member, begins with a toll-free telephone call that establishes contact with a counselor to help diagnose the problem and obtain a solution. EAR serves the whole range of personal, family and work-related problems. In the four years the program has existed, it has served 20,000 cases involving employees or members of their families and usage is increasing.

Behind that simple description lies significant human technology that copes effectively with complex human issues. Most of the problems are so personal, or the opportunity for reprisal so real in the employee's mind, that absolute anonymity must be maintained initially for the employees. Only when they have that confidence are they willing to proceed with the process of seeking solutions.

The counselor receiving calls cannot be simply a well-meaning individual. The employee with a problem is often unable to articulate causes. Each counselor is trained in crisis intervention, a human technology that is especially effective in overcoming the distance barrier that the phone introduces between the counselor and the troubled individual.

In seeking solutions, every attempt is made to use existing community volunteer services rather than attempting to duplicate them. The employee is helped by an EAR advocate. In the case of work-related problems, the advocate's task is to assist both the manager and the employee to seek and interpret the relevant facts until a just conclusion is reached for the employee and the company.

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Annually, the results of the program are evaluated, including savings in turnover, absenteeism and medical costs, for example. The savings exceed the costs of the program many times. Dwarfing the cost savings are the immeasurable, but real benefits to the well being of employees.

Savings from this program are growing as usage increases. A conservative estimate of annual savings exceeds \$10 million.

Services like EAR are not yet widely available, but they will be as the economic and human benefits become more widely known. Already a number of large companies are offering them to employees; and, in time, many small companies will be offering the services to other small organizations, including local units of government.

*Performance Appraisal:* Another important human technology is more effective performance appraisal – a tool that supervisors have used for years, although inefficiently. Properly used, such a tool can increase the productivity of both supervisors and employees. The success or failure of such a program hinges on the rise of human technology, including better defining the relationship between performance and the job, regularly sharing information on appraisals between supervisor and employee, training the supervisors in the necessary communication skills and training the employees in reasonable expectations.

*Concerned Others:* The third program is called Concerned Others, which is computer-based education training for adults who are trying to deal with problems related to alcohol and drug abuse within their families. The object of the curriculum is to educate the participant about the basic facts of alcohol or drug use, how to determine if the use of either is a problem in the family, and where to get help and how. The goal of the course is to teach the participant to clearly understand his or her own role in the problem and to take personal steps toward getting help if help is needed.

The privacy and immediate availability, along with the depth of learning that can be achieved and the low cost of PLATO computer-based education are all important in solving chemical dependency problems.

There are many other human technologies for helping with personal problems that could be used as examples, but there isn't time. And I should add that by only citing Control Data technology for helping people to cope with their problems does not imply that I do not consider other human technology as important. The point is that I wanted

to speak mainly about technology with which I have had first hand experience.

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#### Community Teleconferencing

Finally, I will review technology for community teleconferencing. Community in this instance refers to a group with common interests or the population at large in a given geographical area.

*HOMework*: Control Data's program, called *HOMework*, is an example of working with a common interest group. The purpose of *HOMework* is to provide training and employment alternatives to the severely-disabled homebound population. Currently, there are more than two million Americans classified as being homebound because of a severe mental and/or physical disability.

*HOMework* evolved within Control Data because of our concern over the growing number of severely disabled homebound employees. Tragically, this same group of people has a wide range of untapped skills. Therefore, a project was created to develop training and job opportunities for them using a PLATO terminal in each of their homes.

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The first PLATO terminal was installed in August, 1978, in the home of one of the twelve *HOMework*ers selected. The first work selected for the *HOMework*ers to perform was designing, developing and evaluating educational courseware. Depending on their interest, experience and skill, each participant was trained to perform one of the three functions via the PLATO terminal. The end result is quality computer-based education courseware to be marketed by Control Data.

Control Data is expanding homebound employment and making additions to the types of work performed that includes computer programming.

HOMEWORK is not intended to be restricted to Control Data employees and will become an employment alternative, not only for the disabled population, but also the able-bodied, such as housewives, homebound with small children, or women living in the more remote rural areas.

HOMEWORK can bring the PLATO terminal into the home — providing training and education as well as a means of communication for the disabled person. A counselor participated in the computer network along with the other employees. It is truly a network of disabled persons with varying disabilities, learning different skills at different rates but sharing the learning experience.

*Regional Conferencing:* The computer and communication technology used in HOMEWORK is essentially the same as that for a teleconferencing project to serve the population at large in a region of Minnesota. Control Data recently launched a cooperative program with the Countryside Council, a rural citizen-based organization located in Southwestern Minnesota. Participants live in 19 counties.

The Council identifies issues in which thousands of citizens of the region become involved through studies and in the decision making process through task forces. A wide range of issues is assigned to task forces, including energy, rural housing needs, training of rural public officials, opportunities for women, health care, arts in rural Minnesota, and telephone services.

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A large part of the Council's operating costs are for education and travel reimbursements of Council and task force members. Travel is required over substantial distances and rising energy costs will increasingly strain the budget. The Council reimburses members for travel costs so that no one is denied the opportunity to participate for lack of money to travel. The time wasted in travel, of course, detracts from administrative efficiency. Meeting education and training requirements of the Council program is an even greater challenge, which is further enlarged by the wide separation of participants.

To alleviate the barriers of time and space and help meet the challenges of diversity of needed education and training, Control Data entered into a cooperative program with the Council to provide teleconferencing and more accessible education and training through PLATO computer-based education.

In addition to saving travel time and expense, teleconferencing meetings have other advantages, especially in dealing with subjects requiring reference to large amounts of relevant data. Even though important, I won't take time to comment further on this aspect; however, I will talk about financing.

There have been substantial grants made to the Countryside Council by foundations to finance its operating costs. Control Data has also made a sizeable grant to get the computer-based education teleconferencing and training project launched. One of the conditions of Control Data's support for the Council's teleconferencing and training activities is that it become a stable and self-supporting operation where the services, especially education, are paid for by users who can afford to pay. For those who can't pay, the cost is borne by the government or through other arrangements. I see this approach as a model for other installations.

#### Humanities Financing

Looking beyond the single Countryside Council project, what I am saying is that those who can afford to pay for services should do so. Otherwise, in our already over-burdened society, there will not be adequate resources for the timely advancement of the humanities because it is not likely that there will be increases in corporate philanthropy, foundation grants or government funding.

In fact, I believe that there will be a gradual reduction in funding available for individual projects. One reason is that most corporations are presently making less than optimum investments in capital stock, research and development, and innovation. More importantly, there will be a gradual shift in contribution philosophy by both corporations and large foundations toward holistic programs addressing major societal needs. This approach provides lasting benefits, whereas there is much less benefit derived from parcelling out equivalent amounts of funding through a myriad of relatively uncoordinated small grants, most of which treat the symptoms as opposed to eliminating causes;

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and too many of which absorb too great a proportion of available funds in their administration.

Therefore, there must be a vast increase in the cooperative efforts among business, government and your sector to meet the need for humanistic technology. Such efforts should be made on the basis that those who can afford to pay, do pay, so that those unable to pay can also participate in mainstream America.

#### **National Teleconference**

Before concluding, I will speak briefly about nation-wide teleconferencing. As you can see, the community teleconferencing technology that I have been discussing is only a step away from that needed for the electronic democratic governance networks that have been talked about for many years. Thus, affordable technology is on the horizon for providing local, state and national referendums for interactions between constituents and for other communications.

Still unanswered are the questions of who pays for the network and who controls it. The answers are, of course, related. Control in one form or another comes with all government funding.

Preferably, in our society, the private sector should provide the network. And I am not suggesting that it should be Control Data or any other big corporation or combination of corporations. But, I do believe that corporations should provide initiatives, as mentioned earlier, in cooperation with your sector, the government and others.

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Again, the approach being followed by the community council telecommunications program as mentioned earlier, is an appropriate model for the future. The private sector provides an initiative with technology and some funding. Other sources of financial support include foundations and government. Ultimately the network, which is a collective of many community systems, becomes basically self-supporting.

#### **Conclusion**

In concluding, let me simply say that broad-based cooperation that addresses the enormous need for humanistic technology isn't going to