Computers, Freedom, and Privacy Conference
Chicago, March 1994

THE COMING PARADIGM WARS IN EDUCATION: CURRICULUM vs. INFORMATION ACCESS

J.L. LEMKE
City University of New York
Brooklyn College School of Education
Brooklyn, New York 11210 USA

Conflicting Paradigms

The purpose of this paper is to sow the seeds of division and debate. I believe that a fundamental paradigm conflict is being overlooked or minimized in current discussions of the future role of global information access technologies in education. This is a conflict between one view of education, based on the traditional curricular model, and another based on the norms of free access to information. If we do not articulate this conflict now and respond to its implications, we invite at the very least many important missed opportunities, and more likely, numerous inexplicable failures of social policy.

Let me begin by sketching briefly these two paradigms and then highlighting the essential contradictions between them:

The Curricular Model of Education:

Some Powers-that-Be create a Curriculum: a uniform, prescribed course of study required for all students, which presents them with a monolithic body of information through the medium of a teacher and mass-produced instructional materials; students are then evaluated on the basis of how much of this information they can reproduce on uniform, standardized tests, and to a lesser extent how well they can use the information to perform simple, previously practiced tasks.

The Information Access Model of Learning:

Individuals explore freely in large multimedia databases, matching their perceived needs and interests to available information; they transform and synthesize this information for particular social purposes, and the results of their work are then evaluated by themselves and others according to a variety of functionally based criteria.

The institution in our society which most clearly embodies the first model is the free public school; the institution which most nearly exemplifies the second model is the free public library. In the first model, students' learning is tightly controlled and teachers become the mediators of this control. In the second model, patrons direct their own investigations and librarians provide expert assistance in obtaining access to relevant information.

In the Curricular Model learning is carefully guided along prescribed paths toward prescribed outcomes; in the Information Access Model, individuals and groups direct their own learning and change this direction in unpredictable ways as they encounter and assimilate new information. In the Curricular Model the criteria for the relevance of information are externally imposed according to the value judgments of others; in the Information Access Model users establish their own changing criteria of relevance based on their perceived interests, needs, and the current state of their knowledge. In the Curricular Model, students are evaluated based on how well they have met uniform, standardized goals others have set for them; in the Information Access Model, the outcomes of our work are evaluated by us and by a wide range of third parties based on criteria relevant to specific concerns.

The model of the NREN, the Internet, and global information access is the model of scholars, researchers, and librarians. It is in fundamental conflict with the Curricular Model of education, which is the basis for the current

educational reform and national standards movements. The fundamental paradigm of curricular education, largely unchanged for two centuries, is running head-on into the greatest change in information access technology since the invention of moveable type. And the collision will take place just at the moment of our history when it has become impossible to impose a universal canon of curricular contents on a diverse, multicultural society.

I profoundly hope that the dominance of the Curricular Model of education will be destroyed once and for all in the aftermath of this collision.

To understand why I take this position it is necessary to examine more carefully why it is that many people who, as adults, themselves follow the Information Access Model in their own continuing education, and who would reject the Curricular Model if applied to them as insulting and degrading, still believe that the curricular approach is appropriate for others, especially for the youngest students.

The Curricular Tradition and the Ideology of Childhood Incompetence

The Curricular Model itself has long stood relatively unchanged, but its justifications have changed considerably over its history. The initial justification was that there was a fixed and fundamental body of knowledge which was necessary for every educated upper-class male to function as a reliable, moral, Christian supporter of church and state. The origins of European curricular education are rooted in religious institutions, and were supported by the secular power to preserve social order and to provide initially clerical, and later diplomatic, military, bureaucratic, and technical human resources for the modern European state. As curricular education spread downward in age and social class, its functions became more crucially focused on social control of what was seen (from above) as a seething and dangerous cauldron of passions, needs, and desires. These older legitimizing models still persist, of course, but the dominant justification for the Curricular Model of education in our own century has become more subtly psychological.

For a variety of well-documented sociological reasons, the nature of childhood was redefined in modern times according to a developmental model (see for example, Aries 1962): children are seen as savages in need of civilization, like laborers in need of a structured work environment, or women in need of a father's or husband's guidance: unable to perceive their own interests or to take rational action in those interests. The rising power of the non-European societies of the "savages", of an aggressive working class, and of modern women, have forced a retreat from the ideology of _their_ childlike natures. Children, still relatively unempowered as human beings in our society, still routinely oppressed and abused by adults, are the last remaining category of persons who are still thought to be unable to think and act for themselves. Our modern model of children derives from and reproduces the arguments of older ideological models fashioned to justify the subjugation of women, peasants, workers, and all the other "lesser breeds" of an earlier era. Dressed up in the trappings of developmental psychology in its more romantic forms, this model continues to legitimize efforts to force children to recapitulate the beliefs and values of one or another group of powerful adults.

Seen from the perspective of the alternative, Information Access paradigm of learning, compulsory curricular education is both unnecessary and immoral. It is obviously true that the very youngest humans need to learn the basic tools of natural language and the cultural categories of the society into which they are born in order to function as humans in that society. Apart from those few with serious neurological impairments, all humans learn these fundamentals with great ease and speed. Thereafter, from about the age at which schooling intervenes and attempts to control their further intellectual development, there can be little doubt that they know exactly what interests them at any given time and are perfectly able to formulate effective questions, and exploratory and investigative strategies to learn more. They are perfectly capable of making judgments of relevance and irrelevance, and of modifying these judgments with new knowledge and changing interests and purposes. Children are very good learners of what they want to know.

The problem, from the point of view of the Curricular Model, is that what they want to know, and the beliefs and conclusions they may come to as a result of their investigations, may not agree with the accepted adult wisdom, or serve the interests of those who currently dominate our social order. In the dark words of Rodgers and Hammerstein: "They've got to be carefully taught." The Curricular Model does not value diversity and creativity, only conformity and control. It is a model rooted in fear: the fear that someone may create an alternative belief or value judgment that will prove more compelling for more people than those that support the present social order.

Consider by contrast the freedom and openness of the Information Access Model. It embodies the values of free inquiry and unfettered exploration, transformation, and synthesis of information into beliefs and valuations. Children love the

freedom to play, to explore, to build, to inquire every bit as much as they hate school. Who are we to presume that they do not well recognize their own interests? that they cannot learn without constant prodding and manipulation? In schools, that prodding and manipulation is required to make them learn what and how adults want them to learn, and to suppress their own choices.

Until now younger citizens have had no alternatives. Apart from the physical compulsion to attend school and cooperate with its practices, backed by the deliberate inflicting of pain on them by adults, there were only very limited alternative opportunities for children to obtain access to information. Their access to libraries, for example, has been limited, not by their abilities to read, but by arbitrary segregation into Children's Sections and Junior Libraries, and by widespread censorship and control of the information to which they were granted access. Their access to information through conversation with adults has similarly been limited by adult unwillingness to speak honestly and forthrightly on many subjects about which children ask. Television and film media have given children much wider access to information, but only to a very biased selection and presentation, for which they are often unable to make appropriate corrections because they are denied access to real-world information needed as a basis of comparison.

But now, with computer-mediated access to information, there need no longer be any automatic discrimination against users on the basis of gender, class, culture, or age. Responding systems do not know these cultural categorizations, nor should our transient cultural biases regarding them be programmed into systems of the future that will build and store user-models to customize responses. There are already, and there will continue to be, calls to limit access to global information on the basis of age-discrimination. While we are all entitled to some sort of warning labels concerning the nature of media we are about to access, no one should be denied access solely on the basis of age. This means, among other consequences, that the concept of parental consent must not be applied or extended to the realm of information access. The principle of privacy, moreover, should preclude any third party notification of what anyone accesses.

I hope that it will not take a constitutional amendment to guarantee to all equal, free, and private on-line access to information.

Information Access Paradigms for Education

Classroom-based models

At present most people are thinking about the consequences of bringing access to global information resources into the classroom. If it is only the information that is brought in, there will probably be few consequences of note. Textbooks bring information to students today; they are little used in most classrooms, even where teachers (rarely students) have a choice of textbook titles. Textbooks are used for homework, and homework, by and large, is not taken seriously as a mode of learning by either teachers or students. (The reason for this, very simply, is that most students don't particularly want to know what the assigned reading has to say, and without direct control by teacher or parent, they will find some way to do the minimum necessary. This choice carries a message that adults do not want to hear: students don't want what the curriculum offers. At least not at the time, in the form, or for the reasons the curriculum prescribes.)

Teachers do not use textbooks much in classrooms because they lose some direct control of the focus and development of the classroom dialogue (e.g. Lemke 1989, 1990). For most teachers textbooks represent competition. They are used mainly to buttress teacher authority, and to extend the curriculum beyond the classroom to the study hall or home. Teachers do use textbooks themselves, to plan their lessons, and would probably welcome some additional resources of this kind, especially if they could pull reasonable lesson plans directly off the net that were already adapted to the parameters of their classrooms. This would mean less work, and most teachers are already forced to operate beyond the limits of their resources.

But global information access (GIA) in the classroom would bring more than just information. It would bring changes in routines. When would information be accessed? by whom? how would it be shared with others in the class?

Imagine that students in a classroom could at any time access information resources on-line and share these and their comments on them with others in the class. In such a classroom, where any student could at any time send or receive a private email message to/from a classmate or the teacher, the communications patterns of present classrooms would become unfeasible and inappropriate. Teaching, as it is now understood, simply would not occur. The teacher would

become just one node among many, and not the node most students would prefer to communicate with much of the time. Given the actual patterns of communication that would most likely result in these circumstances, students might as well be sitting at home, communicating remotely, as sitting in a classroom together.

If, on the other hand, only teachers used GIA in the classroom, it would have about as much fundamental impact on the structure of communication as the presence of a dictionary, a textbook set, or a map on the wall.

In still another possible scenario, if students could use GIA for project work, individually or in groups, then a complex system of time-budgeting would need to be devised to balance the Curricular Model (that we all learn the same thing at the same time) with the Information Access Model (that we each learn what we want to know when we want to know it). The problem with this scenario, which is I believe the most common one today, is that the curricular model is not fundamentally a learning model, but a control model, and as a result, it does not stop with learning, but goes on to impose uniform testing and assessment, which ultimately works against all individualization and group project work. Uniform, standardized testing is making another bid today to dominate US education, and its pressures will confine GIA project work to some small portion of the total time-budget, from 10-15% in schools with poor academic records, to perhaps 25-30% in schools whose students always do well on national tests. There is a fundamental conflict of paradigms here. GIA can make no significant improvements in education unless the curricular model itself is replaced.

Home-based models

To round out our view of the alternatives, let's consider a model at the opposite extreme: computer-assisted home schooling. The contemporary home schooling movement has been fueled by social divisions between parental and community values, or between the differing values of various subcommunities, or between general community values and those of more powerful special interests which dominate school systems. Parents take their children out of the public schools for all these reasons, and most send them to private schools, but some choose to help their children learn at home. The state still tries to impose a curriculum on this process, and uniform testing is still its principal weapon of enforcement, but with the time available for home schooling, unlimited by the costs of teacher salaries, building maintenance and security, etc., children can learn a great deal that is not in the mandated curriculum. GIA greatly adds to what children can learn, and intelligent learning assistance (ILA) programs (cf. ITS models, e.g. Wenger 1987), can help considerably to make this process independent of continuous parental involvement.

An extreme model evolving from this beginning would envision each child at home, with a high-grade interface for multimedia access to information of all kinds, including special hyperdocument systems that would serve the needs of novices exploring and learning in new domains. ILA systems would respond to queries based on a continuously updated and stored model of the individual user, and they would be capable of real or simulated natural language dialogue in limited subject matter domains (cf. examples in Wenger 1987). There is very little in the way of academic knowledge that could not be efficiently learned in this way. (For a linguistic model of the semantic basis of subject matter learning, see Lemke 1990.)

What are the weaknesses of this model? What modifications might be made to it to present a more robust alternative to the present school curriculum model of education?

One weakness at present is in the learning of skills. Know-how has a somewhat different structure from know-that; it requires realistic practice, of a kind for which present interface systems are severely limited. The skill one learns best at the interface is the use of the interface. Similarly, of course, the skill one learns best in the classroom is how to play the classroom interaction game. Absent vivid, fully contextualized virtual environments and advanced interfaces to them, the real world is still the best place to learn how to do things in their natural contexts and settings. This is equally a weakness of both the classroom and the home-based independent GIA/ILA models.

Another limitation of the individual access model is the lack of provision for social interaction and collaborative work. This however is not so severe a limitation as it might seem in that communicative interaction, not just with many possible sets of peers, but also with elders and youngers, with experts and resource advisors, becomes possible in a networked learning environment. I assume that in a very short time, surely shorter than the time scale for social change in these matters, we will have videoconferencing capabilities built into every workstation. The limitation thus applies mainly to physical interaction, and to the emotional bonds which humans form more strongly in many cases when they have actual or real-time potential physical contact with one another. This is a very deep and poorly understood matter which we now have a pressing need to understand much better.

There is also something to be said for regular collective reflection and discussion, for synthesis emerging from the dynamics of a group in which one regularly participates. While some of this can be done on-line, it is possible that some of the dynamics may, at least until the perfection of VR, and perhaps even after, require face-to-face physical co-presence. At least we need to hedge our bets on this.

A Comprehensive Alternative Educational Paradigm (AEP)

What do these considerations imply for an alternative educational paradigm? At least the following:

AEP 1: COMPONENTS. The basic learning environment for education should have three relatively independent, but loosely integrated components:

= Individual multimedia workstation interfaces to global information resources and intelligent learning assistants, both human and computational, with some stable and some ad hoc networked communication groups for interaction and collaboration

= Learning centers for face-to-face individual and group interaction with peers, older and younger students, and specialist teachers and counselors, where skills can be learned through use of specialized materials and equipment

= Familiarization visits, and shorter and longer term placements in real-world settings to observe and participate in economic, technical, artistic, and recreational activities with adults

AEP 2: INTEGRATION. The components of the AEP learning environment should be coupled in a variety of ways, e.g.:

= Visits and placements should be prepared for by individual computer-assisted learning (ICAL); experiences during placements should give rise to interests and needs to know which are pursued by ICAL, and by peer and group discussions on-line and face-to-face.

= Learning of specialized skills in learning centers should be contextualized by theoretical knowledge and information gathered by ICAL, and by visits and placements in which the social contexts of use of these skills can be experienced.

= Explorations in the GIA cyberworld should give rise to interests and needs to experience and discuss which can be pursued on-line, at learning centers, and through visits and placements.

AEP 3: EVALUATION. Participants in AEP learning programs should periodically offer the results of their work for evaluation by a variety of criteria established by a variety of interested third-parties.

= This work should be primarily in the form of multimedia presentations (hyperdocuments), including video records of their performance of technical skills and their participation in collaborative work and discussions in learning center and placement environments.

= To the contents of this cumulative portfolio may be added evaluations and recommendations by others, at the discretion of the participant.

= The contents of the portfolio is at all times to be the private property of the participant and under his or her total and sole control.

= Third-parties shall be free to devise whatever criteria and methods of analysis of submitted portfolios they deem useful for their purposes, but must report these criteria and methods along with the evaluation results to the participant as well as to, and only to, other parties freely designated by the participant.

= No third-party evaluator (TPE) shall specify the form or content of portfolio materials to be submitted, apart from universal communication protocol and document format standards. TPEs will, presumably, regularly announce their criteria and methods of analysis, as well as the purposes for which they provide evaluations and the basis of evaluation validity claims.

Giving the Curricular Model its due

There is perhaps still some subordinate role within the AEP model for traditional curricular practices. Minus their former universal and compulsory aspects, curricular models of education can freely compete in the marketplace of approaches to learning. There may well be some students and some domains in which they will continue to have a useful place, so long as they no longer operate as oppressive means of social control or to exclude more independent alternatives.

Economics and Equity Issues

There is yet one more dimension to these issues that needs to be addressed.

There is a substantial possibility that as the universal and compulsory features of the present schooling model of education disappear, that the successor systems will become economically differentiated and social equality of educational opportunity will be reduced even below its present dismal levels.

These alternative educational paradigms will be available first to the more economically privileged sectors of society. This is already happening. During the transitional period of a decade or two, provision must be made to shift educational expenditures from custodial functions to capital resources. Percentages of the vast US education budget need to be allocated to: development of user-friendly ILA system interfaces between students and global information resources; providing communication accounts for all students to access information resources over existing networks with low-end home workstations; converting schools to learning centers with small expert staffs and substantial state-of-the-art specialist equipment of a variety of kinds; organizing networks of organizations willing to accept visits and placements; organizing networks of mentors and advisors to handle student queries on-line.

In the transitional period and perhaps beyond elementary schools will continue to serve critical functions in preparing students for future, more independent learning. By grade 6 or 7 students should be able and free to determine between 25% and 45% of their own educational work, and by grade 9 or 10, they should be operating entirely under the AEP model.

The best insurance against economic discrimination in education is to make communication access free for registered students and to insure that public educational software systems are superior to any which are developed commercially. Large categories of databases must be declared available without fee to registered students, at least equivalent to the holdings of the largest public libraries of today, and including particularly historical and contemporary collections of non-print media.

There are however other challenges to equity besides economic ones. The academic performance of many groups of students is a function not only of the economic marginality of their home communities, and of the conflicts of values between them and those who control present curricula over what is worth learning, but also of the modes of communication in the classroom. Classroom learning and testing in most academic subjects is primarily verbally mediated, and the dominant medium is not only limited to varieties of a single language (English in the US) but to a single variety of that language, thus effectively discriminating against the majority of students, whose home dialects differ significantly not only in phonology, lexis, and grammar, but in discourse-organizing principles. While some few classrooms and communities do accomodate the languages and language norms of a wider range of students, the vast bulk of information accessible on line does not.

Perhaps in the future, as the global variety of languages and the many international dialects of English come to be more democratically represented on the Internet, there will be less built-in advantage for the children of privileged families who use upper-middle class language norms. But meanwhile, and for the foreseeable future, a major requisite of

intelligent information-access interfaces, especially for the young, will be natural language capabilties that can translate, on request or automatically, among varieties of the same language as well as among different languages. In fact, it is not all that difficult to read other dialects of your own language with a little practice, and the assistance capabilities needed for many readers are far less than what full translation demands, and well within present capabilities on large systems. (Unfortunately, the subtle habits of semantic interpretation needed for more difficult texts cannot be replaced by translation. Students would need either high-level text-semantic paraphrase systems or intelligent tutoring systems that could lead them toward these competencies through dialogue and interaction over time. Global multiculturalism may reduce the overvaluation of some of these texts, but it will not reduce the need for all of us to learn to accomodate a wide variety of different semantic orientations.)

Even if we address these concerns, the information revolution still represents a potential danger to social democracy. Our present information systems concepts and our visions of an information culture are quintessential products of a middle-class, masculinist Euro-cultural mentality. They will need to grow and change immeasurably to comfortably fit the diversity of cultural styles in a truly global population.

WORKS CITED

Aries, Philippe. 1962. _Centuries of Childhood_. New York: Random House.

Lemke, J.L. 1989. "Making Text Talk." _Theory into Practice_ _28_(2): 136-141. [Special issue: _Learning through Text_, Joanne Golden, Ed.]

-- . 1990. _Talking Science: Language, Learning, and Values_. Norwood, NJ: Ablex Publishing.

-- . 1993a. "Education, Cyberspace, and Change." _Electronic Journal on Virtual Culture_ (EJVC-L@KENTVM), March 1993. [GET LEMKE V1N1, LISTSERV@KENTVM.KENT.EDU; ftp /pub/ejvc directory of byrd.mu.wvnet.edu; gopher gopher.cic.net under EJVC Archives, Electronic Journals.] Also Arlington VA: ERIC Documents Service (ED 356 767), 1993.

-- . 1993b. "Hypermedia and Higher Education." _Interpersonal Communication and Technology_ (IPCT-L@GUVM), April 1993. [GET LEMKE IPCTV1N2, LISTSERV@GUVM.GEORGETOWN.EDU]. To be published in T.M. Harrison and T.D. Stephen, Eds. _Computer Networking and Scholarship in the 21st Century University_. Albany: SUNY Press.

Wenger, Etienne. 1987. _Artificial Intelligence and Tutoring Systems_. Los Altos, CA: Morgan Kaufmann Publishers.