Communications Technology & Health Education

By Pat McMullan

What does the future hold for those of us in health education? There certainly are forces at work which point to necessary change in the delivery of health care. There are new technologies which could assist health educators to reach more people in a more consistent and individualized way. The public is generally more knowledgeable, has higher expectations, and there is a growing interest in the self-care movement. How do these seemingly unrelated factors fit together? In this article I will present my scenario for the future in health education. It is, I feel, entirely possible although of course, not the only possible way to go. The intent is to explore what I consider to be the major pressures on the present system, as well as briefly discussing the new communications technologies and how they could be applied in an integrated system for a comprehensive health education program.

Influencing Factors

Costs. Everywhere in the world, increasing costs of medical care pose serious problems. In Canada, we can see cracks in the facade of universal medicare as doctors demand increased fees which governments, caught between these demands and the pressures of the current economic situation, refuse to grant. Increasingly high costs for the acquisition of new diagnostic and treatment technologies which must then be used and maintained, as well as the public's increasing expectations and demands, put additional pressures on the health care budget. The financial issues are becoming so acute that they tend to push all other matters into the background as policy makers search for mechanisms to contain costs. Containing costs is only part of the problem, however. The challenge is to do so while providing reasonable access to medical care that is effective and humane. If it were a simple matter of costs, the solution would be easy — reduce budgets. However, the achievement of limiting costs without also significantly limiting access or high quality care, and doing so in a politically acceptable manner is a real challenge.

Self-Care Movement. Many authors including Illich (1976) and Knowles (1977) are increasingly advocating the importance of individual responsibility for health outcomes. Although medical self-care has always been an unavoidable fact of life, organized self-care education is relatively new. Until thirty or forty years ago, care for minor health problems was taught by mother to daughter. Since then, the phenomenal expansion of the science of medicine has decreased consumer confidence in caring for themselves.

In recent years, the trend has again begun to change. Many guidelines based on sound medical advice have been placed within easy reach of consumers. It has been estimated that how well one develops competence and confidence in using this knowledge will directly determine the quality of care provided for up to 96% of all health problems (1, 18, 22, 24). Particularly in the United States, where the consumer directly bears a large percentage of his/her health care costs, health activation and medical self-care classes, books and films are increasingly being used to develop consumers' knowledge base. Related programs such as wellness and health promotion programs are oriented to positive health objectives, rather than specific health problems.

Scenario for Health Care/Health Education in the Future

Considering the forces at work on the health care system it seems inevitable that changes must occur. Howell (1980) presents a futurist's view of the system:

> "As pointed out by Jonas Salk in **Survival of the Wisest** and Maxmen in **The Post Physician Era**, we should expect major structural and procedural changes in future health care systems. The future system will be less disease-oriented and more conscious of prevention and health promotion. It will be guided by those individuals trained in health rather than diagnosis and treatment of diseases. Medicine will still be a major component but will not be the thrust or controller of future systems." (19:25)

A great deal of planning and work must be done. Our task will be develop effective approaches to have an impact on specific factors related to health behaviours and to utilize advanced communication techniques to provide sophisticated, person-oriented health information.

One possible scenario for the future is the establishment of Wellness Resource Centres. I predict that these would: (a) help to reach more people, allowing all citizens both ill and well to use the health care system they pay for (b) shift the focus of health care to the individual and (c) be cost-effective by helping to increase overall long term health and well being.

The first generation of these centres are already in existence in such places as the University of Southern Illinois. These centres promote holistic health, self-responsibility and self-care through a variety of methods such as "rap sessions," classroom presentations, special programs and individual and group counselling.

It is my opinion that the Canadian departments of health (federal and provincial) could take this idea and enlarge it to provide resource centres in each community or city region, much as libraries are provided today. These centres could be staffed by health educators who could act as facilitators, assisting consumers to find and utilize the appropriate resources to suit their individual needs. A variety of communications technology systems could be integrated to provide access to information not normally within easy reach of consumers through print media. Other services could be provided through interactive programs for individuals or groups. This is not to say that the human element would be missing, but rather that the new technologies could be used as adjuncts to health education, allowing much wider dissemmination of information on a more individualized basis.

In this scenario, health education systems will utilize a main frame computer for regional networks with terminals in wellness resource centres. Integrated with the system will be videodisc storage, satellite relays, as well as videotex. Services provided by the system could be accessed at wellness resource centres, or for those who have terminals, in the home.

Using Communications Technology as Adjuncts to Health Education

To date, media used for health education has been mostly confined to radio, videotapes, and television. Several third world countries have used radio programs to reach their populations. The University of South Dakota Medical School has made extensive use of both radio and television for public service announcements (13) and the University of Tennessee has profitably used closed circuit video tape presentations (7). In the future, Wellness Resource Centres, however, will make much more extensive use of increasingly sophisticated communications technologies.

Computers. In a complex integrated system, a regional mainframe computer would be utilized to control and coordinate the communication system. Wylie (1980) describes microprocessors and microcomputers this way:

> "A microprocessor is any device that utilizes digital technology and micro-electronics to 'process' (alter, combine, analyze, store and retrieve, and so forth) information in a specific, basically unalterable way. A microcomputer might be called an 'intelligent' microprocessor. It is capable of processing information in programmable ways." (41:88)

If there is a microprocessor at receiving sites, it becomes possible to provide a media presentation on a main channel and digital information on sub-channels that instruct the microprocessor what to do if a user does one thing or another, thus allowing a variety of programs depending on the interaction. Gold and Duncan (1980) state several advantages of computers that are applicable to health education: First interaction on a one-to-one basis — computers are designed to interact with individuals and respond to the nature of questions or requests, or patterns of responses. Second, accurate, consistent, and unbiased information — an enormous storehouse of information can be provided to individuals that is not subject to variation due to the "moods" or "health" of the computer. Third, apart from the novelty, people generally enjoy interacting with computers because they are responsive.

Fourth, in addition to providing useful information, computers can also gather and store health information. Fifth, home computers can be available when needed — whenever the "teachable moment" arises. Sixth, the branching capabilities of computers allow logical sequences of information to be provided, based on queries of the user or patterns of responses. Seventh, speed and accuracy of recall — many thousands of operations can be handled in seconds, much faster, and probably more accurately than humans can provide information.

Finally, instant indexing and queing capabilities make the home computer faster and more easily usable than reference books.

Videotex. Videotex technology has the potential for significant impact on health education, especially in remote areas, since its interactive function can provide a wide range of services either through a user's ordinary television set or through computer monitors. Hurly et al. (1982) describe videotex this way:

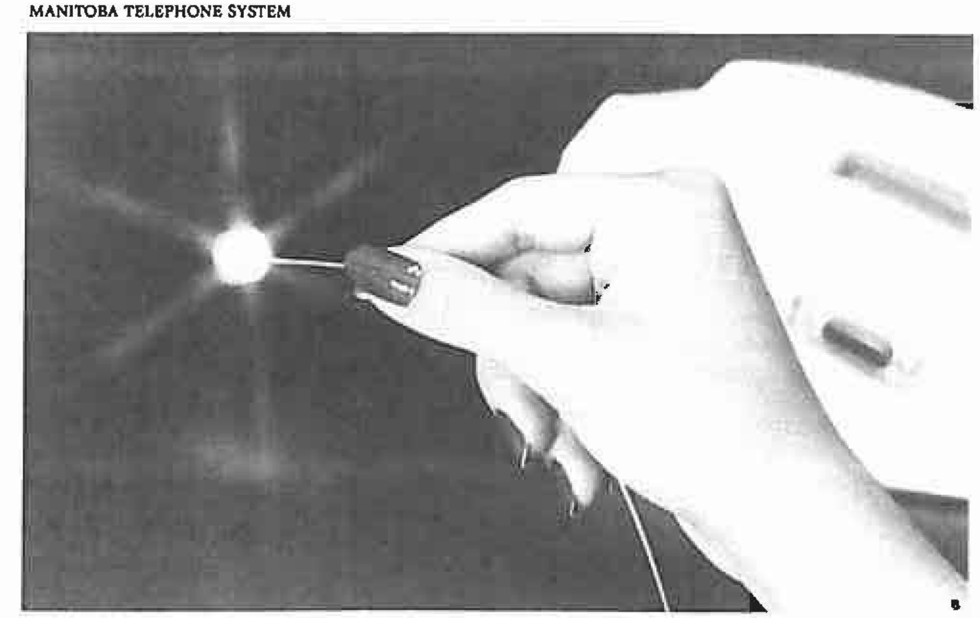
> "Videotex is a medium by which coded information is stored in digital form in a mainframe (host) computer and is transmitted via the vertical blanking interval or full screen video format to a conventional TV cathode ray tube (picture tube) or other monitor by voice grade telephone lines, co-axial cable or fibre optic lines." (20:3)

Cioni (1982) reports a number of future videotex services as seen by the Ontario Educational Communications Authority. First, videotex can act as a complement to educational television broadcast listings, program notes, closed captioning for the hearing impaired, discussion questions and answers, promotion of support services such as seminars, workshops, available materials. This would be very useful in health education as well as in general education. Second, videotex can provide an alternative to conventional print medium especially with rising costs for materials and postage. Users could have access to materials when they need them rather than having to wait and search. This system would provide much more equality of access to health education, especially in remote areas. Third, videotex can be used to distribute educational information. In the health field this could include such things as nutritional information along with simple menus or alerts to parents re: outbreaks of pediculosis amongs school children, together with information re: cure.

Fourth, videotex can provide information retrieval from data banks or reference materials. Fifth, videotex can provide interactive learning programs using TV programs to present the information and computer managed learning to allow users to give individual responses. Sophisticated computer assisted learning algorithms cannot easily be implemented on the present versions of videotex such as Telidon because of host computer limitations since the software was designed primarily for simple information retrieval. In the future, however, it is forseen that software will permit complex interactions among terminals and host computers. Muter (1980) suggests several possibilities for videotex aided learning. Future plans from the Department of Communications, Ottawa, include development of Sound Description Instructions (SDI's) which would permit the storage, transmission, and delivery of auditory messages. He also forsees a facility for talking and teleconferencing over the same lines on which data is transmitted, thus opening up the possibility of a distributed classroom in which educators and learners talk to each other at a distance and simultaneously manipulate images in a common visual space. He sees future terminals as including joysticks, light pens, touch sensitive screens, videodisc players, and tape cassette players. According to Muter, the Telidon terminal contains sufficient intelligence and memory to act as a personal stand-alone computer and to execute programs that have been downline loaded from a remote computer.

At present the use of copper wire telephone lines restricts the rate of information flow and the keypad permits only limited responses, but with full keyboards

MANITOBA TELEPHONE SYSTEM



Fibre optic lines like this will greatly increase the volume and speed of data communications handled at any given time.

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and high-capacity telecommunications channels in place, there is tremendous potential for computer assisted learning on videotex.

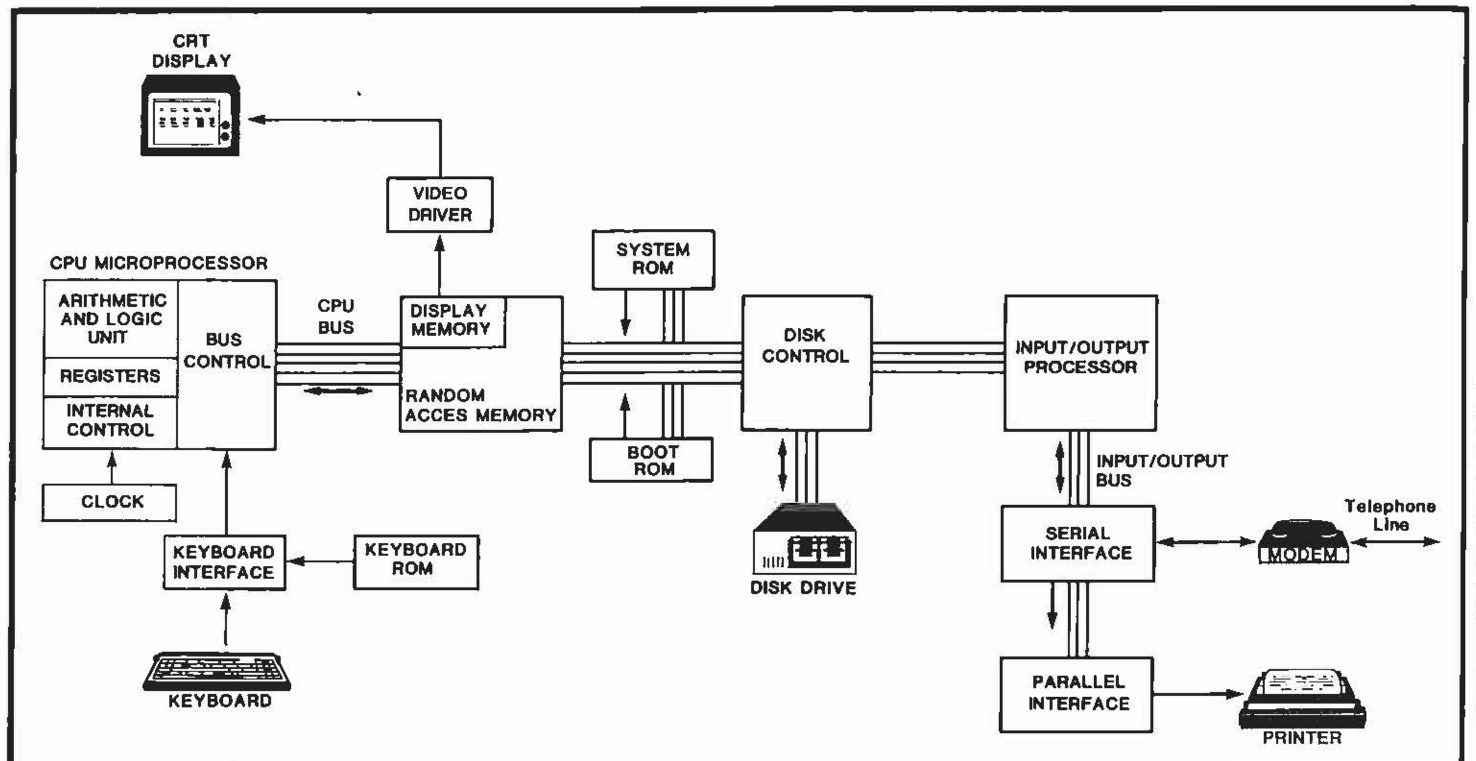
Videodisc. This technology provides a method for storing large quantities of information on a metal coated plastic disc in tracks each having an address, with the information being read by a laser or other light source.

With conventional instructional television, a program begins with the first frame and proceeds in order to the last. On videodisc, however, with its capability for random-access any one of roughly 54,000 frames, this need not be so. The author can design interactive strategies that allow the learner to become directly involved with the program. The American Heart Association has utilized a microcomputer/videodisc system in conjunction with the commonly used simulator manikin "Resusci-Annie" to increase the effectiveness and decrease the training time of cardiopulmonary resuscitation (CPR) courses. A similar simulation system could be quite useful in, for example, teaching a new diagnosed diabetic to administer insulin to himself, or an ostomate to care for his stoma.

Computer simulations by themselves enable users to interact with the computer but can only tell them what they are seeing in a hypothetical case. Coupling a videodisc player with the micro-computer presents verbal information and corresponding visual and audio stimuli simultaneously. The technique allows the user to observe, draw conclusions based on those observations, and respond properly. A branching program can more nearly simulate the thought processes of a "real-life" situation. In this method, students are required to instigate each step without prompting. They must tell the computer when they are ready for an observation, analyse verbal data from the computer as well as visual and audio data from the videodisc, draw conclusions and decide on a plan of action.

Backer (1982) describes a process by which the Massachusetts Institute of Technology utilizes the random-access image storage of the videodisc, to be com-

How it Works: The Microcomputer



This discussion refers to a hypothetical microcomputer.

1. The main information link in a microcomputer is the central processing unit bus (**CPU BUS**). This set of wires carries two types of data: address lines specify where data is going; data lines transport the data.
2. When the computer is turned on the **Boot ROM** (read only memory) sends a simple program to the CPU. The Boot program tells the **CPU** to turn on the disk drive that contains the operating system (**OS**).
3. The OS is a program that manages the computer and its peripheral devices like a traffic cop regulates the flow of vehicles. Some microcomputers place the **OS** in the System ROM. An **OS** may also include utility programs for copying or erasing files.
4. Application programs (e.g. word processing, accounting) read in by a disk drive pass into RAM (random access memory) by direction of the **OS**.
5. The CPU processes data in units called "words". The first microcomputers used 8-bit microprocessors. A new 16-bit version hit the market in December 1982, which processes data in units of 2 8-bit bytes. A 32-bit microprocessor is also now in use.
6. When a key is pressed on the keyboard a processor in the **keyboard interface** determines the position and the code for the key stored in the **keyboard ROM.** The code is placed on the data bus and is passed by the **CPU** to the display memory.
7. Bits in the display memory are turned on or off to correspond with positions on the **CRT** display screen. The **video driver** reads these bits in the order they will appear on the screen, translates these into an on/off electronic impulse and sends them to the electron gun at the back of the **CRT display.**
8. The microcomputer communicates with peripheral devices like printers via input/output ports. Serial and parallel interface ports are required for different devices. Serial ports handle data in a single sequential stream; parallel ports can process several data streams simultaneously.

— Paul Hurly

bined over and over in different ways without repeating the same movie twice. The prototype system which is used for interactive tutorials has three components 1) hardware that supplies the imagery and the means for inputs 2) software that generates the graphics for the viewer functions, handles interactions and controls the imagery and 3) the imagery and sound and the database that represents it. The touch sensitive screen allows the viewer to interact. The system is interruptable and is always responsive to the viewer so that changes can occur at any point. The movie then is continuously interactive and is driven by "simultaneous processing" both by the system and by the viewer whose interests and needs may change as he goes along.

Backer cites several enhancements to the system which are in the planning stages: new interactive controls and alternative graphic formats, e.g., a slow forward/slow reverse function so that any motion sequence can be examined in detail in either direction; image processing techniques will divide images into identified regions that can become active buttons to access further information. This will mean that interaction will no longer be restricted to a certain "menu" but instead information will be "behind" areas of the screen with which it is associated. Videodiscs will also provide other avenues of interaction, including recognition of three dimensional gestures (via spatial tracking sensors) for viewer input and control, as well as voice recognition is specific contexts. These will free viewers from the small monitor format as well as allowing natural interaction when the viewers hands are occupied with equipment in a "hands on" situation.

As Butler (1981) points out, however, there are at present a number of limitations to the use of videodiscs. The cost of producing a master copy is very high and so an agency must be sure of high distribution volume to offset high implementation costs. The fixed videodisc is not well suited for trial and error implementation. Any design or production error that is transferred to the discmaster can turn the initial mastering investment into a total loss. Developing effective interactive video software is difficult and people who can design these materials are scarce. Interdisciplinary expertise in new technologies takes time to develop. In order to take advantage of these media we must develop new instructional design models that allow multidimensional and cluster development of materials, planning for heterogeneous audiences and multiple and continuing format selection. Another problem is that of learning to match the technological quality of commercial television which learners are used to watching. There are some hidden operational costs such as design costs and a breakeven point of 2,000 copies in production. Finally there are several other

MANITOBA TELEPHONE SYSTEM

Telidon videotex images can be received by modified TV sets, like the one above, or on video monitors with decoders.

obstacles identified by Butler as follows (although these apply to tape formats as well): the high cost of videodisc players; the high cost of replacing existing equipment; the lack of technical expertise among instructional personnel; the possible incompatibility of playback models or interfaces with other equipment.

Satellite Technology. A direct broadcasting satellite system utilizes high powered satellites to transmit television signals which can be received by a low cost "dish" receiver with an antenna one metre or less in diameter. This technology is very important to a system which is to provide equality of access to remote areas, such as is the case in Canada.

India used the ATS6 satellite from 1975 through 1976 on a national scale. Among other programming, health and hygiene discussions as well as family planning were included. Canada has developed a domestic communication satellite network, the Anik series, which could be used to support health education. It is already used, among other things, to provide medical information and services to small communities and remote areas. Most locations using the satellite have a two-way audio voice capability.

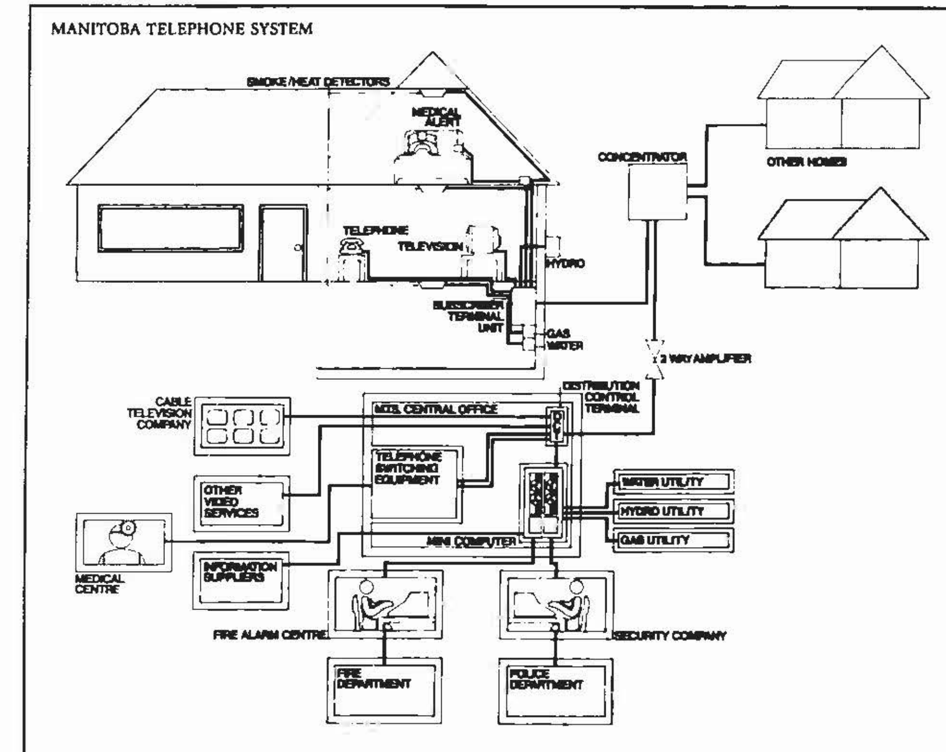
The satellites could have important applications for health education as a relay point for videotex, educational television programs, or telesoftware which could be relayed in offpeak time for storage in local terminals. Some of the constraints in utilizing satellites are the high costs of production and launch (which are decreasing with miniaturization and the space shuttle), as well as crowding of the orbits and broadcast bands. A social constraint is the problem of broadcasting to areas where local individuals and/or governments do not want a signal. Much work has to be done on standards and regulations.

Application to Health Education

What needs to be done in order to make the new technologies a positive extension of health educators? What kinds of programs can be developed that would have an impact on an individual's health? These are not easy questions to answer and several factors must be taken into consideration.

First, health education must be in-

Continued on page 26



This schematic diagram of Manitoba's Project Ida shows a wide range of services can be delivered electronically to the home.

Continued from page 7
dividualized with respect to the health education needs of the users. We must consider what kinds of things people would want or need on programs. Second, health education applications should be useful to large numbers of people. This being the case, applications would need to be developed that are based on "generic" needs, not so specialized that only a few individuals would benefit from them. Third, health education programs must be developed keeping in mind the variability of health background and experiences of the users. We must recognize that users will be of different ages, educational backgrounds, ethnic identity and health status. Fourth, health education programs should provide more than information needs, they should also be designed to include educational components that could have an impact on attitudes and behaviours.

What kinds of programs could we provide for health education? I think the possibilities are endless and there are many creative minds out there that could provide quality applications. To begin with, however, we could have numerous self-evaluation applications; e.g., computerized dietary analysis with immediate feedback to the user; life-style evaluation, with assessment of health risk factors and feedback re: impact on life expectancy; or mental health application such as life stress analysis. Other possibilities might include a first aid program which could utilize the branching capabilities of the computer to lead the user quickly through decision making to determine rationally what first aid was indicated in, for example, a case of poisoning. Similarly, there could be an important role for programs which could help the user to determine when a physician could be called for a stomach ache, fever, etc. These last two would be especially useful with home terminals. Another useful program might identify potentially hazardous or undesirable interactions of various prescribed and over-the-counter drugs and other substances.

Implications of Technological Innovation

The issues surrounding the extension of the new technologies into the educational field have been addressed by, among others, Bulger (1982), Butler (1981), Dede (1981), Forsythe (1980), and Hurly and Hlynka (1981).

Christopher Dede (1981) has postulated several effects of technological innovation on education which can be adapted to the health education field as well. A larger proportion of the society will have access to instruction. This means that the potential for impact on the health practices of our society will be tremendously improved.

There will be a high initial capital investment in development and delivery systems followed by an overall reduction in costs in the long term. These savings will be due in part from the substitution of machines for human effort. More people can be reached with a more consistent message using the new technologies — hundreds or thousands at one time as contrasted with the ten to twelve per day who can be reached by public health nurses or health educators at present. Considering the present economic recession and high interest rates, the high start-up costs may delay the utilization of the new technologies, however. The use of such media for health education would require strong political support and it would be quite difficult for politicians to justify the massive costs at a time when there are many other pressing demands.

Finally, to realize potential cost reductions, large numbers of instructional devices must be utilized and curricula will have to be centrally produced. Due to the economics of sale, specialized programs are very expensive while those which have a broad application are much cheaper. This, unfortunately would decrease local control over content.

Erkel (1979) found that unless health care plans are congruent with consumers lifestyles and needs, they will not be implemented. Taking this into consideration then, the centralization of production, while it would decrease costs, could lead to totally ineffective programs. Something produced for the Maritimes or a Toronto audience might be culturally and ethnically inappropriate for a target audience in northern Manitoba since it would depict an environment greatly divergent from that of the target audience. We must also be concerned about the appropriateness of educational level.

Considering the diversity of needs in Canada, it would seem better to have at least regional needs considered. Debbie Bulger (1982) and her colleagues in making a videotape for families of their patient population at the University of Tennessee carefully tailored the videotape to the patient population. Skin tones in the graphics were ambiguous so that white families would see a white mother and baby and black families would see a black mother and baby. Professionals and patients were of both races and all had southern accents. They found that these details made the viewers more comfortable with the information they received.

This experience illustrates the point made by Zimbardo (1977) — that the likelihood that a receiver will accept the conclusions advocated in a given message is in part a function of the receiver's perception of the source's credibility which, in turn, is in part dependent on source-receiver dependability. Similar conclusions have been made from work done by communications theorists at Yale University. Psychological factors are important in any communication but especially so when technology is used. It is most important to pay attention to the local context and provide human support systems especially in remote areas. It is essential that we balance the need for economy of scale with the needs of various cultural or regional groups.

A further consequence of the new instructional technologies will be the necessity for massive changes in both preservice and inservice training for health educators. They must be prepared to do both low-level maintenance and programming of these systems. This will mean an extensive infra-structure and educational support system. A related issue is the technological literacy of the users. More and more children will be learning about the technologies in school but what about their parents or even older siblings? It will be necessary to provide courses for them perhaps through community evening programs or some other form of continuing education.

An issue not addressed by Dede but certainly of concern is the role of the educator. One argument is that the amplication of human effort through the use of technology enables more people to be served in more places at less cost. On the other hand, there is a great concern that there is a unique quality to a human intensive activity, such as education that cannot and should not be replaced by technique or machines.

Forsythe and Hart (1980) feel that what seems to be overlooked in the argument against technological approaches is that standard classroom teaching practices probably do far more to curb individual uniqueness and learning. Their point is that resources can be used to individualize while human beings can be employed to personalize the learning experience and learning environment.

> "The role of the human interface is as a guide, catalyst, learning helper and motivator as well as expert learner. The content of knowledge will be contained in resources such as books, cmputers, videotapes, audiotapes, television and other people. Knowledge itself is as much the process or skill of acquiring it as it is the content and so any human assistance must be well versed in process as well." (15:369)

As mentioned throughout this paper, there must be skilled people, facilities for production and sufficient money available for the production of high quality software in order to make an education program successful. When introducing any innovation, it is also important to consider the attitudes and values of the target population in reference to the change. Individuals need time and assistance to adjust. In the case of this health education scenario, the problem will be to change the focus from illness to wellness, and the responsibility for wellness from the government or the medical profession to the individual or family.

Conclusions

The current economic situation together with swiftly rising health care costs are putting great pressure on the system. How do we provide for optimum health within our resource base? Another pressure is public expectations. There has been a continuing growth in public awareness in the health care fields, coming in part from the generally increasing levels of education. A public which is knowledgeable both demands and expects more. The existence of a universal medicare system contributes to these expectations in that it is assured that if one requires health care, not only is it available to all but also accessible to all. It is evident that it is more usual for the articulate middle class to take maximum advantage. A caring society may have as its goal educating less vocal groups to a better understanding and use of community

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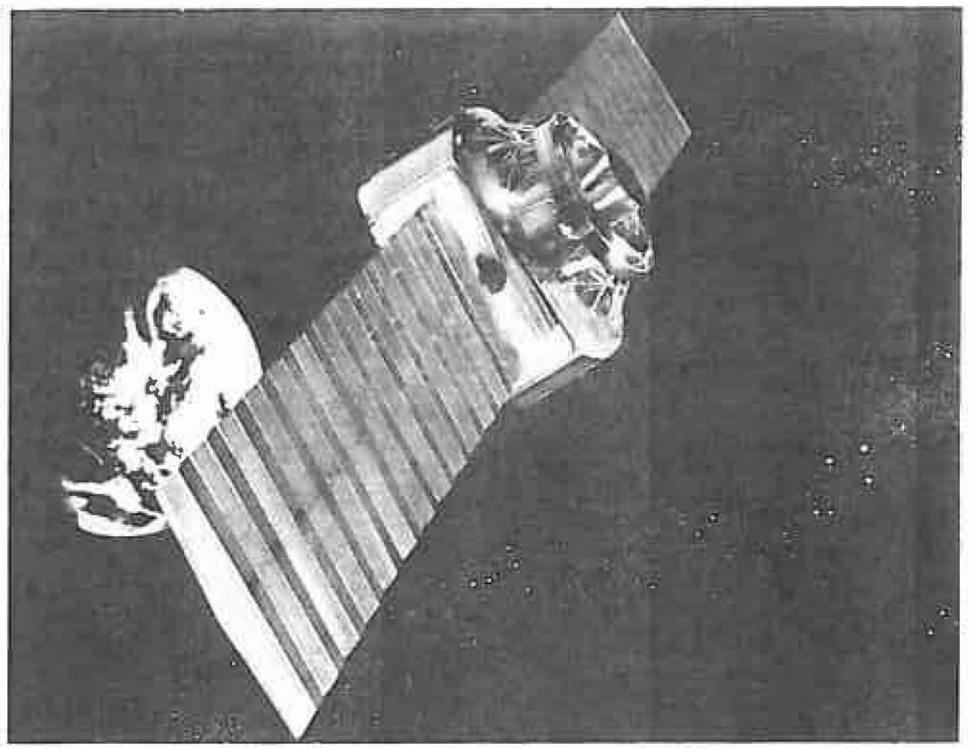
DEPARTMENT OF COMMUNICATIONS



Canada's ANIK B satellite

How it Works: Guided Wave Optics

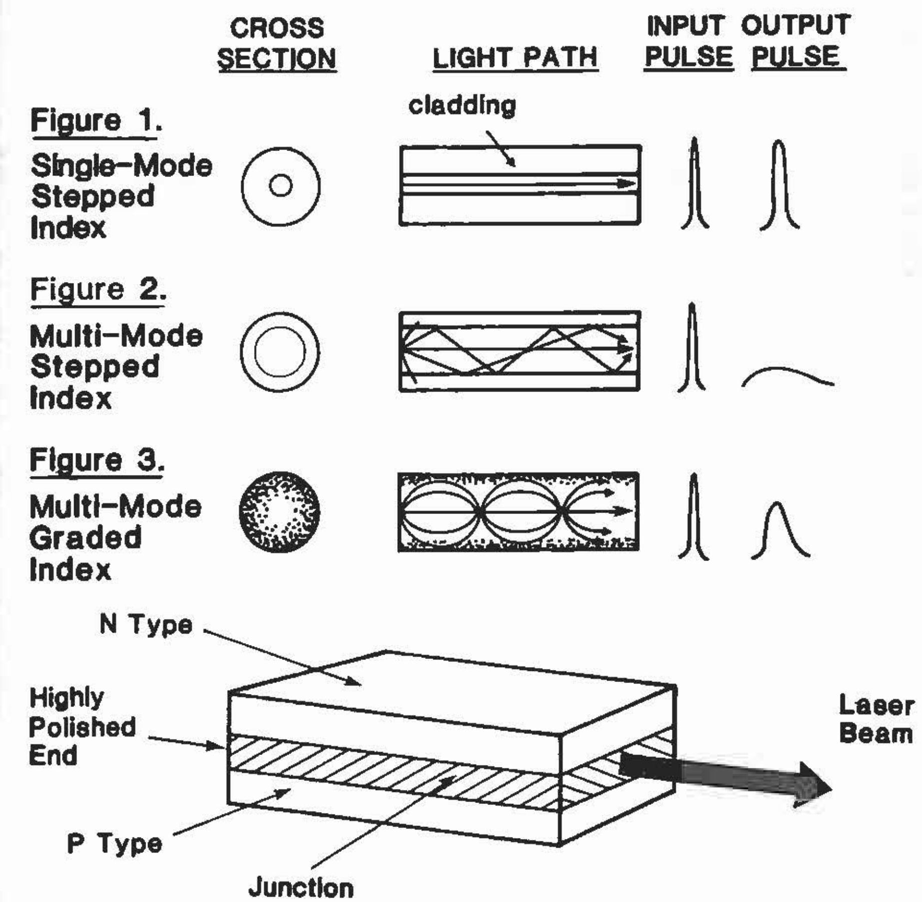


Figure 4. Semiconductor Injection Laser

DEMODULATOR

An optical fibre is a cylindrical glass core of uniform refraction surrounded by a concentric layer (the cladding) which has a lower index of refraction. Light enters one end and as it disperses along the length of the fibre it is reflected back by the cladding. The core diameter of single-(mono) mode fibres (figure 1) is 7-10 millionths of a meter (micrometers). Multi-mode graded index fibres (figure 3) are currently in use as communication lines because they are easier to join (the cores are larger than single-mode fibres) and light dispersion is not as bad as with stepped-index fibres (figure 2).

Light signals are generated in digital code by semiconductor injection lasers (figure 4). An electron moves from the negative (N-type) semiconductor material to the positive (P-type) material as an electrical current is applied. As the electron crosses the junction energy is lost which is emitted as light.

Technological advances soon will make it possible to use single-mode fibres. New installation equipment will allow technicians to align the smaller cores in the field. Newer lasers capable of generating light pulses in picoseconds (trillionths of a second) will use the greater capacity of single-mode fibres. These fibres can carry over 100,000 telephone conversations simultaneously, and television, videotex or other broadband data transmissions at 9600 bits per second.

— Paul Hurly

Continued from page 7

resources as well as continuing to provide for the others. How can this be accomplished? One possible scenario, which has been explored in this paper, is a broader application of health education, utilizing the new communication technologies to provide equality of access to resources.

If we accept this scenario as a possibility for the future, as health educators we have an important responsibility in the present. We must learn all we can about the new technologies, what they can and cannot do, and their possible impact upon our clients. We must lobby, become committee members and generally make our presence felt so that when decisions are being made, regulations and standings being set, we can influence the decision makers in ways that will allow the new technologies to be used to best advantage.

Bibliography

1. Ademuwagunz, K., "Information and Motivation in Health Education," **Health Education Journal**, 1979, Vol. 31. No. 3, pp. 58-61.
2. Backer, David, "One of a Kind Video Programs," **Instructional Innovator**, February, 1982, pp. 36-28.
3. Beck, T., "Videotape Scenes for Desensitization of Test Anxiety," **Journal of Behaviour Therapy and Experimental Psychiatry**, 1972, Vol. 3, pp. 195-197.
4. Bonham, George (ed.), **The Communication Revolution and the Education of Americans**, Council on Learning Change Magazine Press, 1980.
5. Botvin, Gilbert J., and Anna Eng, **Life Skills Training**, New York: Smithfield Press Inc., 1979.
6. Braun, Ludwig, "Computer-Aided Learning and the Microcomputer Revolution," **Programmed Learning and Educational Technology**, November, 1981.
7. Bulger, Debbie, "How to Support a Pregnant Woman in Less than 25 Minutes," **Instructional Innovator**, January, 1982, pp. 26-27.
8. Butler, David W., "5 Caveats for Videodiscs in Training," **Instructional Innovator**, February 1981, pp. 16-18.
9. Cioni, Maria, "The Telidon Trials," **Instructional Innovator**, February 1982, pp. 31-32.
10. Daynes, Rod, "Experimenting with Videodisc," **Instructional Innovator**, February 1982, pp. 24-25 and 44.
11. DeChenne, James and Robert Evans, "Simulating Medical Emergencies," **Instructional Innovator**, January 1982, p. 23.
12. Dede, Christopher, "Educational, Social and Ethical Implications of Technological Innovation," **Programmed Learning and Educational Technology**, November 1981, pp. 202-213.
13. Decker, Daniel S., "60-Second Clinics for Better Health," **Instructional Innovator**, January 1982, pp. 30-32.
14. Erkel, Elizabeth, "The Implications of Cultural Conflict for Health Care," **Health Values: Achieving High Level Wellness**, March/April 1980, pp. 51-57.
15. Forsythe, Kathleen and Roger Hart, "Learning in the Eighties: The Interface Between the Human Tutor and Educational Technology," **Proceedings of the Third Canadian Symposium on Instructional Technology**, 1980, pp. 467-474.
16. Gold, Robert S. and David F. Duncan, "Potential Uses of Micro-processors for Home Health Education," **"Health Values: Achieving High Level Wellness**, March/April, 1980, pp. 69-70.
17. Hinz, M. et al., "Resources for Patient Education," **Instructional Innovator**, January 1982, pp. 33-34 and 44.
18. Hochbaum, Godfrey (editorial), **Health Education**, January, February, 1978, o. 25.
19. Howell, Keith A., "Visions on the Future of Health Education," **Health Education**, March/April 1980, pp. 24-25.
20. Hurly, Paul, Denis Hlynka and Janet Hurly, "Videotex — An Interactive Tool for Education and Training," **Tele-conferencing and Electronic Communication**, University of Wisconsin, 1982.
21. Hurly, Paul and Denis Hlynka, Correspondence Education and Mass Media: Some Issues and Concerns, **Programmed Learning and Educational Technology**, 1982.
22. Illich, Ivan, **Medical Nemesis: The Expropriation of Health**, New York: Panthion, 1976.
23. Kearsley, G., "Videodisc and Beyond," **Proceedings of the Third Canadian Symposium on Instructional Technology**, 1980, pp. 395-402.
24. Knowles, John H., "The Responsibility of the Individual," **Daedalus**, Winter 1977, pp. 57-80.
25. Lindenmayer, Graeme, "Information and the Technologies for Handling It," **Programmed Learning and Educational Technology**, November 1981, pp. 214-222.
26. Labonte, Ronald N. and P. Susan Penfold, **Health Promotion Philosophy — From Victim-Blaming to Social Responsibility**, Ottawa: Health and Welfare, Canada, 1981.
27. Lafferty, Jerry, "A Credo for Wellness," **Health Education**, September/October 1974, pp. 10-11.
28. McCusker, J. and G. Morrow, "The Relationship of Health Locus of Control to Preventive Health Behaviours and Health Beliefs," **Patient Counselling and Health Education**, Summer-Fall 1977, pp. 146-150.
29. McKay, susan, "Wholistic Health Care: Challenge to Health Providers," **Journal of Allied Health**, August 1980, pp. 194-201.
30. Mechanic, David, **Future Issues in Health Care**, New York: The Free Press, 1979.
31. Muter, P., W.C. Treuniet and D. Phillips, "Computer Aided Learning and Videotex," **Proceedings of the Third Canadian Symposium on Instructional Technology**, 1980, pp. 319-326.
32. Needle, Richard H., "The Importance of Well-being and the Future of Health Education," **Health Education**, January/February 1978, pp. 28-30.
33. Polcyn, K.A. The Role of Communication Statellities in Education and Training: The 1990's," **Programmed Learning and Educational Technology**, November 1981, pp. 230-244.
34. Puska, Pekka, et al., "A Comprehensive Television Smoking Cessation Programme in Finland," **International Journal of Health Education**, September 1980, pp. 1-25.
35. Salk, J., "What Do We Mean by Health?" **Health Education**, January/February 1978, pp. 14-16.
36. Selim, Robert, "Health in the Future: In the Pink or in the Red?", **The Futurist**, October 1979, pp. 329-342.
37. Shane, Harold F., "The Silicon Age and Education," **Phi Delta Kappan**, January 1982, pp. 303-308.
38. Shelton, John L., **Behaviour Modification for Counselling Centers — A Guide for Program Development**, Washington: American College Association Media Publications Board, 1976.
39. Tydeman, John, "Videotex: Ushering in the Electronic Household," **The Futurist**, February 1982, pp. 54-61.
40. Watts, Norman, "A Dozen Uses for the Computer in Education," **Educational Technology**, April 1981, pp. 18-22.
41. Wylie, Donald G., and Georgette Takushi, "The Exciting Future Technology Will Bring," New **Directions for Continuing Education**, 5:1980, pp. 85-93.
42. Woolfe, Roger, "Videotex and Teletext: Similarities, Differences, and Prospects," **Programmed Learning and Educational Technology**, November 1981.
43. Zinor, Stanley D., "Turn Your Television into an Information Terminal, **Instructional Innovator**, February 1981, pp. 21-22.
44. Zimbardo, K. et al., **Influencing Attitudes and Changing Behaviour**, 2nd Ed., New York: Addison-Wesley, 1977.

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