Norman Henchey

Means and ends
The reduction of curriculum to technique

The feeling that a technology is taking over is no new one for mankind, but there is something total about the system entailed by computers that may be new. Such systems of "technique" tend to suppress individuality and to suppress meaning, for they subvert ends to means. In his wide-ranging overview of its effects on curriculum, Norman Henchey draws an unexpected parallel between the phenomenon of microcomputers in education and the "mandated" curricula now manifest in many societies like Quebec's. He shows how each of these developments meets the criteria enunciated by Jacques Ellul as characteristic of a system of "technique" - a total, independent, closed system, defiant of understanding and influence unless an exceptional effort is made to restore a balance between means and ends.

In recent decades, there has been a growing preoccupation with the role of technology in our society.

While it is true that there is nothing particularly new about such a concern - preoccupation with dangers of technology is one of the recurring themes of intellectual history - the debate about technology, its assumptions, its nature, and its implications, has become deeper and more widespread in North America since the Second World War. There are a number of factors which have caused technology to be the subject of special attention: the spectacular advance in many technologies resulting from military and aerospace-related industries, the rapid and widespread diffusion of various technologies throughout our society, and the application of technological methods to different forms of human organization; an increasing sensitivity to the ecological impact of certain technologies, anxiety about the dangers of nuclear power and nuclear weapons, and a growing body of knowledge and insight into the impact of technological transfer on the cultural patterns of societies on

the receiving end of technical development.

In the 1970's and 1980's, two developments brought a new character and a new urgency to the discussion: a prolonged economic recession in the developed nations increased public skepticism about the inevitability of technological progress and about the distribution of benefits resulting from what progress there was; and the signs indicated that North America, Japan and other nations were in the process of transforming themselves from an industrial, manufacturing-transportation-based society to a post-industrial, information-communications-based one, the nature and social implications of which are still far from clear. Thus, as the debate was beginning to increase in tempo about such issues as engineering, manufacturing, weapons, environmental impact, and patterns of production and consumption, a whole new agenda of high technology issues was placed on the table: bioengineering, microcomputers, satellites, chips, robots, videotex, automated offices, and electronic cottages.

A number of social critics have led the way in "posing the technological question", and among the major contributions to one side of the debate are the general theory of **la technique** developed by the French thinker Jacques Ellul, the concept of planetary culture described with such brilliance by William Irwin Thompson, the political and sociological reflections of Theodore Roszak, the notion of convivial tools presented by Ivan Illich, and the potential of appropriate technology advocated by E.F. Schumacher.(1)

On the other side, the debate has been joined, less by defenders of the technological status quo, but more significantly by the advocates of the current technological revolution. Masuda(2) is confident that we will avoid the dangers of the "Automated State" and will choose "to follow the path to 'Computopia'", because "the computer as innovational technology is an ultimate science," that is, one "that will bring immeasurable benefits to humanity if wisely used, but which will lead to destruction if used wrongly." He is also confident that "the information society will come about through a systematic, orderly transformation." This optimism is shared by Joseph and Harkins who wrote about "ethnotronics" as "the new field of studying and designing inorganic electronic devices that have interactive "cultural" characteristics, shared with people and/or other systems." They foresee that "the spread of convivial ethnotronic systems will lay the foundation for a world from which everyone - rich and poor, expert and non-expert, highly educated and educationally deprived - can benefit."(3)

A recent report on the information technologies prepared by the Science Council of Canada is more cautious, warning of the economic, social, political, and cultural dangers of the communications revolution, including a decline that "would bring Canadians inevitably to a condition of pastoral servitude by the middle years of the twenty-first century." Yet the authors of the report hasten to strike a more positive note:

"If, on the other hand, Canadians are willing to make the political and financial commitments needed to master the new technologies, particularly in the areas of computers and communications, resource extraction and processing, energy, research and education, then we will reap the benefits of new employment opportunities, reversal of trade deficits, and strengthening of our cultural sector, and achieve a new and powerful competitive position in the global marketplace."(4)

It seems that the debate over technology is not quite over but is entering a new phase of analysis.

Using technology to control learning

This issue has some importance for the theory and practice of curriculum. On the theoretical side, there has been analysis by neo-Marxist critics such as Henry Giroux(5) on the sociology of knowledge upon which much of curriculum theorizing has rested, a set of assumptions strongly influenced by "the logic of scientific methodology with its interest in explanation, prediction, and technical control." Likewise, the work of Pinar and the "reconceptualists,"(6), especially their preoccupation with the hidden curriculum and its effects, is based on a rejection of at least some of the assumptions of technology, and proposes very different assumptions, goals, and strategies from those commonly associated with mainstream curriculum theory and development.

On the practical side of the curriculum domain, there are two powerful developments that promise (or threaten) to transform curriculum design and practice in Canada and the United States. The first is the rapid diffusion of microcomputers in elementary and secondary schools and the race by administrators and teachers to learn Basic, Logo and Pascal, to take courses on "The Computer in the Classroom", and to adapt themselves to what is coming to be called "computer-aided learning", (a significant shift in terminology from what until recently was called "computer-assisted instruction"). The second development is the tendency of government bodies, after a decade of freedom, diversity, and innovation, to define with much greater precision their objectives, content, expectations, and evaluation procedures, using the models of instructional systems, competency programs, and mastery learning.

Both microcomputers and mandated curricula have much in common: they arise from pressures outside the education system, they are inspired by a concern that school learning is inefficient and irrelevant, the rhetoric accompanying them stresses pragmatic and career-oriented goals, and they both show a tendency to employ technology to control learning.

There are, then, links to be made between (1) the critics of technology, (2) the information-communications revolution, (3) curriculum theory, and (4) the new curriculum technologies of microcomputers and government-mandated curriculum. The purpose of this paper is to illustrate one small set of links, between the theories of the critic of technology, Jacques Ellul, and the introduction of both microcomputers and mandated curricula, with specific reference to Quebec. The dominant theme is the tendency of technology to substitute means for ends and thus to endanger the role of meaning in the curriculum.

Ellul and technique

Jacques Ellul is a French philosopher and theologian, an active member of the French Reformed Church and of various social movements within France. Although he has over twenty books available in English on a variety of subjects including law, propaganda, politics, technology, and theology, his influence in North America has been modest, at least outside of the fields of philosophy and theology. He has three major works dealing with technology: his most famous is The Technological Society published in 1964, and this has been updated in two recent works, The Technological System in 1980, and a very useful summary of his thought published by the Canadian Broadcasting Corporation entitled Perspectives on Our Age: Jacques Ellul Speaks on His Life and Work (1981).(7)

The key concept of Ellul's thought is that of technique; this is often translated in English as "technology", but he prefers the English "technique" as a more accurate rendering of the term. Ellul defines technique as "the totality of methods rationally arrived at and having absolute efficiency in every field of human activity."(8)

The main elements are a stress on methods as opposed to objectives, on methods as a totality or general system rather than as individual tools or procedures, on rationality as this has come to be defined in the Western scientific tradition, on efficiency as economical procedures, and on every field of human activity as the range of application of technique, not simply those related directly to engineering and technology.

As a preoccupation with rational methods, technique has two dimensions: it is a key phenomenon in our society, a central fact of our reality, and a major influence shaping our environment; second, it is a point of view, a system of thought and interpretation that determines the way we look at our reality, the way we define problems and the way we propose solutions.

As a fact of reality, technique has become more than the tools and instruments we use to control our environment; it has become "a milieu in which people live," and "a milieu (that) both makes living possible and also forces change, obliges us to

transform who we are because of problems arising from the milieu itself."(9) A milieu does two contradictory things to us; it provides survival for those who adapt to it, and at the same time it brings danger to those who cannot change in response to problems arising from the milieu itself. Adaptation offers survival but change offers threat, and both survival and threat are functions of our milieu.

Ellul goes on to describe three successive human environments: the natural environment of the prehistoric period in which man was in direct contact with nature, where the environment offered the basic necessities of life, and where the dangers were largely natural phenomena such as shortages, wild animals, and disasters; the social environment of the historical period, in which man's major contact was with human society, an environment that protected him against nature but also posed problems of organization, distribution of wealth, and war; the technological environment of the modern age, in which technique mediates our contacts with nature and other humans, where our survival depends on the power of our technology and our greatest threats come from this same technology.(10)

Technique is also a point of view, "an instrument of knowledge, a scientific instrument. It offers the central viewpoint in which one must place oneself if one wishes to understand and explain what is happening."(11) When technique as a way of thinking joins technique as a phenomenon, a situation is produced in which all phenomena in society are either imitations of technique (as administration, for instance, is refashioned to imitate the computer) or a compensation for technique (entertainment, recreational use of drugs, tourism, spectator sports).

As more and more phenomena become reactions to the influence of technique, in the positive sense through imitation or in the negative sense through compensation, there are two important consequences. The first is the suppression of the subject, since technique, through its mediating function, objectifies the self and brings distance to human relationships. The second consequence, and one of special relevance for curriculum, is the suppression of meaning. Ellul writes:

"Then there is the suppression of meaning; the ends of existence gradually seem to be effaced by the predominance of means. Technology is the extreme development of means. Everything in the technological world is a means and only a means, while the ends have practically disappeared. Technology does not develop toward attaining something. It developes because the world of means has developed, and we are witnessing an extremely rapid causal growth. At the same time, there is a suppression of meaning, the meaning of existence, the meaning of 'why I am alive', as technology so vastly develops its power."(12)

He goes on to argue that as technique increases its power, it

destroys values and meaning. "Whenever power augments indefinitely, there is less and less meaning. One seeks a meaning when power allows us to be ourselves, without being superhuman."(13)

Technique as a total, closed system

The power of technique comes from the fact that, both as a social phenomenon and as an intellectual model, technique has become a system in the current sense of "an ensemble of mutually integrated elements, situated in terms of one another and reacting to one another." At a sociological level, individual techniques and technologies, machines, processes, products, and delivery systems must be seen, not as isolated phenomena, but as part of a larger totality, the building blocks of a technological culture. One of the most striking examples of the transformation of technique into system is the communications revolution which is taking place at the present time. A microcomputer or a communications satellite or a cable company all form part of an integrated whole that links the silicon chip with fiber optics with satellite technology, integrated through computers into videotex systems of interactive television, with prospects of transforming marketing, shopping, banking, political feedback, and business communication. In this sense, a chip is not only an integrated circuit, it is also an integrated system within society.

Technique also forms a system of thought, a complete epistemology that shapes our basic knowledge constructs, the models by which we define reality and respond to it. Our dominant scientific paradigm, as Mendelsohn points out (14), has its roots in sixteenth and seventeenth century Europe when a new epistemology emerged, linking the empirical methods of the artisans and inventors with new concepts of knowledge developed by Bacon and others. Key values were control over nature and denial of responsibility for the effects of this control and the industrial revolution of the nineteenth century added the new elements of rational bureaucracy, loss of emphasis on any transcendent purpose, precision of measurement, and exploitation of resources (and people). Ellul argues that not only is technique the application of knowledge but knowledge is also the application of technique, because our instruments of observation, such as radio telescopes, and our instruments of control of data, such as computers, define what questions can be answered and therefore what questions should be asked.

As technique links both reality and thought, we find ourselves, according to Ellul, in a total system in which the basic values of the real world are usefulness and work and the basic value of the intellectual world is know-how. These values produce a social structure with a new class of technical experts - engineers, social engineers, systems analysts, strategic planners, and managers - who share the same philosophical

assumptions about what is good and what is effective and about the importance of "rationalizing" the natural and social environments.

Ellul warns that there are two important consequences of technique as system. The first is that "technology obeys its own laws, its own logic." It is a closed system, independent of morality and political control. It is also self-increasing but not self-regulating, since it is difficult to have feedback external to the system of technique. A second consequence is that we can no longer understand technique as such; an individual technique such as television cannot be understood except in relation to the whole system of technique, and this system is complex and ambivalent, with both positive and negative features that cannot be separated. Because we think within a mental system of technique, we cannot really understand a social system of technique.(15)

This very brief summary and interpretation of the complex thought of Jacques Ellul underlines the following basic points:

1. Technique is the total system of rational methods and their application to various activities.
2. Technique has two dimensions: as a phenomenon of reality which is shaping the environment in which we live, and as a method of thought and interpretation of reality.
3. As a result, everything in our society is either an imitation of technique (e.g. management) or a compensation for technique (e.g. entertainment).
4. Technique leads to the suppression of subject, through its mediating function, and the suppression of meaning, with the power of means reducing the significance of ends.
5. The power of technique arises from the fact that it has become a system, both in reality (e.g. the communications system) and in thought (western concept of rationality).
6. The basic values of utility, work, and know-how have created a social structure with a new class of technical experts.
7. The consequences are that technique has become an independent system and one that defies understanding and influence.

These essential elements of Ellul's thought provide us with one kind of framework with which to examine two major developments in contemporary curriculum practice, the introduction of microcomputers and the establishment of detailed curriculum guidelines by government.

Microcomputers in schools: fear, fad, and flight

It is difficult to find a precedent in educational history for the speed, scope and enthusiasm with which microcomputers have been introduced into schools. The microrevolution hit

American schools in 1979, and already there are around 100,000 microcomputers in U.S. schools with a projection of 600,000 by 1986.(16) Across Canada, schools, school boards and ministries of education are engaged in various crash programs to get more and more microcomputers into classrooms and to prepare teachers to use them, or at least not to be afraid of them. Ontario brought 4,000 computers in the past two years, and now over 70% of Ontario schools have at least one micro. New Brunswick, Alberta and other provinces are establishing various offices of computer technology and have set targets for making microcomputers standard equipment in every school. Quebec has declared its intent to have one computer in every school over the next couple of years and to prepare appropriate French software and courseware. There is scarcely a conference on education that does not have sessions on computers and displays of dazzling electronic equipment, and many organizations have taken the new technology as the major theme for meetings and conferences. TV Ontario has a comprehensive television and print program on computers in education, the professional and popular journals are filled with articles on microcomputers, led as usual by **Time** Magazine, and universities and colleges are unable to keep up with the flood of demands for courses and workshops on Basic, Logo, Pascal, Computers-in-the-Classroom, and the value of microcomputers for various subjects and student populations.

All of this raises the question: Which is more significant, the computers or the computer phenomenon? How is it that education systems, habitually criticized for inertia and conservatism, especially when presented with an innovation coming from outside the system, have responded so quickly, so completely and so happily to the Apples, Ataris and Pets? Where are education systems with budget cuts and salary freezes finding the resources and the will to buy hundreds of thousands of microcomputers? Why is the teaching profession, threatened on one side with redundancy because of shrinking enrolments and on the other side by decline of public confidence, embracing a technology that in every other field is showing considerable potential for what is euphemistically called structural unemployment? What is prompting a public that wants its schools to go back to the basics to leap forward to the largely unknown terrain of computer learning? And how is it that educational planners are regarding with such serenity a technology that many futurists promise will transform the assumptions, structures, institutions, and procedures of public schooling in North America?

There are three explanations: fear, fad, and flight. Educators are fearful that pupils, sophisticated graduates of the computer camps and connoisseurs of the electronic arcades, will revolt against the teacher-talks-and-pupils-listen model that has already begun to lose credibility and influence. Education has always had a weakness for fads, from project methods to open-space schools, and microcomputers are indeed a "hot" item.

At a deeper level still, public education, demoralized by public disenchantment and resource limitations and totally disoriented by the conflicting and shifting demands and goals of a society undergoing profound social and economic transformations, is grasping a new and exotic technology that, it hopes, will renew with style and method what it is unable to provide in substance and goal. It is fleeing from the ambiguous to the controllable.

There is a resonance when Joseph Weizenbaum of M.I.T. says that computers in the schools represent a solution in search of a problem. We must get them as quickly as we can, but what are we going to do with them? To date, the introduction of computers into schools, both in the United States and in Canada, has been haphazard, dependent largely on local initiative, with the middle class often receiving the first fruits of hardware and creative programs and the disadvantaged receiving more limited facilities and a narrow range of programs, usually remedial in nature.

It would, of course, be wrong to assume that computers are being blindly accepted by educators with no regard for learning potential. There is a hope that computers will aid in the teaching of various subjects, from number theory and historical simulation to design and creative writing. They are being used with some success to provide skill training in reading and mathematics for those in need of remedial assistance. They are increasing our power to manage institutions, to organize learning, and to keep close check on student progress. The work of Papert(17) has stimulated use of computers to improve children's thinking and problem-solving skills. Microcomputers with telephone links may reduce the intellectual isolation of schools in rural areas.

Beyond these specific issues there is the growing concern about computer literacy, a desire to ensure that the next generation of students have both the skills and attitudes that will enable them to adjust to the employment and social demands of the new information society. In an evocative metaphor, Deringer and Molnar of the U.S. National Science Foundation urge, "A computer-literate populace is as necessary to an information society as raw materials and energy are to an industrial society."(18) We may be quite vague about what this information society will look like, what kinds of employment skills it will require, whether computers will become so "user friendly" that they will require very little skill to use, and what the psychological and sociological pressures of such a society will be, but we do know that computer literacy will help us prepare for it.

Microcomputers as technique

Whatever our view of the promise or threat of microcomputers in society and education, the introduction of microcomputers in schools presents a clear illustration of Ellul's

concept of technique.

1. It involves a total system of information and communication, dramatically enhancing our methods of storage, manipulation, and distribution of data. A pocket calculator is a tool; a microcomputer is a system.
2. Microcomputers are educational phenomena, a rapidly growing element in the economy and the culture of education services in our society, both in schools and outside of schools. They also represent, in the use of computers and in the logic of programming, a certain way of thinking, an approach to defining issues, a method of searching for solutions.
3. Microcomputers are resulting in imitation, in teaching and evaluation techniques, and in compensation, in the form of games as recreation and learning strategies.
4. There is a certain suppression of subject as person/person and person/environment relationships are more and more mediated, or simulated, through computer networks. Serious consideration is beginning to be given to the nature of person/machine links, the field of "symbionics." There is also the suppression of meaning as powerful methods of learning tend to make marginal issues of the goals of learning and even of the content of learning.
5. The power of microcomputers is that they form a total information-communications system that is coherent, available, and compelling. They also form an emerging intellectual system of cybernetics and artificial intelligence; the basis of epistemology seems to be shifting from mind to circuit.
6. The basic values of what is called computer literacy are access to information and manipulation of information, and already a new class of experts is arising, complete with arcane skills and esoteric vocabulary, raising the possibility of an emerging feudalism with technolords in control of the debugging and the modems, and technoserfs playing space invaders and working at word processing.
7. As a consequence, the microcomputer phenomenon seems to be out of anyone's control, not easily contained by existing ethical systems and planning procedures. It is also a system that, because of the complexity of the technology and the speed with which it is developing, defies our understanding and makes thoughtful analysis of significance a serious challenge.

In essence, then, the challenge of microcomputers as technique is that they provide immensely powerful methods of learning, knowing, and communicating. These methods cannot be abandoned, even if we wished to do so, but they place a burden on educators at all levels and in all fields to balance their power with careful attention to the content of learning, and to the goals, individual and social, to which learning and living

should be directed.

Curriculum guidelines as technique

If microcomputers are having a powerful influence on our methods, content, and goals of learning, there is a second technique at work in shaping curriculum, in the form of detailed government guidelines for the organization of content in various elementary and secondary school programs.

Prior to the 1960's, it was common for provincial ministries of education to regulate what was taught in schools through the publication of fairly specific syllabi, detailing general objectives and often specific content, and through systems of examinations and textbook approval. As systems expanded in the sixties, as teachers became more academically and professionally qualified, and as a spirit of diversity, openness, and innovation spread through the land, the major emphasis in curriculum development, in most places, shifted to individual boards, schools, and teachers; government controls were loosened, syllabi were vague and suggestive in nature, and the role of provincial examinations was reduced or eliminated.

In the 1970's and 1980's there arose a general climate of concern about declining standards, especially in basic skills, of criticism of schools, of calls for more control over curriculum, some standardization of structures, and greater accountability. It was also a period marked by the growing influence of management by objectives, competency-based programs, mastery teaching, strategic planning, systems of instructional design, and models of evaluation. Thus demands for more coherence could be met with scientific instruments of definition and control. A number of states adopted long lists of minimum competencies for certification and instruments for testing students; Canadian provincial ministries of education have felt the same pressures and respond in various ways by increasing the specifications for at least parts of the "mandated" curriculum. In some cases, new guidelines were issued for key subjects, in some cases certification requirements were tightened, in some cases special new programs were established, particularly for those intending to go on to post-secondary studies.

Quebec has a tendency to approach the problems of educational change by means of comprehensive reforms. In the early 1960's, the Quiet Revolution was accompanied by a Royal Commission on Education, the creation of a Ministry of Education, the complete reorganization of education structures from preschool through university, and a series of regulations dealing with programs, teaching, examinations, and teachers. During the late 1970's and early 1980's, a second reform has been taking place, involving new roles for parents in policy making, proposed changes in the organization and powers of school boards, and the thorough reorganization of curriculum and instruction at preschool, elementary, and secondary levels.

The documentation accompanying this curriculum reform is awesome in its extent: (1) a Green Paper in 1978 proposing changes for elementary and secondary levels, (2) six volumes reporting the results of public consultations following the publication of the Paper, (3) a policy statement called The Schools of Québec detailing government proposals, in 1979, (4) special policy statements on children with learning difficulties, the economically disadvantaged, and on vocational education, in 1979-80, (5) two detailed regulations (régimes pédagogiques) in 1981, each containing over fifty articles, laying out the framework for curriculum and instruction, one for preschool and elementary levels and the other for the secondary level, (6) close to fifty separate program syllabi for the different subjects of the elementary and secondary curriculum, each between fifty and seventy pages in length, (7) a projected 12,000 pages of teachers' guides to accompany the new programs, (8) various documents, guides, instructions, and instruments dealing with such issues as approval of textbooks and teaching materials, evaluation of programs, evaluation of learning, requirements for certification, and instructional organization.(19)

With reference to the curriculum, the most important principles are the following:

1. The Ministry of Education is exercising firm, direct, and comprehensive control over the objectives and content of curriculum and over measures of quality control.
2. Two standard curriculum frameworks are established, one for elementary and one for secondary education, governing all schools of the province. These specify the subjects that are required, the year at which they are to be taught, and the amount of time or credits assigned to each.
3. The emphasis is on general education and basic skills. At the elementary level, almost one-half the time is to be devoted to the teaching of mother tongue (French or English) and mathematics. In the five-year secondary school (grades seven to eleven), there are no electives in the first two years and a total of six elective courses over the last three years. Vocational programs are delayed until the end of the secondary school, in grades eleven and an optional grade twelve.
4. There is a single program for each subject at each grade level, to be adapted to pupils who are "mainstreamed" and to those who are gifted.
5. Considerable emphasis is placed on systematic evaluation of students' learning and evaluation of the curriculum.
6. It is required by regulation that each pupil have at least one textbook for each course he is following.

In developing the curriculum for each subject, from preschool to senior secondary school, from religious education and art to sex exucation and physics, the Ministry of Education

has adopted the models of mastery learning. The program for each subject includes

1. overall objectives: the principal outcome sought by the program;
2. general objectives: instructional objectives, general educational goals to be achieved and the changes anticipated in the pupil;
3. terminal objectives; detailed changes expected in the learner at the end of a learning sequence (e.g. a unit);
4. intermediate objectives: a behaviour or learning achievement that leads to the attainment of a terminal objective.(20)

The following are examples of the number of objectives in certain programs:

	General	Terminal	Intermediate
Social Studies (primary, grades 1,2,3)	3	14	72
Social Studies (intermediate, grades 4,5,6)	5	24	152
Mathematics (primary, grades 1,2,3)	12	40	109
Mathematics (intermediate, grades 4,5,6)	12	49	177
Ecology (junior high, grade 7)	5	57	227
Mathematics (junior high, grades 7,8)	7	26	145
Moral Instruction (junior high, grades 7,8)	12	59	160
Economics (senior high, grade 11)	7	18	49

What the Quebec Ministry of Education is doing is constructing a general curriculum system for all the elementary and secondary schools of the province, with a coherent plan for the division of learning areas, definition of objectives, organization of content, procedures for instruction, and methods of evaluation. It is an attempt to bring rationality to the content of education, and the basis is a complex and intricate schema of learning objectives which have directive power for content organization and methods of instruction, but which are not clearly rooted in any overall philosophy or policy.

Early in the process of curriculum reform, in an introduction to the Green Paper in 1978, a previous Minister of Education had this to say, in dealing with the question "Does a 'philosophy of education' evolve from this Green Paper?":

"...I am very much aware that any genuine educational policy presupposes a philosophy of life and man. It will certainly be found somewhere in between the lines, perhaps even where we would not expect to find it.

We have tried, however, to take as our point of departure day-to-day experience and people's opinions. We have avoided the great pedagogical theories, for when ideas lose contact with life and its demands there will always come a time when life reclaims its rights."

In the policy statement which followed in 1979, The Schools of Québec, there is a brief chapter entitled "The Aims and Objectives of Public Education", listing vague and rhetorical aims such as "the capacity to love and be loved" and objectives such as "to help young people find a meaning in life."(22) After six pages of this, the authors go on in the rest of the 160 pages to deal with "life and its demands" and in the subsequent development of programs the philosophy "somewhere in between the lines" looks very much like technique.

This approach to curriculum development satisfies the requirements of Ellul's concept of technique:

1. It is a total curriculum system, conceived, developed, and being implemented according to rational methods.

2. There are two dimensions: as a curriculum, it is becoming part of the reality of Quebec schools, following a program of implementation between now and 1986; as curriculum development it is a logic according to which we approach society's needs, the nature of learning, the internal organization of different disciplines, and the inferred needs of the students.

3. As a result, all aspects of the aims, content, and processes of schooling are being shaped in imitation of a general scientific/technocratic model, with social, instructional, psychological and auxiliary services serving as compensation.

4. The subject, as teacher and learner, is in danger of being suppressed by the comprehensive structure and process of the regulated curriculum. Similarly, meanings in various aspects of life and thought and value are fitted into the framework of general, terminal, and intermediate objectives, tamed within the enclosures of the program.

5. It is a comprehensive system for schools, covering

timetables, instructional organization, choice of teaching materials, organization of content, and methods of evaluating learning and reporting to parents. It is also an example of systems theory applied to curriculum, establishing the criteria by which learning is approved and certified.

6. There are implicit values of utility and social cohesion inspiring the distribution of subjects and the internal dynamics of individual programs. There are also complex skills of proposal-making that must be mastered by teachers if they hope to propose alternative programs. The system is defining curriculum expertise in a technocratic way, and there is concern that this expertise resides, largely, within the civil service of the Ministry of Education, or is seen by many to lie there.

7. Curriculum in Quebec is in the process of becoming an independent system, beyond the control of individual boards and teachers, and probably beyond the control of parents and the public, other provisions for participation notwithstanding. There has been no serious attempt, at least not yet, to assemble these arrays of objectives into a meaningful picture. The objectives have been prepared in parts and are being implemeneted in parts, subject by subject, level by level, unit by unit.

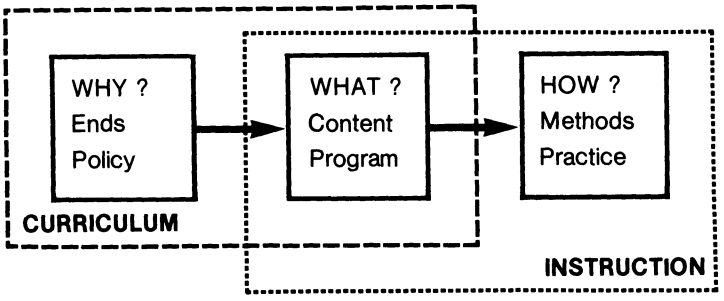
The challenge of curriculum systems such as the one being attempted in Quebec is that, although many worthy goals are being sought by the reformers and many good and important objectives are being framed within individual programs, the curriculum like the other example of microcomputers, is becoming more than a process, an instrument, or an approach. It is becoming an environment shaped by technique, a complex of means in search of ends.

Means and ends in curriculum

Means are important and there is nothing wrong with placing emphasis on them, in curriculum or in other areas of life. Powerful means are even more important than weak ones, and we have a positive obligation to give them the emphasis they deserve. It is both necessary and right that we explore and exploit the potential of microcomputers and curriculum systems for making learning more effective and accessible. The challenges to learning, the possibilities for learning, and the need for learning are such that we must use all the means at our disposal to further our own learning and enhance the learning of others.

But it is crucial to make a distinction between instruction and curriculum, between media and messages, and between

means and ends. In the ideal world, the direction should be something like this:



In the real world, the direction is sometimes reversed. A technology develops, its existence and the market factors surrounding it begin to shape what it is used for and influence the purposes of an activity or institution. When this happens, there is a danger that means will replace meaning in curriculum; curriculum leaders - theorists and practitioners - must seek to restore that balance of means and ends that will preserve meaning. This involves more than a philosophical analysis of concepts such as knowledge, curriculum, the educated person, and utopian futures; it also involves more than attempting to put the brakes on the development of a technique, or attacking a system because it is rational.

It is in the linking of means and ends that curriculum theory and development, curriculum practice and criticism, bring the coherence and balance to teaching and learning. If we give priority, for example, to the objectives of anticipation and participation proposed by the report of the Club of Rome (23), we may then think about what content, in elementary social studies for example, would be most necessary in order to achieve these objectives, how a curriculum system can stimulate both teachers and students to pursue these objectives, and how the use of computer simulations can contribute to this learning.

If "learning how to learn" is a fundamental objective of education for the information society, we must identify the learning methods embedded in fine arts, natural science, anthropology, literary criticism, ecology, and religious inquiry. Curriculum systems must clearly identify this theme of learning how to learn and weave it into the different programs of studies at both elementary and secondary levels; likewise, the linking of school microcomputers to library facilities and information networks becomes a priority for computer use, and knowing "how to ask the right questions" becomes as important as knowing the right answer.

There is a saying, attributed to the Talmud, that if we don't know where we are going, any road will take us there. As a mapping system, curriculum had better guide our

techniques to our destinations, or these techniques will become our destinations, and the flow chart and the arcade will become the "course to be run".

NOTES

1. See, for example, Jacques Ellul, The Technological Society (New York: Vintage Books, 1964); William Irwin Thompson, Evil and World Order (New York: Harper and Row, 1976); Theodore Roszak, Person/Planet (New York: Anchor Press, 1978); Ivan Illich, Tools for Conviviality (New York: Harper and Row, 1973); E.F. Schumacher, Small Is Beautiful (London: Sphere Books, 1974).
2. Yoneji Masuda, The Information Society as Post-Industrial Society (Washington D.C.: World Future Society, 1980), p.153.
3. Earl C. Joseph and Arthur M. Harkins, "The Emergence of Ethnotronic Systems in the 1980s," in Through the '80s: Thinking Globally, Acting Locally, Frank Feather, editor (Washington D.C.: World Future Society, 1980), pp.308,309.
4. Science Council of Canada, Planning Now for an Information Society: Tomorrow is Too Late (Ottawa: Minister of Supply and Services, 1982), p.56.
5. Henry A. Giroux, Ideology, Culture and the Process of Schooling (Philadelphia: Temple University Press, 1981), especially Chapter One "Schooling and the Culture of Positivism: Notes on the Death of History." p. 42.
6. William Pinar, Curriculum Theorizing: The Reconceptualists (Berkeley: McCutchan 1975); see also the Journal of Curriculum Theorizing which is the main publication of this curriculum school of thought.
7. The Technological Society (New York: Vintage Books, 1964), The Technological System (New York: Continuum, 1980), Perspectives On Our Age: Jacques Ellul Speaks on His Life and Work (Toronto: Canadian Broadcasting Corporation, 1981).
8. Ellul, The Technological Society, p. xxv.
9. Ellul, Perspectives on Our Age, p. 60.
10. Ibid., pp. 60--63.
11. Ibid., pp.47-48.
12. Ibid., p. 50.
13. Ibid., p. 50.
14. Everett Mendelsohn, "The Internationalization of Science," in The Social Implications of the Scientific and Technological Revolution (Paris: Unesco, 1981), pp. 8-15.
15. Ellul, Perspectives on Our Age, pp. 64-69.
16. There is quite a range of estimates about the extent of this phenomenon. These figures are taken from Jean Blouin, "Les nouveaux analphabètes," L'Actualité, 7-12

(December 1982), pp. 35-43.

17. Seymour Papert, Mindstorms (New York: Basic Books, 1980).
18. D. Deringer and A. Molnar, "Key Components for a National Computer Literacy Program," Computer Literacy, R. Seidel, R. Anderson and B. Hunter, eds., (New York: Academic Press, 1982), p. 3.
19. Québec, Ministère de l'Education, Primary and Secondary Education in Québec: Green Paper (Québec: MEQ, 1978); Consultation sur le livre vert de l'enseignement primaire et secondaire (Québec: MEQ, 1978), 6 volumes; The Schools of Québec: Policy Statement and Plan of Action (Québec: MEQ, 1979); Regulation Respecting the Basis of Elementary School and Preschool Organization and Regulation Respecting the Basis of Secondary School Organization (Québec: MEQ, 1981).
20. The English versions of the course syllabi for each elementary and secondary school subject should be available by September 1983. Each syllabus includes a general introduction to the course, an explanation of the structure of objectives, and procedures for evaluation, as well as the lists of objectives and content units.
21. Green Paper, p. 11.
22. The Schools of Québec, Chapter Two.
23. James W. Botkin, Mahdi Elmandjra, Mircea Malitza, No Limits to Learning (London: Pergamon, 1979).

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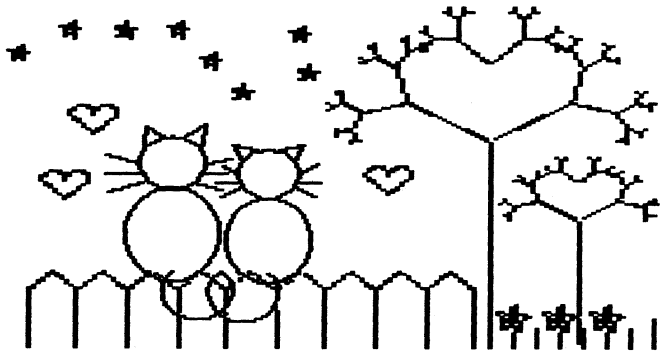

"Good Night"
Dana Aneliunas