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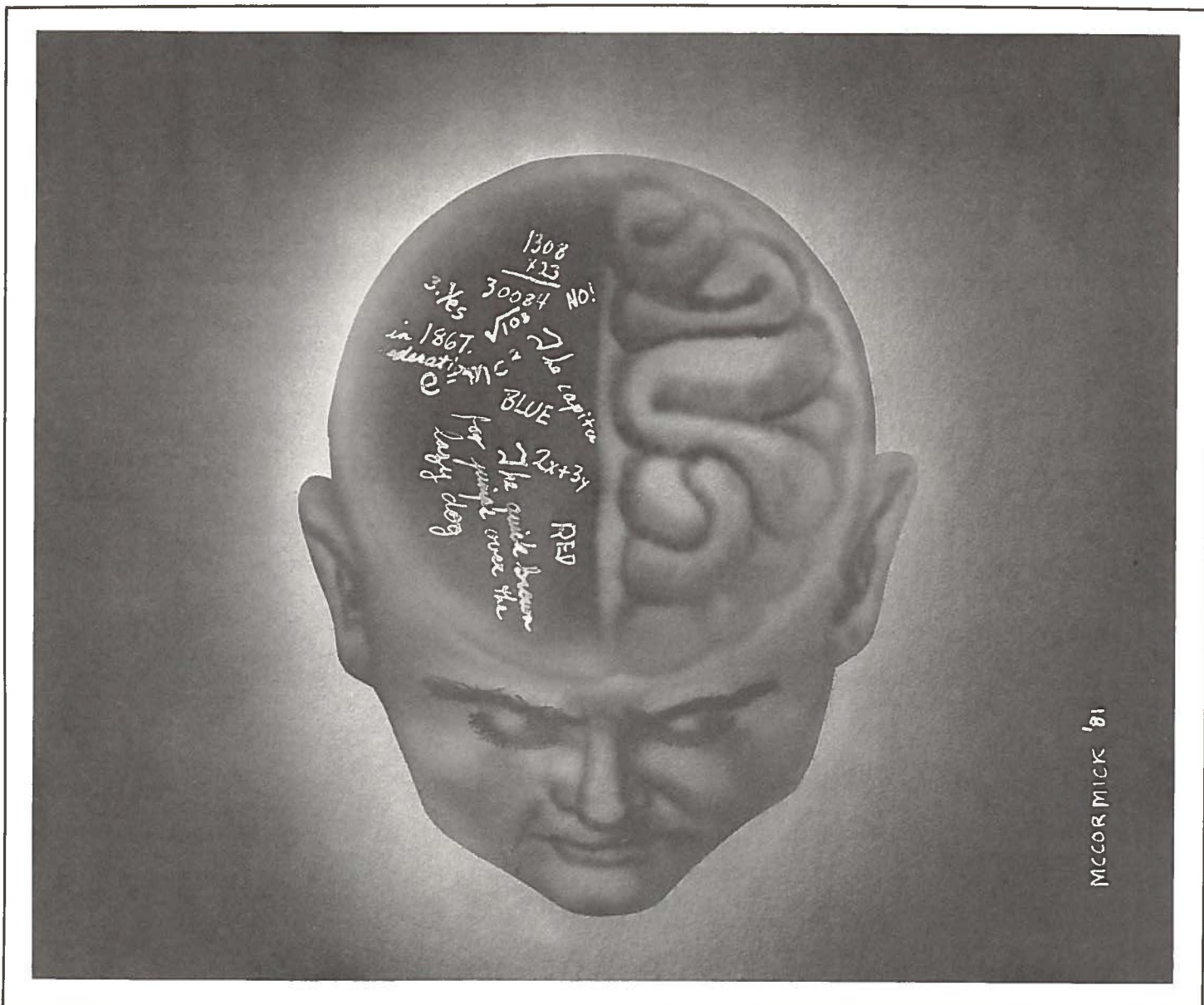
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MCCORMICK '81

Are We Teaching Only Half a Brain?

James R. Nord

For most of the past 100 years, the focus of neurological studies was on the left hemisphere. This was largely because the cognitive function of language was found to reside there. Because of the prevailing view that our capacity for language set us apart from "lower species," it seemed logical that the hemisphere in which the comprehension and production of language takes place should be the more highly developed hemisphere, and thus in ultimate control over the rest of the brain. The left hemisphere was, therefore, called the "major," "dominant," or "leading" hemisphere, while the right was considered to be the "minor" or "subordinate" hemisphere.

It was not until the middle 60's that the research on split brain patients opened up the gap between left and right hemispheres which led to the discovery of right hemisphere dominance on many types of tasks and the subsequent paradigm shift from the concept of hemispheric *dominance* to one of the hemispheric *specialization*. Hazel Henderson (1978) calls paradigms "those different pair of spectacles we put on which enable us to see some patterns while distorting or obliterating others" (p. 379). As more and more evidence accumulates, there seem to be more people who are seeing the two hemispheres as equal but different, thus distorting or obliterating the old view of the left hemisphere as dominant and important and the right as secondary.

New Paradigm

Thomas Kuhn (1962) articulates a theory of intellectual change that has had significant impact on the history of science. According to Kuhn, once scientific communities have reached a certain level of maturity, they begin to operate on the basis

of "some implicit body of intertwined theoretical and methodological belief" (p. 6) that he calls a *paradigm*. When difficulties arise in using that paradigm and when an extraordinary set of investigations begins which leads to a new paradigm, a scientific revolution is taking place.

What is this new paradigm in the neurosciences? What implications does it have for higher education? Can those of us who are interested in the improvement of instruction in higher education ignore this scientific revolution taking place in the neurosciences? Might it signal a revolution in instruction as well?

What is the new paradigm in the neurosciences?

In overly simplified terms, the evidence seems to indicate that the left cerebral cortex of the brain functions primarily as a digital computer in which discrete units of information are processed on a temporal continuum. Language is perhaps the best known manifestation of this time-oriented information-processing mode. Words can be considered discrete units which are processed over time. Arithmetic also seems to be primarily in the left hemisphere. The specialized activities of the left hemisphere have been described as propositional, logical, analytical, verbal, linear and temporal.

By contrast, the specialized activities of the right hemisphere of the cerebral cortex have been described as appositional, emotional, synthetic, visual-spatial, holistic and simultaneous. It has been compared, in its information processing capacity, to an analog computer in which multiple inputs simultaneously interact and effect each other and the final output. Music, art and athletic prowess are all demonstrations of the holistic information processing mode of this hemisphere.

Educational Implications

What implications does this have for higher education? As Bogen (1977) has expressed it,

Since education is effective only insofar as it affects the working of the brain, we can see that an elementary school program narrowly restricted to reading, writing and arithmetic will educate mainly one hemisphere, leaving half of an individual's high-level potential unschooled.

If it is true for an elementary school program, is it not more true for higher education which is even more verbally oriented? Is it possible that higher education is teaching only half a brain?

Can those of us who are interested in the improvement of instruction in higher education ignore this scientific revolution taking place in the neuro sciences? Is there really a revolution taking place at all?

Not everyone has accepted the change in paradigms. Not everyone has changed their spectacles.

Even today, there are some scientists who cling to the view that the right hemisphere is a mere unconscious automata, while we live in our left hemisphere. This is not really surprising. Old paradigms die hard.

Normal science, the activity in which most scientists inevitably spend most of their time, is predicated on the assumption that the scientific community knows what the world is like. Much of the success of the enterprise derives from the community's willingness to defend this assumption, if necessary at considerable cost (Kuhn, 1962, p. 5).

It is especially difficult for those who have gained a reputation by adhering to a paradigm to later repudiate it and follow another.

For these men the new theory implies a

change in the rules governing their prior practice of normal science. Inevitably, therefore, it reflects upon much scientific work they have already successfully completed (Kuhn, 1962, p. 7).

Part of being ordinary as a scientist is to resist changes of a certain sort, the sort that question fundamental assumptions, this resistance going under the vigilante activity of "maintaining high scientific standards."

Shifting Paradigms

The difficulty of shifting paradigms, from seeing the left brain as dominant to the more current "two-brain hypothesis," can be seen in the writings of one of the leading neuropsychologists as he struggles over the evidence of hemispheric differences. Luria (1973) used the expression dominant even when attempting to describe the difference between the two hemispheres.

It is for this reason that the functions of the secondary and tertiary zones of the left (dominant) hemisphere start to differ radically from functions of the secondary and tertiary zones of the right (non-dominant) hemisphere (p. 18).

The recognition that dominance is not absolute comes shortly thereafter.

However, it must be remembered that the absolute dominance of one (the left) hemisphere is not by any means always found (p. 78).

Luria finally admits that there is a historical lack of understanding of the right hemisphere.

These still completely unstudied defects lead us to one of the fundamental problems — to the role of the right hemisphere in direct consciousness. However, because the study of this highly important problem has so far been neglected, we can do no more

at this stage than mention it (p. 168).

It is, therefore, not surprising that many educators might be skeptical of some of the findings on lateral hemispheric specialization, for these same findings could possibly threaten their own teaching paradigms. In the public controversy between the two paradigms then, many faculty members might willingly hear the arguments for the dominant left hemisphere paradigm while ignoring those arguments supporting the two hemispheric paradigm. They could thus claim there is not enough evidence yet. What is the basis for the alternative paradigm? Should educators consider the evidence seriously or can they afford to ignore it?

Studies of Brain Function

A functional map of the human brain has been created from evidence obtained from a number of sources over a number of years. The earliest, and perhaps most extensive evidence regarding brain functioning has come from studies of the effects of brain damage. The earliest findings were that the left hemisphere was the seat of language. Based upon this early finding, the concept of the dominant left hemisphere dominated the field until the early 1960's. This evidence could be considered suspect for purposes of higher education because higher education is supposed to deal with normal brains.

Regardless, the evidence from brain damage victims has been highly correlated with several other approaches. A cytoarchitectural map was created by Brodmann (1911) based upon the autopsies of normal people as well as brain damaged people. In his work, Brodmann looked directly at the physical properties of the brain and found that different parts of the cortex were physiologically different. The size, length and quality of neurons were different in dif-

ferent parts of the brain, and these differences correlated with the functions performed such as speech, vision, etc. Again, people in higher education may dismiss this evidence on the grounds that they deal with live people not dead bodies.

A third approach to creating a functional map of the brain was developed from evidence obtained through electrical stimulation of parts of exposed cortex during brain surgery. This evidence seemed to correlate very well with evidence of the other two approaches. Again, this evidence might be ignored by higher education types since higher education does not normally stimulate the cortex directly. I suspect that some students might even add, that higher education does not even stimulate the cortex indirectly.

Interestingly enough, in the early years, none of these approaches found much evidence of lateral hemispheric specialization. It was quite clear from the early studies that language was a left brain function in most normal people; but it was believed by most early neurologists that the two hemispheres were similar, but that the left hemisphere was dominant and the other hemisphere was a kind of redundant reserve. The evidence was there, as recent reviews of the older findings reveal (Bogen, 1969). They just did not see the difference before, because they did not look for it. It was not until recent technology gave us new evidence, that the basic paradigm of dominant-secondary began giving way to the paradigm of left and right specialization.

In 1960, Dr. Joseph Bogen, proposed that the brain of humans might be split for the purpose of controlling the interhemispheric spread of epilepsy. Dr. Bogen's first patient was extensively studied both before and after the operation (Gazzoniga, Bogen and Sperry, 1962, 1963, 1965). Since that

time, examination of other human patients who had had their brain split by a surgical knife revealed a variety of striking and dramatic effects. From all outward appearances, these patients showed almost no effect of the surgery. But when tests were developed in which the experimenter communicated with only one hemisphere, dramatic differences were found. It was found, for example, that a word, spoon in this instance, could be flashed to left visual field which, in man, is exclusively projected to the right hemisphere — and the subject would say, "I did not see anything." Subsequently, with the left hand (right hemisphere), he would be able to retrieve this object (spoon) from a series of objects placed out of view. When the subject was holding the correct object in his hand and out of view the experimenter asked, "What is in your hand?" and the patient answered, "I don't know." Clearly, the right hemisphere recognized the word spoon because it reacted appropriately to the correct stimulus and made the appropriate response.

But the left hemisphere, did not see the picture flashed to the right hemisphere, nor did it have access to the touch information from the left hand which is projected to the right hemisphere. Further studies indicated that while the left hemisphere excelled in verbal processing of information of all kinds as would be predicted, the right hemisphere proved superior in managing visual spatial tasks such as drawing cubes, and arranging blocks to match a design.

New Studies Emerge

After the discoveries on split brain patients, multiple new questions about brain function emerged. Galin and Ornstein (1972) did studies on normal individuals under more or less normal circumstances by reading micro-electrode recordings of cortical

activity evoked by behavior or sensory stimuli. This fifth approach to functional mapping of the brain uses an electroencephalograph (EEG).

Galín and Ornstein found definite evidence that different tasks are processed by different hemispheres in normal humans. And in ordinary activities, there is a type of alternating between hemispheres which takes place. "Our opinion is that in most ordinary activities we simply alternate between cognitive modes rather than integrating them" (p. 413).

A sixth approach to functionally mapping the brain is by means of a radio-active-isotope technique which introduces a radio-active substance into the brain blood stream (Lassen, Ingvor and Skinhoj, 1978). By means of a matrix of geiger counters, the blood flow in the parts of the brain can be measured during various types of sensory stimulation, behavioral responses, and even internal cogitations. The method is based on the fact that the flow of blood through the tissues of the body varies with the level of metabolism and functional activity in those tissues. The findings using the blood flow techniques both clarify some aspects of the mapping process and complicates others.

While all of these approaches are different, and while there is not yet total consensus, there is a growing correlation of evidence which provides a stable basis from which a two-brain paradigm is emerging.

Brain Dominance and Instruction

Whether the professional body called higher education accepts the earlier paradigm of a dominant left brain or the new emerging paradigm of the lateral hemispheric specialization, makes a difference. The nature of instruction depends on ones' assumptions about the nature of man and mind. What we in higher education do

about our instruction, depends in large part upon our assumptions about the nature of the brain with which we are dealing. We also operate from a dominant paradigm in our instructional life.

Originally simply synonymous with pattern or model, paradigm has come to have a more specific meaning since its use by T.S. Kuhn in his seminal study The Structure of Scientific Revolutions (1962). Thus we shall use the term dominant paradigm to refer to the basic way of perceiving, thinking, valuing, and doing associated with a particular vision of reality.

A dominant paradigm is seldom if ever stated explicitly it exists as unquestioned, tacit understanding. . . . A paradigm cannot be defined precisely in a few well-chosen sentences. In fact, it is not something to be expressed verbally at all. It is what the anthropologist hopes to understand after he has lived in a foreign culture for a long time — what the natives in a society perceive with their eyes and value with their feelings (Harman, 1976, p. 24).

This is what Kenneth Boulding (1964) has called "the image" and Donald Michael (1977) perhaps more accurately labelled "the myth. So myth — the 'humanly constructed objectivity' — determines what we pay attention to and why" (p. 94).

If we believe the myth that the left brain is dominant because it controls language, we can teach to the left hemisphere through language and not be concerned about the results. But if we assume the two hemispheres of the brain are each dominant for certain functions, then we must re-examine the basic teaching paradigm we are using; or we may find ourselves teaching only half a brain.

The term teaching is used here in the intentional sense and learning is considered as the resultant effect. Teaching or instruction is considered the deliberate intentional act

of constructing a cognitive map in the brain.

As Meredith (1972) expressed it, *Instruction is thus comparable to an architectural operation in that it involves selection and design leading to a permanent structure permitting a continuing exercise of particular functions. But whereas the yield of the architects work is overt for all to see, the structure resulting from instructional activities is a synaptic pattern in the brain of the learner. Only his enhanced capacity for behavior is overt, in actual performance (p. 10).*

What is being suggested is not that most people do not learn with both halves of the brain, but that the institutions of higher education do not intentionally involve the right part of the brain. They seem, in fact, to focus almost exclusively on the left part of the brain.

The primary vehicle of communications in higher education has been, and continues to be, words. The words may come from the mouth of a fresh new assistant professor in a small class of 30 students. They may come from the learned hand of a distinguished full professor in the form of a textbook used by thousands of students around the country — even around the world. Higher education has been and continues to be a world of words, words, words and more words.

In any paper such as this, I feel somewhat constrained in talking about the right hemisphere and its specialized functions. It is similar to a male doctor explaining pregnancy. I would prefer to make you all pregnant with the visual side of my message, but I am constrained to utilize the existing mode of communication within our profession. I am at a loss, not for words, but for meaning. As Patrick Meredith (1972) put it:

Traditionally instruction has been dominated by the spoken word. . . . The

dialectic of the 'socratic method,' in which the whole burden of communication is carried by a single medium, is still regarded as prestigious rather than parasitic. It is parasitic because, apart from onomatopoeia and intonation, amplified by gesture, the structure of the verbal medium bears no determinate relation to its messages. The latter depend entirely upon associated experiences. Words are effective only when the experiences are first guaranteed (p. 10-11).

Von Foerster (1972) adds:

We seem to be brought up in a world seen through descriptions by others rather than through our own perceptions. This has the consequence that instead of using language as a tool with which to express our thoughts and experiences, we accept language as a tool that determines our thought and experience (p. 34).

This paper is too short to do anything more than point in a general direction. I have tried to point towards a new paradigm, toward an expanded view of higher education. The new paradigm in the neuro-sciences does not reject the old paradigm, but rather subsumes it. Newton's physics was not proven wrong by Einstein, but rather found to be a special case within a larger world view. The implications for higher education of the new findings in the neuro-sciences is not a rejection of the verbal mode of teaching, nor a rejection of the analytic approach to teaching — rather the implications seem to me to be an expansion of perception, an ability to see more than just the verbal analytic approach. As Carl Sagan (1977) has expressed it:

The two modes of thinking are of very different complexity, but they have complementary survival value. . . . In a way, sciences might be described as paranoid thinking applied to Nature:

we are looking for natural conspiracies, for connections among apparently disparate data. Our objective is to abstract patterns from Nature (right hemisphere thinking), but many proposed patterns do not in fact correspond to the data. Thus all proposed patterns must be subjected to the science of critical analysis (left-hemisphere thinking). The search for patterns without critical analysis, and rigid skepticism without a search for patterns are the antipoles of incomplete science. The effective pursuit of knowledge requires both functions (p. 192).

In my right hemisphere, I see the new paradigm of complimentary hemispheres of the brain, demanding that we re-examine our paradigm of teaching. My right hemisphere can see a new pattern emerging with greater and greater use of visuals in education. This will take place to the point where the term visual aid, may even be replaced with the term verbal aid, to describe our use of words. But with a touch of paranoia, my left brain has warned me to be more critical in my analysis. As a consequence, we have begun an investigation into some of the effects of this "two-brain" hypothesis on our teaching procedures. The first three questions we are asking are:

1. Is the complexity of the visual message itself critical to determine which hemisphere processes the visual information?
2. Is information processing associated with viewing and recognizing faces primarily a right hemisphere function?
3. Does varying the use of verbal/visual material in three-dimensional exhibits affect hemispheric processing?

Our investigations are but a small beginning. They are but a speck of sand on the bottom of the sea of ignorance. But we be-

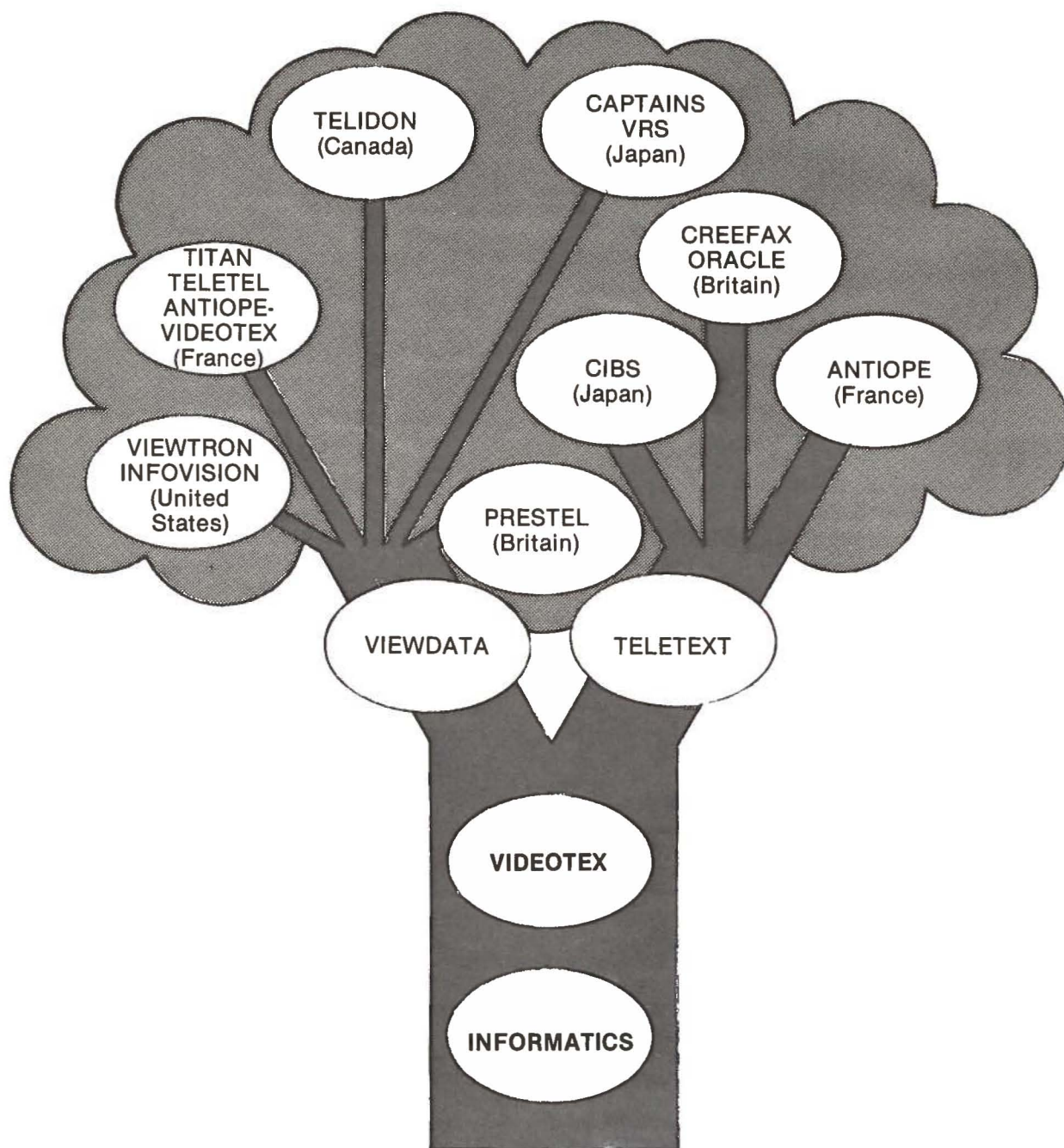
lieve they are an important beginning, and we welcome and encourage our co-workers in higher education to join us in building up a mountain of evidence to overcome that sea of ignorance. We encourage them to view anew their role in the instruction of their students. Then with some skepticism, we also encourage them to test out the new vision with fairness and rigor. In the long run, a pooling of our findings should have a major effect on our basic paradigm, but in the short run, the very search by each of us should have an exhilarating effect on our teaching.

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Figure 1. The Videotex Family Tree



On the Educational Media Horizon: Telidon

Paul Hurly and Denis Hlynka

Telidon. What is it? What are its implications for society and education? This article will attempt to answer these and other questions. To do this we will draw upon the unique opportunity we have had at the University of Manitoba to work with Telidon in conjunction with the first Canadian domestic field trial of this technology.

This article will first describe the basic components of the videotex family of which Telidon is a member. It will then identify the specific features of Telidon and will discuss some of its potential applications. The numerous educational functions which Telidon could provide will then be summarized, and a review will be provided of some of the current experiments involving this technology. The article will conclude by speculating on the impact which videotex technology could have on society and the educational process during the next two decades.

Technological Family Tree

Telidon occupies a niche on one branch of a technological family tree. Figure 1 represents the genealogy. The word *informatics* is now generally accepted as an industrial term referring to computer communications of all kinds. *Videotex*, while used in some circles as a term synonymous to informatics, has gradually emerged during the past year as a means of identifying one component of the informatics development in the western world. Videotex now commonly refers to computer-based communications designed to utilize the versatile cathode ray tube receiver of the domestic television set. This configuration will provide a springboard, industry planners hope, for creating an information-consuming mass market.

Teletext refers to a broadband broadcast system for inserting text or graphics in the vertical blanking interval which comprises a normal TV signal. Teletext can be obtained in either a non- or pseudo-interactive mode. *Viewdata* systems, which are also referred to as videotext in some circles, operate in either a partial or fully interactive mode. Viewdata images are transmitted, rather than broadcast, using either voice grade phone lines, coaxial cable, or fibre optic lines. The similarities and differences be-

tween these two formats are important.

The first operation teletext system in the world was CEEFAX which the BBC1 and BBC2 in Great Britain began utilizing in 1975. Information on this system now includes updated weather, news and sports reports, as well as transportation schedules. Britain also introduced the first commercial viewdata system, Prestel, from the British Post Office in 1979.

Teletext and viewdata systems both utilize a computer to store information in coded bits which can comprise either a text or graphic image. The user accesses the information in any of the interactive modes by using a hand-calculator type key pad or a typewriter-like keyboard. An example of non-interactive teletext is the news or weather bulletins which are super-imposed over regular television programs. In this case the user has no choice concerning the information which is displayed. The decision is made by a technician in the television broadcast studio.

In a pseudo-interactive teletext system the user may select any one of up to 400 screens or "pages" of information which are stored in a computer. Unlike a viewdata user, however, the teletext user in this case never actually communicates with the computer. The teletext message pages are broadcast in a continuous repetitive cycle simultaneously with the regular television picture transmission. When the user presses the code for the desired page on the key pad or keyboard, this message activates a decoding unit on the adapted home TV set. The decoder will then pluck the requested page of information from the broadcast cycle, will assemble the image, and will insert the information into the vertical blanking space on the TV signal while it suppresses the regular TV broadcast. This latter step is eliminated when the teletext information is displayed on a separate channel where no regular television programming is in progress. The speed of access of teletext systems is thus determined by the speed of the broadcast cycle and the number of pages of information being broadcast.

A viewdata system user, on the other hand, directly accesses a main computer memory via an on-line network analogous to the types of systems utilized for office or scientific data retrieval systems. The user

selects the desired page of information which is located in the computer memory and is virtually instantaneously displayed on the TV screen. Despite the higher operating costs, the large memory capacity of viewdata systems (up to 500,000 pages of data are presently possible) and their rapid unrestricted access to the entire memory have made them a very attractive communication technology. One key component of a viewdata system is the modem (MODulate/DEMODulate) which interfaces between the computer, the transmission device, and the modified television set. The modem translates the digital (on-off pulse) signal of the computer into an analogue (wave) format for telephone line transmission. The new integrated viewdata/television sets currently available from companies like Zenith contain a modem and a small micro-processor.

Following the introduction of Prestel in England, France and Japan also began field testing viewdata systems, and vying for the right to become the yardstick by which international industrial standards for this new technology would be established. Canada's sudden emergence into this international race in 1980 with the introduction of Telidon caught the British and the other major developers and researchers by surprise. Work on the Telidon concept had started in Canada in 1969 as a Department of National Defense project with possible application to satellite and weapons development. In the early 70s the project was transferred to the Communications Research Centre of the Department of Communications (DOC). It is this group which perfected the current Telidon design.

Unique Features

Telidon has several distinct features which presently rank it in the forefront of the international viewdata market. First, Telidon utilizes Picture Description Instructions (PDI) which describe graphic images as basic shapes, thus permitting their combination with text on the same screen or page. An alphamosaic as opposed to an alpha-geometric command instruction has meant that Telidon images have a remarkably high resolution when compared with many other computer systems.

Second, Telidon employs forward and backward compatibility. That is, its data transmission system operates independent of the particular terminal hardware which the user or information provider has. So as terminal hardware improves the resolution of the Telidon-produced image will also improve, yet it will operate on older terminals or modified television sets quite satisfactorily. Third, the coordinate system for the "alphanumeric" (alphabet and number symbols) signals used for drawing consists of 1,024 positions with a high resolution display apparatus, or 256 positions of resolution in the horizontal plane. Utilizing the smallest of the six Telidon character sizes, Size 3, Height 1, the total working format per screen is 40 columns of 20 lines. Transmission by narrow band width dedicated phone lines is usually restricted to a maximum rate of 120 baud (characters per second). This will increase substantially when coaxial or fibre optic cable is utilized to 2500-4500 baud.

Image creation is accomplished via a special IPS (Information Provider System) terminal which utilizes an alphanumeric keyboard for text and standard geometric shapes, and a "joystick" for point-by-point graphic creation. The joystick is an operator controlled device which allows the information provider to position point-by-point dots on the IPS screen to build more complex polygons. To facilitate inputting the IPS operator selects various modes which will be utilized from a series of menus displayed in succession at the bottom of the IPS terminal screen. The menus are selected by punching a series of F-code keys located on the IPS terminal keyboard. No special knowledge of computer languages is required to input information. The University of Manitoba's IPS terminal operator, for example, was trained in six hours. Proficiency in the graphic arts is a major asset for the prospective IPS operator.

Applications

What is the current status of Telidon today? Telidon has been accepted as part of the international standard for viewdata systems design and production. Telidon has been successfully marketed in Venezuela and Switzerland, and several separate trials

have been underway in the United States for some months. The first public field trial in Canada has been underway in Headingley, Manitoba as part of the Manitoba Telephone System's Project Ida technology experiment. Alberta Government Telephone and Telecable-Videotron in Quebec are planning Telidon field trials for 1981, while Bell Canada has incorporated Telidon technology in its current Vista trial in several Ontario communities. The first public trial of a fibre optic distribution network is scheduled to commence in Elie, Manitoba in 1981. MTS intends to offer Telidon as a service to Elie home owners. The software instructions and hardware to permit a fully interactive version of Telidon are now available for field utilization. The current Telidon model uses a key pad device which delimits access to the computer memory bank as pages of information must be stored in a linear, branching structure instead of the random access type of file which characterizes most business, library and scientific data systems.

While industrial and commercial uses may provide the greatest immediate application for viewdata systems like Telidon, the DOC, like the British Post Office, is counting on the development of the mass home market. A broad range of services and potential uses are available. Imagine checking your current bank balance via your TV set and then ordering an item from the retailer's catalogue using the key board terminal in your home. Interested in Saturday entertainment? It would be possible to access the theatre box office or stadium seating plan, order reserve seats from those still available, and have them charged to your credit account. In Manitoba farmers can consult daily grain and livestock prices from Telidon terminals located at grain elevators and agricultural extension offices. Future innovations will permit users to search a variety of data bases tied into a viewdata network by using keyword descriptors. By typing in the index word, "sail boat" for example, the user could find listings on how to build, fix, or buy. France recently initiated a test in Saint Malo of its ANTIOPE-VIDEOTEX system for directory assistance. Many telephone utilities are hoping that viewdata data banks may one

day make telephone directories and costly printed yellow pages redundant.

Educational Applications

Another service which viewdata systems could provide to homeowners could be degree and non-degree credit, and social demand educational programs. The University of Manitoba has been investigating the potential of Telidon for distance education as part of the MTS Project Ida field trial in Headingley. Project Ida field trial in June 1980 to test a full range of electronic services as part of the Integrated Home Information Services concept.

One educational service which Telidon could provide would be the delivery of computer assisted instruction programs to augment correspondence or other primary delivery methods. Maximum cost effectiveness could be realized by networking thousands of home television sets into regional university data bases. Home terminals would allow school students to work on homework, complete drill-and-practice exercises, and engage in problem-solving, simulation and modelling exercises. Under-educated learners could undertake initial remedial work using computer-based ABE courseware without publicly identifying themselves to an institution — thus avoiding the social stigma which many functional illiterates dread.

Another educational application of Telidon would be computer managed instruction for independent or distance learners. Should the industry recognize the full potential of the domestic Telidon keyboard users could also acquire a "smart" microcomputer terminal. A "smart" terminal is one which can permit users to manipulate as well as receive data. "Smart" Telidon terminals would allow users to download (transfer) data from the main computer memory bank to their homes, and then to work on this data in the off-line privacy of their own Telidon terminal. Microcomputer companies have already recognized the inherent advantages of networking and now companies such as Apple, Commodore and Radio Shack are developing means to interface their home computer with viewdata systems like Telidon.

Telidon could play other roles in the

learning process. Terminal-to-terminal communication could greatly enhance tutoring for distance learning programs. The electronic mail feature would also speed the submission and return of assignments. Various surveys have demonstrated the importance of improved counselling services for

adult learners. The Telidon data bases could facilitate greater access to information — if the cost is reasonable — and better planning of self-directed learning projects. This form of learning, we are reminded by researchers, comprises an estimated 70 percent of all adult learning activity.

The Telidon network could allow learners to search library catalogues, check reading lists, order or reserve textbooks, access graphic image or microfilm collections, or keep up-to-date with changes to the course calendar. The limitations of current viewdata systems can be attributed more to

Figure 2. Telidon pages of information can presently be accessed by a hand-held key pad. Information pages can combine both text and graphic images.



human preconceptions, and lack of insight and inventiveness, than they are a result of limitations inherent in the technology. Right now the sky is the limit. A certain tension exists, nevertheless. For current technologies, even ones as futuristic as viewdata systems, are almost monthly being eclipsed by new innovations. If nothing else, this rapid change is making it increasingly difficult to determine which technology will dominate the telecommunications services for the next half century. The desire, therefore, of investors to receive more immediate as opposed to long-term returns may lead to the implementation of viewdata services which satisfy the lowest common denominator. The tendency to compare the present excitement and promise of viewdata systems like Telidon with the history of the diffusion and application of television in North America is more than a coincidence.

The educational domain is the focus of experiments in several provinces. Specifically, the University of Victoria is studying the potential of programming Telidon in NATAL, a new computer language developed by the National Research Council. The University of Manitoba has developed several interactive short courses, and is investigating the integration of Telidon with the existing correspondence program, the design of a keyword searching system, and large-scale networking configurations. The Ontario Educational Communication Authority is programming Telidon courseware and experimenting with a Telidon teletext signal. The University of Waterloo has been developing software interfaces to facilitate third party access, that is, the ability of existing central computer data banks in institutions like libraries, hospitals and universities, to network into the Telidon system. Other institutions also known to be undertaking work include Athabasca University, Memorial University, Quebec University and the Ontario College of Art. Efforts have been made to establish a national consortia of participating institutions as well as a series of Telidon educational advisory committees to the government and industry. The Canadian Videotex Consultative Committee which reports to the Department of Communications has been the most active to date.

Social Impact

Clearly, with the advent of Telidon viewdata technology, Canadians find themselves in a "technology pull" as opposed to a "needs push" situation. Researchers have found the improved means; now many of us are being asked to identify the need. Two inappropriate responses, we maintain, would be to bury our heads in the sand or to develop a luddite reaction. Purposeful technical change has been essential historically for the evolution of our societies. Nevertheless, many important questions deserve attention.

Computers, in general, are expected to drastically alter the Canadian and world economy during the next two decades. The increasing dependence upon and importance of electronic information processing has raised many crucial issues for our society. These include the questions of personal

privacy and confidentiality, security, freedom of access, the impact of transnational data flow on national sovereignty and culture, vulnerability, computer literacy, job dislocation, demographic shifts and the nature of social control.

Educational technologies, computer assisted instruction included, have yet to demonstrate that they can make a significant positive difference in the learning process. CAI programs in general will warrant close scrutiny, and administrators will require assurances that courseware can be updated as required by the educational system rather than as dictated by private suppliers. The dynamic tension will continue between the principle of providing services to meet as yet unspecified demands from individuals and small groups of learners versus the economic benefits of producing materials which maximize economies of scale by ap-

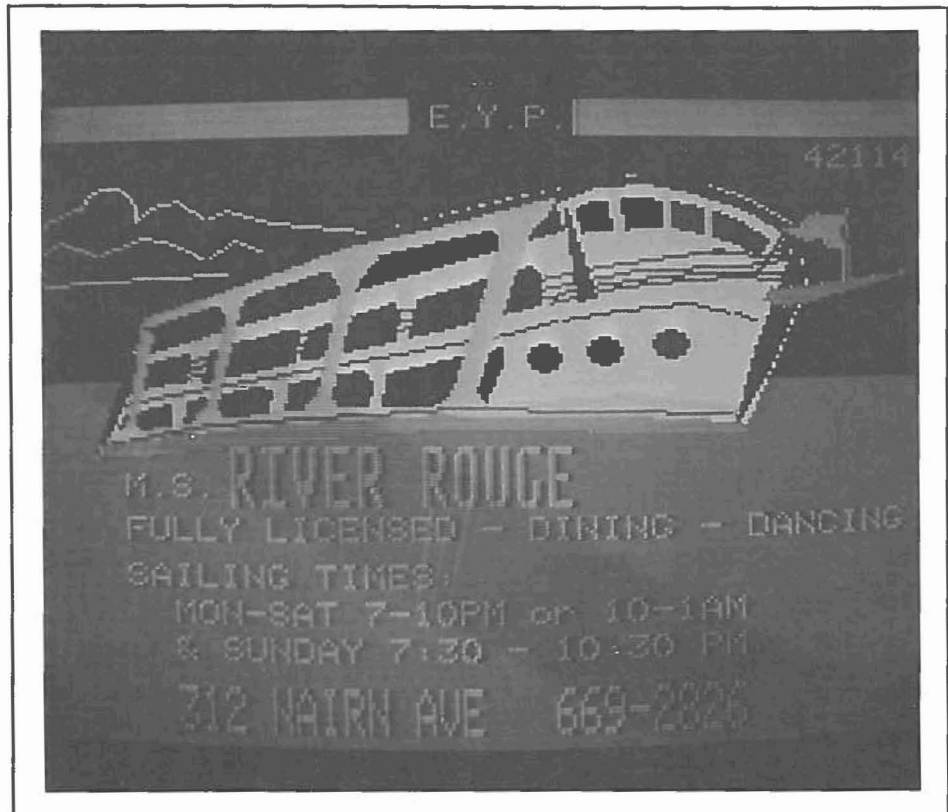


Figure 3. The Manitoba Telephone System established a new unit called the Electronic Yellow Pages to create facsimile ads for the Project Ida field trial on Telidon as an alternative to the printed yellow pages.

pealing to a broad market. The ultimate challenge in Canada will be regulatory, both in terms of telecommunications policy and educational jurisdiction. The historically developed provincial educational control over curriculum could be faced with increasing financial pressure to reach a consensus on at least a regional basis to permit greater sharing of course developing costs associated with CAI materials. We remain confident that human beings, as social animals, will continue to seek out learning experiences in interpersonal setting, and that systems like Telidon will not transform us into recluses.

Conclusion

Though there are many important policy questions such as service costs, licencing regulations and third party access which still have to be resolved, viewdata systems like Telidon represent an important new frontier in business and home communica-

tion. Various Canadian universities and communication authorities are committed to experiment with and to evaluate the efficacy of this new technology so that it will be employed as effectively as possible to meet the needs of Canadian society.

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Paul Hurley, Lecturer, Correspondence Coordinator for the Continuing Education Division, The University of Manitoba, has coordinated the university's involvement in Project Ida, the Manitoba Telidon field trial. He holds a Master of Continuing Education degree. His research interests include instructional design, media impact on the social change process, and needs assessment and evaluation in the adult learning process.

Dr. Denis Hlynka is Associate Professor of Educational Media/Technology in the Faculty of Education, The University of Manitoba. His research interests include communication media in the classroom, product design, visual literacy and film music.

LEADERS OF THE 20th CENTURY

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De Gaulle
Hitler
Mao
Roosevelt

Stalin
Mahatma Gandhi
Truman
Hirohito
Franco

Adenauer
Eisenhower
Tito
Nasser
Ben-Gurion

Krushchev
Kennedy
Elizabeth II
Shah of Iran

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President

Anne Davidson

In appreciation. A fitting theme, perhaps, for my final message as president. From this privileged stance where review and assessment of our Association is expected it seems obvious that I share my thoughts with you at this time.

It is, of course, no secret that AMTEC falls within the impecunious category. We have survived through sheer hard work, dedicated effort and the support of very many friends. How else could an association of some five hundred members survive? There is always the danger that complacency will set in; that we shall take for granted our good fortune and neglect to register gratitude. And so against that happening I recount the good things.

Cece Wilkinson, long-known to media people in Canada, has undertaken to trace the history of media associations in Canada. Many members have responded to his request for archival information. *Roots*, he calls it. He will be in Truro at AMTEC '81 to present his draft. The cost of his trip will be his financial reward. He reported on his progress to the Board when we met in Toronto in February.

Mal Binks, past president, also called. He continues to be responsible for Awards — the AMTEC pins presented in recognition of service to the Association, the certi-

ficates for Merit and plaques for Excellence in Media Festival entries. Few members will know that the Award for Leadership which recognizes outstanding contribution in the field of media is encased in magnificently crafted Ontario black walnut from a lovely tree which Mal's father had to remove from his yard.

When one enumerates the free services enjoyed by AMTEC the list is indeed impressive. We are most grateful for the expert advice received from June Landsburg's colleague, Professor Lynn Campbell. His most generous guidance has alerted us to the need to comply with certain requirements of the law and of the Minister of Consumer and Corporate Affairs. Tireless efforts of conference planners, substantial contributions from sponsors of conference events, numerous long distance telephone calls, secretarial time, even free duplicating, printing and mailing on occasion are some of the benefits it would be extremely difficult to cost.

Particularly significant, too, is the work of so many contributors to this journal. We continue to marvel at the leadership and dedication of Richard and Pat Lewis.

It was with beginner's naivete that I designed the agenda of the first meeting of the Board of Directors. Somehow I felt that

there ought to be a distinct pattern: administration and development. By the latter I had envisaged growth of interest in the professional sphere. However, administration demanded a very substantial emphasis. Five days of meeting time since the last annual general meeting dictates the setting of priorities. Hopefully the decisions have been wise and expectations realized.

In order to move on from our present mode of operation it will be absolutely essential to seek funding in support of a different structure or goals. Increasing membership fees is not in my view the solution; we must increase membership quite dramatically. Permanent office space is needed so that there is no change of official address every time there is a new secretary-treasurer. In my opinion there is urgent need for a salaried administrator. Former presidents have identified these needs and directors have concurred. Can we now make definite plans for action?

For their loyalty and downright hard work I express grateful thanks to the Board of Directors, the membership chairman, the archives chairman and the editor and his very fine team. If this Board is representative of future leadership AMTEC surely can expect to flourish. I wish my successor Lou Wise the good fortune I have enjoyed.

Editor

Richard F. Lewis

Media Message is the only journal in Canada which deals exclusively with the field of educational communications. As a result, the journal should reflect the wide interests of people interested in the field. At present, *Media Message* is in a developing state. This year we introduced the concept of refereed articles — articles chosen by professionals in the field as publishable material. Previously, articles were chosen on an informal editorial decision. These refereed articles have directly influenced the tone and editorial slant of the journal. It has become more academic and less practical. Is this the type of journal that AMTEC desires? To answer this difficult question, the editorial advisory committee will meet in Truro and discuss some alternatives.

Among the alternatives suggested are a journal with a wider focus — one with a refereed section, but including a variety of special sections reflecting the diversity of interests in the Association. For example, special interest groups within AMTEC could be asked to submit regular columns dealing with issues particular to their area. In 1979-80, Clayton Wright fulfilled this editorial responsibility for the media specialists group. This year the same approach was attempted with the instructional development group, but adequate material for regular publishing was not submitted.

In order to maintain a wider appeal, a

variety of different sections would have to be introduced: microcomputer programs, case studies of media, university research round-up, organizational news, conference announcements, a people section, etc. have been suggested.

The new sections would not have the same length or depth of the refereed articles — they could be short, news type articles. In the microcomputer sections, programs which work or don't work could be explained, hardware and software evaluations and perspectives could be printed. Informal comments on the topic and its future uses would also be welcomed.

The university round-up would acquaint researchers with the current work of other researchers, grants received, articles published. This was tried in a limited way in one of the newsletters last year.

Organizational news would replace the AMTEC President's message. It would list membership information, awards information, media festival details and conference information. If space permitted more details on a variety of conferences would be provided.

The people section would focus on members' activities, change of position, etc.

Obviously, these ideas only skim the surface of newsworthy topics. If the AMTEC membership is interested in a wider appeal journal, members would be responsible for

writing up all noteworthy developments and submitting them to the journal's editors. This type of cooperation would help significantly in providing a backlog of material for future publication.

A word of caution must be expressed at this time. During the last two years, the general rank and file has been particularly quiet about *Media Message*. Although we have had sufficient material for each journal, this material has been gathered through personal appeal — not by membership submission. Except in rare cases have members prepared copy and submitted it as a general news item. As a result the newsletter has contained information researched and written by the editors. The journal has contained articles requested by the editors. Obviously a journal with a variety of columns covering a wealth of topics cannot be researched and written and edited by a part-time editor. AMTEC as an organization must make a commitment to this focus.

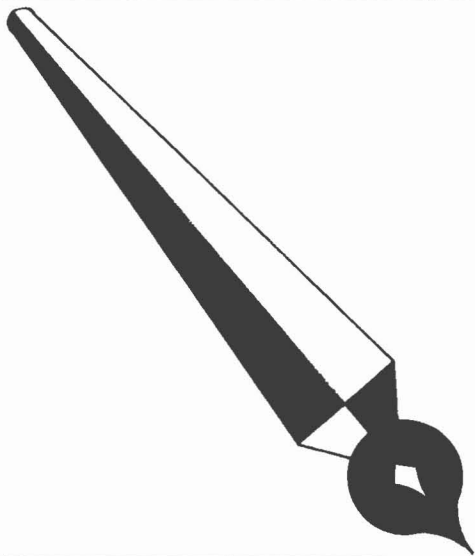
The alternative, to develop a quality, refereed-only, academic journal, is certainly a viable worthwhile endeavour. This alternative would also require the support of the membership, because members would be encouraged to assist the editorial advisory committee and to volunteer for the positions of associate editor.

We would like your comments and reactions to these ideas.

Applications Invited for Editor

A new editor will assume responsibility for *Media Message* and *Newsletter* in June, 1982. The AMTEC Board would like to appoint the new editor at the June, 1981 annual meeting so that he/she can work with the current team for the year immediately preceding the editorial term.

The editor is paid a small honorarium for the term as editor but not for the year preceding the appointment. The task of editor offers an opportunity to influence the direction of the organization and to guide its publications. Members interested in applying or in nominating a prospective editor should contact the current editor, Dr. Richard F. Lewis.



The Sesame Street Model: An Adaptation to Programming for Canadian Adolescents

Muriel Stringer

Concern for the impact of television on children is by no means a new phenomenon, although recent events such as the declaration of 1979 as the International Year of the Child have given studies on the effects of television on children some impetus, albeit perhaps of a spurious nature and more related to the availability of funding than to any lasting commitment or interest in the field. In Canada, the IYC elicited a variety of responses ranging from the founding of the International Television Research Information Centre at the University of Alberta to the preparation by Peggy Liptrott and Alice Poyser of a cross-country survey of children's programming which was commissioned by the Assembly of Arts Administrators of Canada.

Overall, however, very little research on children's television has been done in this country, and in general such research elsewhere has tended to deal with limited, often negative aspects of television for the young. In the 1960's, research focussed primarily on the effects of televised violence on aggressive behavior in viewers, and in the 1970's the emphasis was on other possibly harmful effects such as advertising and social stereotyping (Huston-Stein, 1977).

In the midst of this conglomeration of the academic, the negative and the piecemeal, the work of the Children's Television Workshop stands out as an alternate approach with a cohesive and well-designed project aimed at capitalizing on the intrinsic appeal the medium appears to have for almost all children.

Children's TV Workshop

Sesame Street and subsequently *The Electric Company*, however, were intended for children in pre-school and middle elementary age groups respectively, and it was not until very recently that the CTW with its *3-2-1 Contact* series made any attempt to reach children in the upper elementary grades. In this last series, as in its earlier efforts, the Children's Television Workshop is still dealing primarily with factual material and with cognitive levels of behavior.

In Canada, the strength of children's television lies in programming for the preschooler (Roberts, 1979). Between the ages of six and eight, the Canadian child turns to adult programs, and in this country as elsewhere an increasingly large proportion of the upper-elementary-aged viewer's time

is given to programs not specifically designed for this audience (Poyser and Liptrott, 1979). The classic study by Himmelweit, Oppenheim, and Vince (1958) showed that, in Britain, from age 10 onwards at least half of the child viewers were watching adult fare. Feilitzen and Linne (1975) found a similar changeover to adult viewing in 8-year-old Scandinavian children, and Poyser and Liptrott (1979) estimate that the Canadian 11-year-old spends around 80 per cent of his viewing time on programs intended for a much older audience.

The present study, then, was based on three assumptions:

1. That there is a dearth of programming specifically designed for the 9 to 12-year old.

2. That such programming as is available to this age group is either of a superficial nature, e.g., adult situation comedies, or set at a purely or largely cognitive level.

3. That the research-production team approach used by the Children's Television Workshop could be used to design and test programming of a non-cognitive nature.

With these considerations in mind an Edmonton group undertook the project "After Sesame Street, What?" between fall 1978 and fall 1980. The project was supported by a Canada Council Explorations Grant to the Director, Roy Pudrycki, by a grant from Alberta Culture and by a six-month sabbatical leave granted by Athabasca University to the author. The following description indicates the structure of the project, the research lines pursued, and the difficulties and limitations of applying the team approach in this context.

The Working Group

Inherent in the *Sesame Street* research and production model is the formation of a group of individuals with complementary skills. The *Sesame Street* group included psychologists, teachers, sociologists, filmmakers, advertising personnel, writers of children's books and experts in television production. Implicit in the formation of such a team is access to substantial funding — the Children's Television Workshop had \$8 million to support its first two years of operation.

"After Sesame Street, What?" was perforce carried out by a much smaller group and with far less support. The composition of the working group, although originally

conceived in fairly grand terms, out of necessity was dictated to a large extent by the availability of those willing to work unpaid rather than by a careful selection and amalgamation of needed skills. The group ultimately formed consisted of two content consultants (one of whom acted also as project director), a director of research, a data analyst, and a television/film producer.

The small size of the team inevitably resulted in some deficiencies and gaps in manpower. A child psychologist, and someone with experience in children's television might have contributed greatly to the project. As it was none of the group had any professional experience in communicating with children. This could, however, be considered an advantage since the open admission of ignorance by all concerned and the lack of pre-conceived ideas on children's preferences did encourage a fairly analytical and enquiring approach to many aspects of the project.

With only five members in the team, communication was simplified and the work speeded up considerably — an important consideration, given that no one was able to work full-time on the study. As well, the content expert-researcher-creator triangle succeeded in remaining in reasonable equilibrium.

Project Structure

The project was split into two major areas — form and content research, although it must be recognized that this is an artificial division made purely for the purposes of allocating responsibility. In practice, the lines between form and content were not easy to delineate and in fact there was a constant and very close liaison between the directors of the two areas.

Three other areas, not properly considered research but included as a necessary part of the total project were a literature search; a survey of methods of financing and marketing films and television programs; and liaison with outside agencies either via conferences or through direct contact.

The largest area covered so far has been the form research which thus merits additional explanation.

Determining how material can best be presented to a particular audience is no

small task. When the material is only vaguely defined, the task becomes infinitely more difficult and indeed the emphasis shifts from form to content quite frequently as research on appeal characteristics in the use of the medium itself brings to light findings which belong more properly in the content area.

Deciding on the "ideal" program for any audience is a major undertaking. In the case of children's programming, the road to the decisions one must make is fraught with special problems. Whether to offer, as was originally intended, a straight drama series based on classical themes and emphasizing human relationships or whether to attempt to introduce more substantial content into formats with apparent appeal, such as situation comedies, was a choice which seemed clear-cut at the outset but which became less so as the project progressed.

The emphasis in the form research lay in trying to arrive at some indication of how the medium might best be used to communicate to this age group content based on a variety of human interactions. The research itself branched in two major directions, one dealing with children's apparent preferences as suggested by their viewing habits, and the other with a composite of data on the needs and other interests of 9 to 12-year-olds.

Using viewing patterns and apparent preferences of existing programs as an indicator for planning future programming has inherent drawbacks. Programs selected as favourites may achieve this status largely through availability, frequency of broadcast, and airing in a suitable time slot; they may, in fact, have little resemblance to the type of program the children would really enjoy most. To ask a child what he would like instead of existing programs is hardly likely to provide data on any acceptable alternatives since the child himself has only his previous exposure to television to draw on as a model and has no way to determine what might be done with the medium as opposed to what has already been done. The strategy of using data from several different sources in order to build up a composite picture of the children's interests, needs, and preferences in television was therefore adopted, and the following individual but closely linked research studies carried out.

1. A survey of television watching preferences of grade 4, 5, and 6 children in Edmonton.

2. Characteristics of preferred programs of grade 4, 5, and 6 children.

3. Follow-up survey of television watching preferences in 8 to 12-year-olds.

4. Children's literature preferences.

5. Cross-Canada survey of upper elementary aged children's extracurricular activities and television preferences.

6. Availability of children's programs.

7. Ability of upper elementary-aged children to interpret visual metaphor.

These studies are described in detail in a final report to the Canada Council.

Problems and Limitations

The problems in attempting to adapt the *Sesame Street* team model to plan, produce, and evaluate a series with non-cognitive objectives are essentially two-fold.

To launch such a project in present-day Canada appears to be an impossible task: funding is wholly inadequate to allow a group to be brought together that in any way resembles the breadth of skills and experience brought to bear in the work of the Children's Television Workshop.

But perhaps more important are the limitations in the model itself when it is applied to content which is immeasurably harder to define and communicate than the mechanics of the alphabet. Research as a partner to content and communication has severe limitations in this context. The report resulting from "After *Sesame Street*, What?" gives some indications of how television might be used to bring to a neglected age group programming of a non-trivial nature. The results, however, cannot be looked upon as anything more than a reasonably well-substantiated guess as to the structure of such programs. Nor, despite other attempts to measure attitudinal change (Roberts *et al*, 1974) is it likely that a series based on affective objectives could be evaluated in any meaningful way.

In endeavouring to apply the principles of the multi-faceted team approach to affective objectives, the short-comings of the *Sesame Street* model are brought into sharp focus. The model in essence consists of the marriage of the art of the story-teller, the

artistry of the communicator and the science of the researcher. At best an uneasy union, the marriage breaks down and should be dissolved when demands are made on members of the partnership who are unable to respond in any useful way. In dealing with non-cognitive learning, the researcher is the first to reach the limits of his capabilities and to find that the realisation of all of the efforts of the group relies in the end, not on further analysis and more detailed research, but on the creator's own intuition — a necessary ingredient in any successful communication.

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Muriel Stringer is an instructional developer at Athabasca University in Edmonton. She holds a doctoral degree from the University of St. Andrews in Scotland and spent a recent sabbatical leave as Director of Research for Alpha Omega Studio, a non-profit organization engaged in research on children's television.

Evaluation of a Mobile Audiovisual Materials Delivery System

Tom Rich

With assistance from Cathy Ayers Horne

The use of audiovisual resource materials in Prince Edward Island schools is very much in a developing state. A number of factors have contributed to this situation. Perhaps primary among them is the very late arrival of consolidation. In the early 1960's well over 300 schools could be found on the Island. As recently as 1971 there were 217 school districts, each with its own school board, serving a population of not quite 29,000 students. In 1972, under a development plan, five regional school units were established. Since that time the remaining one-room schools have been phased out and today 70 schools serve the Island's school population.

As a result of the large number of tiny schools and of small budgets, the audiovisual facilities and materials collections available to Island teachers were extremely limited. Few teachers had any exposure to, or training in, the use of media equipment and resources in teaching. Even today only about one third of Island teachers have taken any sort of media course in university.

It is in the context of this recent change in the educational system in Prince Edward Island that one of the regional units decided to do something to improve the accessibility and use of audiovisual materials. Regional Administrative Unit 4 has about 9,000 students located in 20 schools and served by approximately 300 teachers. In 1975, libraries and audiovisual resources varied widely between the schools but could often, in the smaller schools, total only a few overheads, some audiotapes and perhaps a dozen filmstrips. As far as utilization of media resources was concerned the most pressing problem was a simple lack of materials. The difficulty in overcoming this problem was that not enough money was available to develop the media libraries of the individual schools. One of the principals in the unit suggested an alternative based on a system he had seen in operation in Calais, Maine — a mobile delivery system operating much like a bookmobile which could visit each school periodically and provide a large centralized collection of audiovisual materials.

The idea met with acceptance and after some initial unsuccessful attempts to get direct provincial government financing for the project the unit decided to develop it on its own. A media librarian was hired to coordinate the operation and each school agreed to donate one third of its existing AV materials collection. To purchase new

materials, the principals also agreed to turn over to the AV mobile a portion of the special grant money that they were getting from the Department of Education for upgrading of their libraries. The Department allowed the unit to charge the salary of a bus driver and half the salary of the AV librarian against their normal operating budget.

During the fall of 1975 a school bus was converted into a mobile delivery van and approximately 2,000 items were purchased to add to the materials obtained from existing school libraries. In December the AV mobile began scheduled visits once every two weeks to each of the unit's 20 schools. Circulation for the initial round totalled 970 items. By the end of the school year the circulation had grown to more than 1,500 items per round out of a collection of 4,795 items. Of this collection, 80 percent were filmstrips and audio cassettes. The rest consisted of small amounts of overheads, slides and other materials.

As the end of the first year's experiment with the mobile AV delivery system approached, the principals in Unit 4 decided it was necessary to conduct an evaluation to determine the attitude of the teachers to this type of delivery system. The media coordinator from the Department of Education was requested to carry out an evaluation of the operation in co-operation with the media librarian.

Several aspects of the operation of the AV mobile were of particular concern to the principals. These included the amount of materials used, particular areas of difficulty in the system and the teachers' feelings about spending their school library development money on this sort of unit-wide operation. Aspects of the operations that might lead to dissatisfaction were felt to be the amount of materials, the schedule of visits and the time available during stops at schools. Finally, the principals wanted an overall idea of whether the teachers were happy with this method of developing the amount of audiovisual resources available to unit schools and if they felt this was the best way to spend scarce resource money.

Method

In consultation with the media librarian in charge of the AV mobile, a questionnaire was drawn up to survey the attitudes of the teachers in Unit 4 toward the mobile. A preliminary version was submitted to the principals in the unit to insure the content

validity. On the basis of their comments, revisions were made. The final questionnaire contained fifteen questions.

The questionnaires were mailed to the schools with a covering letter to each principal. The letter to the principal contained five questions to be answered by the principal: equipment needs, material needs, equipment repair, responsibility for equipment and the need for instruction in all resources. The teachers were directed to complete the survey questionnaires anonymously and the data were compiled with no effort being made to identify either the respondent or school.

Results

A very good response was received from Unit 4 teachers to the survey. A total of 227 completed questionnaires representing approximately 74 percent of the unit teachers was received. Fifteen responses to the questions asked of the principals were received from Unit 4. This equals a 75 percent response rate. It should be noted here that the percentages shown on the breakdown of responses to individual questions on the survey reflect only the valid responses to each question. In many cases this will not be the same as the total number of respondents listed above because of multiple answers to questions (rendering them uncodable) or missing responses. In addition, percentages have been rounded off occasionally resulting in totals of more than 100 percent.

Not only do a very high percentage of the teachers responding (93 percent) use the mobile, but 95 percent of them would recommend its use to other teachers while 83 percent are happy with their school's money being used to support the mobile. Those who were not happy were asked to specify what they would spend money on; 31 did. Of those, 24 felt that individual schools should purchase materials, four felt more teachers were needed, not materials, two felt more equipment was necessary and one felt programs should be upgraded. Forty-nine percent of the teachers surveyed taught at the elementary level.

It is interesting to note that 40 percent of the teachers borrow between five and eight items each bi-weekly visit. In addition, eight percent of the teachers borrow more than 13 times each visit. This perhaps results from the fact that some teachers pick up materials for several other teachers.

The teachers' priorities for improving

service and selection of type, subject area and grade level of materials they would like to see purchased are summarized in Table 1. Ninety percent chose more material as their first priority for improving service. About 38 percent felt there was the greatest need for social studies materials with language arts and math/science coming next at 23 percent and 20 percent respectively. While 46 percent wished to have more film-strip-type of materials, 26 percent saw a need for more 16mm films. The largest percentage, 48 percent wanted elementary materials with junior high second at 29 percent. The rest of the subject areas, types of materials and grade levels were picked by a substantially smaller section of the teachers responding.

The mean response to five of the eight questions on attitude toward the AV mobile was over four on a scale of one to five indicating a generally positive attitude to the effectiveness of the mobile, the time available during stops, the schedule of visits, the helpfulness of the mobile and the effect the mobile had on use of AV materials. The highest mean score, 4.3, and smallest standard deviation, 0.9, were found for the question which dealt with the effect of the mobile on use of AV materials. A total of 58 percent of the respondents suggested that it

had increased their use of those materials. Three items, quantity of materials, catalogue information and the reservation system, had means lower than four. The question that generated the largest negative response was the quantity of materials with 41 percent listing it as average and 16 percent as very poor.

The results of the summing of these eight questions are found in Figure 1. Of the teachers surveyed, 45 percent find the AV mobile to be very good while at the other end of the scale only 5 percent find it very poor. The mean response of 3.9 with a standard deviation of 0.4 would indicate a generally favourable attitude toward the mobile, even taking into account some degree of unhappiness over the amount of materials.

The responses to the final question on the survey, which asked for suggestions for improving the service of the mobile, were examined to find out if there were any problems with the service provided by the mobile not identified in the questionnaire. Some 98 teachers responded to this item. Of the comments made, by far the largest group (54) focused on the lack of materials. Other comments included difficulties with scheduling and frequency of trips (10),

length of time at a school (7), lack of detail in catalogue (6), problems with checkout procedure (6) and several other miscellaneous complaints. Twelve people specifically complimented the operation or concept of the AV mobile.

The chi square data indicating the relationship between use of the AV mobile and attitudes toward the mobile are found in Table 2. All are reported at the $p < 0.5$ level of significance. This information provides an indication of some potential reasons for non-use of the mobile. Significant relationships were found between the use of the mobile and the attitudes toward the quantity of materials offered, the information in the catalogue and the reserve system. The teachers' perception of how helpful the mobile was and of its effect on their use of materials were both significantly associated with use of materials from the mobile. In addition, both the grade level of material and the type (i.e. film, filmstrip) that the teachers felt were needed were significantly associated with use.

Two factors, the respondents' reported satisfaction with spending their school's money on the mobile and their recommendation for use of the mobile, when associated with the eight scaled questions on attributes of the mobile, provide a check on

Table 1
Need for Materials

First priority for improving mobile service		Grade level with most need for AV materials	
More material	90%	Elementary	48%
More visits	5%	Junior High	28%
Detailed catalogue	4%	Senior High	16%
More personnel	1%	Grades 1-8	5%
Other	1%	Grades 7-12	3%
BASE = 197		BASE = 141	
Subject area with most need for AV materials		Type of AV materials most desired	
Social Studies	38%	Filmstrips	46%
Language Arts	23%	16mm films	26%
Math/Science	20%	Audio tapes	11%
Phys. Ed.	7%	Overhead trans.	6%
French	5%	Slides	5%
Ind. Arts/Home Ec.	3%	Records	3%
Other	4%	8mm film loops	3%
BASE = 152		BASE = 171	

the reliability of these measures. The results of chi square performed on these relationships are found in Table 2. Again, all are reported at the $p < .05$ level of significance. Significant associations were found between the teachers' willingness to recommend the mobile and their satisfaction with spending money on the mobile. In addition, both were significantly associated with seven of the eight questions forming the attitude scale — the exception being the satisfaction with the catalogue.

Discussion

The overall response of Unit 4 teachers to the operation of the AV mobile is quite positive. With 93 percent of the teachers using the mobile and 95 percent of them willing to recommend its use to other teachers, it is evident that the mobile is filling a need in the unit's schools. It is interesting to note that of the 18 percent of teachers who were not happy having school money spent on the mobile most felt that the money should be spent on materials specifically for their school.

There is no doubt that the major complaint with the mobile is a lack of materials. What is perhaps surprising is that even though 90 percent of the teachers said the amount of material available was insufficient, Unit 4 teachers were slightly above average in their use of AV media when

compared to other Island teachers. Of particular interest is the fact that almost 20 percent more teachers from Unit 4 chose filmstrips as the most useful medium. Their use of filmstrips reflected this, being higher than any other unit (Rich, 1978). When one couples this with the fact that Unit 4 teachers also use more audiotapes (which are often combined with filmstrips) than any other group of teachers and the fact

that filmstrips represent the majority of the collection on the mobile, the possibility that the AV mobile has positively affected the use of media in the classroom suggests itself.

The data presented here are not really complete enough to support a direct relationship between the AV mobile and the level of use of AV media in Unit 4, nor is there any prior study of media use in Island

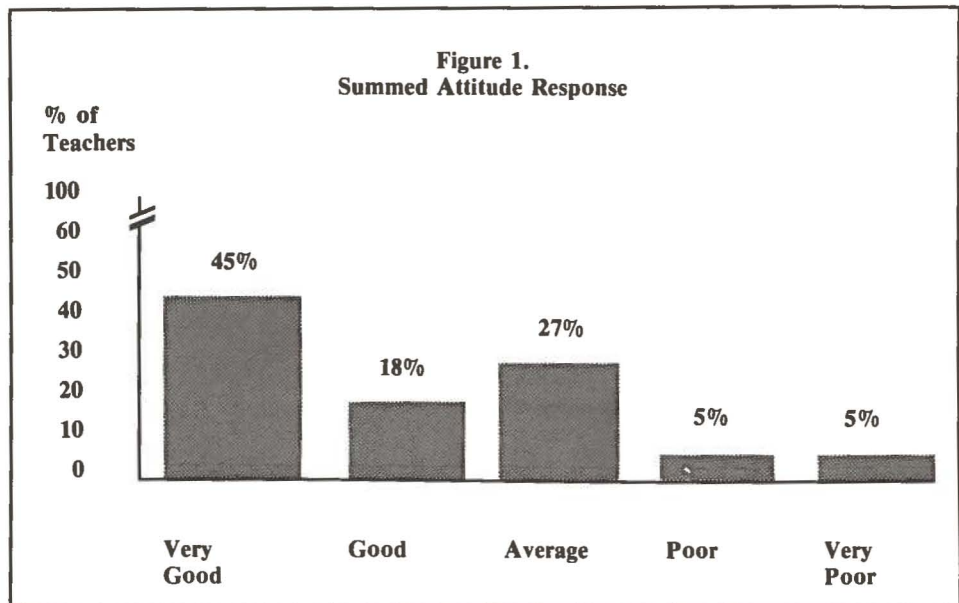


Table 2
Relationships Between Attitudes and Use of Mobile

Attitude Questions	Use of Mobile		Satisfied with money spent on mobile		Willingness to recommend mobile	
	(df)	X ²	(df)	X ²	(df)	X ²
Use of mobile	(1)	0.2	(1)	0.2	(1)	0.0
Satisfied with money spent	(1)	0.0	(1)	56.3*	(1)	56.3*
Recommend mobile to others	(4)	9.2	(4)	90.5*	(4)	91.8*
Overall opinion of mobile	(4)	80.3*	(4)	45.7*	(4)	34.6*
Helpfulness of mobile	(4)	47.3*	(4)	37.4*	(4)	35.8*
Effect of mobile on AV use	(4)	5.5	(4)	47.0*	(4)	41.0*
Schedule of visits	(4)	20.4*	(4)	22.7*	(4)	9.6*
Quantity of materials	(4)	10.0*	(4)	8.9	(4)	3.8
Catalogue information	(4)	3.5	(4)	19.5*	(4)	12.4*
Time during stops	(4)	12.7*	(4)	37.5*	(4)	24.4*
Reservation system	(4)	1.3	(4)	10.6*	(4)	41.5*
Priority for improvement	(4)	23.0*	(4)	7.0	(4)	6.3
Grade of materials needed	(6)	14.3*	(6)	18.0*	(6)	4.8

*Significant at $p < .05$

schools to provide a comparison. One can say, however, that the fact that over 75 percent of the teachers say it has either somewhat or greatly increased their use of media in conjunction with the reported greater use of media when compared to other units suggests a strong possibility that this is true.

Aside from the amount of reported use of materials from the mobile, the overall attitude toward it expressed by the teachers is also good. Even taking into account unhappiness over the amount of materials and to a lesser extent the information provided in the catalogue and the reservation system, the summed data over the eight attitude questions indicate that 63 percent of the teachers felt the service the mobile was providing was good to very good. Only 10 percent rated it poor to very poor. Considering that the mobile had only been in operation for six months at the time of the survey and that early operation problems were, as is to be expected, still being worked out, this would seem to indicate a substantially favourable attitude to the mobile.

Examination of the chi square indicates that the people who did not use the AV mobile were also the ones who were the most unhappy with the quantity of materials, the information provided in the catalogue and the reserve system. This association supports the findings of the scaled attitude questions. These three areas rated lowest for all the teachers. It is conceivable that a larger selection of materials and an improved catalogue and reservation system would not only be beneficial to the attitude toward the mobile but perhaps convert at least some of the 10 percent of teachers who do not use the mobile to the service. It is also important to note that use of materials was significantly related to the availability of materials at particular grade levels. Although the total number in this comparison is small, it would seem that a barrier to the use of the mobile for high school teachers is simply a lack of suitable materials.

The relationship of the teachers' willingness to recommend the mobile and spend money on it to the other factors tends in general to support the above findings. The fact that there is a significant relationship between the teachers' overall opinion of the mobile and their perception of its helpfulness and effect on their use of media on the one hand and their willingness to both recommend it to another teacher and spend school money on it on the other indicates good reliability of the questionnaire in de-

termining the teachers' attitudes. The significant relationships also indicate the possibility that some negative attitudes toward the mobile are a result of some unhappiness with the schedule and the time allowed at each stop in addition to the quantity of materials and the reserve system. The lack of significant relationship between willingness to recommend and spend money on the mobile and the priority for improvement arose from the fact that those who were unwilling to recommend it or spend money on it were those who tended to suggest that the best way to utilize the money now spent on the mobile was in buying new materials for individual schools. The one relationship which might have been expected but was not found was with the question on information in the catalogue. Although the teachers wished more information, this apparently did not alter their overall opinion of the AV mobile.

The major complaints with the AV mobile are thus the need for more materials, the desire for more information in the catalogue and for improvement in the reservation system for booking materials. To a much lesser extent there is some slight dissatisfaction with the schedule and time allowed at each stop.

The survey of principals produced little usable data, as far as materials and equipment are concerned, with the exception of a demand for more filmstrip projectors. This is to be expected since that is the most commonly used medium. What is significant is the fact that over 73 percent of the Unit 4 principals felt that their teachers needed more instruction in use of AV materials. It is well noted here that only about 32 percent of Island teachers had had any sort of university level course in use of AV materials or equipment. Obviously a further area for work in developing the utilization of media materials is in training teachers in their most efficient use.

Summary

The response of Unit 4 teachers to the initial operation of the AV mobile is certainly positive. There is even the possibility that in as little time as six months the mobile may already have had the effect of slightly increasing the use of AV materials among the teachers it serves. There would appear to be a general agreement among the teachers that the mobile is a worthwhile project and a good means of providing AV materials to Unit 4 schools. Criticisms of the mobile

arise not so much from the concept of a mobile delivery system as from a desire for even more materials. Considering the fact that the over 4,500 items now in the mobile collection represent many more materials than any one school had previously, it is obvious that a crucial factor in providing more materials is that they relate to the specific needs of the teachers served and provide for multiple copies of items in high demand.

It is obvious that no centralized, delivery based resource system can offer all the advantages of availability and flexibility inherent in a large individual school based media resources centre. However, the results of the evaluation and the personal observations by this reviewer of the AV mobile in operation indicate that it is a viable and efficient alternative to the purchase and consequent duplication of materials by individual schools, particularly considering the limited amount of money available on P.E.I. for AV teaching resources. The growing demand for these resources in our schools at a time of rapidly rising costs would suggest the importance of exploring alternative approaches such as this.

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Roles for Instructional Development in Adult Education

Richard A. Schwier and Reginald Wickett

Those of us who sing the glories of instructional development, and who see great promise in the areas of education and industry for our students, may have inadvertently neglected a very important group — adult educators. Canadian continuing education requires that its adult educators function in a variety of situations ranging from urban centres with complex resource bases to isolated rural and northern areas with very limited resources. Geographic and demographic realities require extensive instructional development efforts in order to realize innovative approaches and education programs, as well as agencies such as community colleges to organize the delivery of such programs. The adult educators who participate in these programs must be no less innovative if needs are to be met. This will require a diverse approach to the training needs of adult educators, which mandates an element of instructional development training.

A working knowledge of instructional development provides a vital opportunity for growth to the adult educator involved in a complex, evolving delivery system. Adult educators must perform new tasks, and develop instruction within the context of evolving agencies and programs. Perhaps the key to growth, as well as survival, in this respect is the ability to systematically design instruction for a variety of systems.

Certainly one of the major roles most often played by instructors, which they are seldom trained to perform, is that of curriculum design agent or consultant. How often is the instructor asked to revise a course, make recommendations for curriculum change, or serve on a curriculum development committee? The answer is “all too often” if the individual has no background in performing these tasks.

How can training be provided for those people who work with adult learners, and what role can instructional development play in their training? Approaches to adult educator training include:

1. University degree credit training (graduate and undergraduate level).
2. Non-credit traditional training.
3. Innovative training (for those persons involved in non-traditional and traditional programs).

Some of these approaches are already in existence in various forms, while others are being considered by leaders in the field of continuing education. Each approach should be examined in the light of important developments in the field of continuing education. Priorities for the development of each approach, as well as the incorporation of instructional development content, should be related to the potential impact of each approach to training, resource availability, and consistency with important agency developments.

University Degree

Graduate studies in continuing education are designed for people who have a solid background of experience and a desire to pursue academic studies of this type; however undergraduate studies in continuing education are available in only limited forms in Canada. This represents a major deficiency because many of the teachers of adults could benefit from an appropriate undergraduate learning experience. Many of these people have neither the opportunity nor the desire to pursue graduate studies.

University degree and certificate programs provide a framework for long-term, systematic learning when related to the needs of educators of adults. Other approaches to training are responsive to short-term needs but they will not replace this approach to training. Traditional university-related programs, particularly at the graduate level, train people for positions of leadership in the field of continuing education. Most likely, these individuals will influence policy and provide impact at the program level.

Where does training in instructional development fit? These individuals, as leaders, will have a major impact on the curricular and delivery systems in continuing education. It is reasonable to expect that they will require formal training in the development of instruction in order to successfully carry out these responsibilities. Even if external development agencies are contracted to carry out actual development efforts, administrators and leaders must be conversant in the language of instructional development in order to direct, and later disseminate

the results of major development efforts.

Non-Credit Traditional Training

Many educators of adults, whether teachers, programmers or administrators, do not find degree programs appropriate to their career needs. A shorter term approach is required because it can be problem-specific and made more readily available. This approach to non-credit training fits well within traditional programs delivered by many agencies, and usually consists of workshops or seminars which vary in length from an hour to several days.

This type of training offers a variety of opportunities for training in instructional development. Typically, short-term continuing education training events deal with such topics as adult learning principles, philosophy of adult education, communication, and instructional strategies. Such programs could profit from the introduction of training events covering systematic development of instruction, curriculum design, modular construction, learner analysis, task analysis and evaluation. Of course, the duration and approach employed in non-credit traditional training functions would not be sufficient in most cases to develop a high degree of expertise in instructional development. They would, however, promote an awareness of the processes involved, and acquaint adult educators with the importance of instructional development in the field of continuing education.

Innovative Training

We should appreciate the advent of new styles of delivery for educational programs in the near future. These new styles can occur in traditional and non-traditional agencies, and it is in this area that extensive instructional development programs can have the greatest impact. But the emphasis shifts at this point from training adult educators in ID skills, to carrying out the development of instruction for programs. Innovative training will need to be appropriate to particular needs in the community, and must reflect the nature of the local resources, geography and population. Distance education programs dictate the need for non-traditional forms of delivery.

Future innovative programs will take into account the need for non-traditional forms of delivery such as self-paced learning strategies including modules, multi-media approaches, and learning activity packages, as well as coordinated televised instruction. Resource limitations will dictate fewer teachers who will be required to act as part of the resource base available to learners, and not as the primary instructional delivery mechanism. Learning resources will need to be portable, and will need to be self-contained. Modular instruction, however packaged, will predominate in program delivery.

Two types of personnel will be required to make this type of delivery system viable: trained instructional developers who have sufficient experience and breadth to deal with program development for adults, and trained teachers who are capable of functioning as resource persons in this type of program, and who are conversant in the language of instructional development.

Universities must train professional instructional developers to produce strategies and materials to support non-traditional delivery. In addition, teachers who have traditional training and experience, will require retraining in order to function within the non-traditional system, and must receive training in instructional development in order to aid in the implementation, field testing, evaluation, and revision of instructional components.

The exact nature of this training should be defined by the agencies involved in accordance with the needs of the programs in which they will function, but certainly the role of the adult educator, and the role of the instructional developer will interface. The following description of roles will serve to underscore the similarities of the two, and point to the need for training in instructional development for adult educators.

Development Expertise

1. Act as a resource who is supplemental or integral to the learning module.
2. Become a liaison between the administration, development team, learning modules, and the learner.
3. Provide feedback or evaluative information to the learner.

4. Guide learners through unfamiliar, often threatening, modes of instruction.
5. Select appropriate projects from the domain of adult education for instructional development.

Roles of the Professional Developer

1. Conduct needs and learner assessments.
2. Manage client relationships.
3. Analyze and sequence the structural characteristics of a job, task or content.
4. Specify instructional strategies and select appropriate learning resources.
5. Conduct formative and summative evaluations of implemented instruction.
6. Promote the diffusion and adoption of developed projects.

We will concentrate the remainder of the discussion on the adult educator delivering innovative, self-contained instruction, as an example of an opportunity for the integration of instructional development and adult education skills.

A self-contained, modularized program requires the teacher to familiarize groups of inexperienced learners with the nature of the learning activities, and promote their progress through a program. This will require knowledge of the learner and of the program, and this can be best achieved through a working knowledge of the instructional development process. Given a thorough understanding of the structural components, and the developmental aspects of a program, the teacher can act more effectively to effect the passage of students through a "foreign" mode of instruction.

There is a need for a teacher to act as a knowledgeable resource person and provide opportunities to discuss learning. This is a vital role for the teacher in any instructional situation, but particularly in an individualized learning setting which is heavily materials-oriented. The teacher must be available to solve problems related both to the content and to the mode of instruction.

The teacher must also perform an evaluative role, both in assessing students' performance in instruction, and in conducting formative evaluation on instructional packages. The teacher should be able to communicate intelligently with the instructional development team about the structure, ap-

propriateness, and possible modifications to instruction. A knowledge of the process of instructional development would be invaluable in lubricating this communication.

Conclusions

Training in instructional development can be a vital part of improvement in the continuing education delivery systems in Canada and particularly in the area of distance education. ID training will assist in the implementation of new styles of program delivery and it will help practitioners adopt new roles and functions.

But training in instructional development must occur in two parallel areas in order to exploit the current potential for innovation in continuing education. These areas include the training of professional instructional developers to facilitate the creation of alternative instructional strategies, and the training of adult educators in the process of instructional development, so that they can implement developed programs, and aid developers in the evaluation and modification of instruction for their students.

If either area is neglected, serious consequences are risked. Without professional developers, we face the risk of poorly designed, haphazard approaches to significant instructional needs. Perhaps more importantly, however, without a body of adult educators who are familiar with the process of instructional development, we face the possibility of having sound instructional programs which are poorly implemented. We cannot ignore the need to incorporate training in instructional development at both levels in the area of adult education.

Richard A. Schwier is an assistant professor in Educational Communications at the University of Saskatchewan. He is also an associate editor for *Media Message*.

Reginald Wickett is the Head of Continuing Education for the University of Saskatchewan.

Review

Shirley Murray

The Strongest Man in the World

16mm color film. 13 minutes. Distributed by Kinetic Film Enterprises Ltd. Produced and directed by Halya Kuchmiju.

\$500 (16mm)
\$175 (video)

Virtually every town, large or small, has its town crazy, the eccentric recluse who is either shunned or regarded bemusedly from afar. After death, the vestiges of his existence make their way into oblivion, surrendering their place in memory of those who have been deemed more socially reputable. Olha, Manitoba and its crazyman, Mike Swistun, are rare exceptions. Swistun distinguished himself from the rest of this genre by having been billed, for a brief moment, as "The Strongest Man in the World." Moreover, the memory of this anomaly won't follow the usual route, but will live on through the documentary of his life by Halya Kuchmij, a young film-maker who discovered Swistun while researching another film.

Swistun, who recently died of cancer at the age of 80, began life as a farmboy of Ukrainian parentage in Ohla, Manitoba. Unimpressed by the Ringling Brothers,

Barnum and Bailey Circus strongman, whom he saw dazzling a Winnipeg audience, Swistun flexed his own muscles, upstaged the hero and landed a job on the spot. For the next month Swistun toured Western Canada with the circus and was scheduled for its world tour. Fame and fortune were short-lived. Family and the seasons intervened; filial piety superceded the realization of dreams, and home to the harvest went Swistun.

After this brief nip from his trough of glitter, the Strongman rarely ventured far from Ohla. Instead, he worked the land and devoted himself to restoring and preserving elements of his pioneer Ukrainian heritage. In his spare time he entertained the locals with feats of strength, sleight of hand and hypnotism. In spite of his loyalty to the land and his culture, these other pursuits separated Swistun more and more from the mainstream of his small farm community and were the basis of a belief that he was possessed by the Devil. By the time we see the aged Swistun in the film, he is the stereotypical town eccentric. His house is ramshackle, reeking of craziness, and his appearance suits his environment. He is unkempt and odd of dress with matted hair and piercing Rasputinish eyes.

Kuchmij tells Swistun's story through an

intermingling of old photos, archival materials and current footage of Swistun with his family and neighbors. We see through it, the progression of Swistun from a hopeful young man filled with energy, excitement, and dreams, to an old man, strange in comparison with those around him. Yet, he possesses a stamina and vitality rarely seen in others his age; and is still capable of bending steel bars in his teeth, which is, indeed, the feat of a "Strongman" of any age.

The film is competently and sensitively produced. Narration is by Jack Palance, himself the son of a strongman. Photography and editing are by Allan Kroeker, who, incidentally, produced "How Much Land Does a Man Need," distributed by Marlin Motion Pictures.

While the film misses the mark of being a masterpiece, it is a delightful exploration and celebration of eccentricity. Teenaged students, in classes which deal with people and value constructs, could not avoid this eccentric. The film digs beneath the sidewalk caricature of the eccentric and reveals his universality without destroying his uniqueness.

Shirley Murray is a teacher-therapist at the Roy Wilson Centre, Sedley, Saskatchewan.

Guidelines for Authors

Media Message accepts papers dealing with the field of educational technology and learning: computer assisted instruction, learning resources centres, communication, evaluation, instructional design, simulation, gaming, and other aspects of the use of technology in the learning process.

Manuscripts should be typed on 8½ x 11 paper. All material must be double spaced. Include a title page stating title, full names of authors, identification of each author (position and institutional or other affiliation), and mailing addresses including post-

al codes for each author. References should be prepared according to the style suggested in the Publications Manual of the American Psychological Association.

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