COMMUNICATIONS AND THE PHYSICALLY HANDICAPPED

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A LITERATURE REVIEW WITH SOME POLICY IMPLICATIONS

J.R. Lucyk
Broadcasting and Social Policy Branch
Department of Communications
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1. INTRODUCTION

A review of the literature on "communications and the physically handicapped" reveals a great mass of published material on a wide range of related topics, but there appears to have been no significant attempt made to date to provide any comprehensive overview of the area or to establish the "state-of-the-art".

In a sense, this is understandable, as the handicapped do not form a single homogeneous group but rather they fall into numerous disability groups and sub-groups which are quite distinct from one another in terms of their communications problems. These different problems obviously require correspondingly different, and often tailor-made, solutions. This results in researchers' and developers' normally working in isolation from one another, with no overall sense of direction provided or co-ordination achieved.

Thus, there is a real need to stand back and to distill certain common denominators and recurring themes that apply to all handicapped persons in general, regarding their communications, irrespective of the specific nature of their handicaps, in order to facilitate the formulation of some overall policies and programs aimed at providing the handicapped the same access to the same information and entertainment which so-called "normal", or non-handicapped, persons enjoy.

This paper, therefore, attempts to identify, with "broad-brush strokes", those common denominators and themes that one discerns from a review of the literature. It does not attempt to address to any great extent the communications needs and problems of the handicapped by specific disability groups. For sources of more detailed information on specific disability groups or on specialized subjects, the reader is referred to the bibliography at the end of the paper.

Nor does the paper seek to document in great detail the "broad-brush strokes" which are presented. Specific quotations and references are sometimes provided to illustrate the author's findings. In most cases, however, the findings are articulated only slightly differently in several of the readings. The main purpose of this paper is simply to present a set of findings which, in the author's judgement, are most relevant and, indeed, indispensable - as a basis for future policy development in the area of "communications and the physically handicapped".

Finally, some concrete examples of possible future public policy initiatives in this area are presented for consideration.

2. SUMMARY

This paper begins by describing the "state-of-the-art" of research and programs in aid of the physically handicapped, generally, and the "communications" component of that picture, specifically.

What emerges is the realization that until recently the "state-of-the-art" has not been very far advanced. This has been due largely to a lack of basic data on the handicapped and a lack of any large-scale co-ordination of efforts around the world or even within individual countries - such as the United States, which is recognized as the world leader in the field. Fortunately, there is clear evidence that the "state-of-the-art" has now begun to catch up to the "space age", and great strides can be expected to be made, but with equally increasing public pressure being brought to bear by the handicapped, who are now seen as the latest "minority group".

The paper attempts to describe the handicapped according to various major disability categories and to discuss the respective communications environment and needs of these people.

The record of the mass media in its treatment of the handicapped and the media's use by the handicapped are examined. Telecommunications is considered, as a tool that offers great potential for the physically handicapped, by providing an alternative to or substitute for transportation. It is seen also that one of the main reasons why telecommunications technology holds such great potential for the handicapped is its unique ability to allow the handicapped the same access to information and entertainment as the non-handicapped enjoy, by employing only slight accommodations.

It is seen that there is an incredible plethora of communication aids and devices already in existence but that these aids and devices (as is true for telecommunications technologies, systems and services) are vastly underexploited. Serious problems, cost being the major one, currently are inhibiting their utilization on a more widespread basis.

A view of the handicapped from the perspective of politics is provided, which reveals that the handicapped are receiving much better treatment of late through legislation but that it would be a grave error to regard legislation - or communications technology, for that matter - as the sole saviours of the communications handicapped. It is seen that the roots of the problems of the handicapped are largely social, psychological and economic in nature. Psychological and social attitudes of and toward the handicapped need to be modified if the potential of "communications" is to be realized. There are clear indications, too, that the handicapped are poor and socially isolated. Communications holds inestimable potential for getting to the roots of all these problems. The failure to bring communications to bear, for example, by providing increased opportunities for social contact and vocational rehabilitation, will only leave the handicapped in an ever worsening condition of isolation and poverty.

Finally, some examples of possible future public policy initiatives in the area of "communications and the physically handicapped" are presented. Their inclusion, in what was initially intended to be only a "literature review", appears justified in view of the fact that so much of the current focus

on the handicapped has suddenly become highly political. It was therefore considered important to include in this paper some ideas which have already been exposed to the light of day in the political arena.

Much remains to be done in aid of the physically handicapped. "Communications" can play a significant role in this regard.

3. STATE-OF-THE-ART

Panel on Research Programs to Aid the Handicapped

In April of 1977, the "Panel on Research Programs to Aid the Handicapped" reported to the Committee on Science and Technology, U.S. House of Representatives. Their report indicated "a critical deficiency in completeness and extent, and the lack of overall direction" in the United States' research programs to aid handicapped individuals. For this reason, the Committee impaneled a second group of experts to examine the area. This second panel, which reported in January of 1978, concluded that the original findings were valid.

The first Panel had been charged with conducting a study of the handicapped which included "the identification of the application of existing technology and state-of-the-art in present domestic and foreign programs of research and development".

From the author's review of the literature, these reports appear to be the most up-to-date and comprehensive in the world. Considering this and the fact that the United States is generally recognized as the world leader in the field, the Panels' findings are particularly disturbing.

The Panels concluded that "... in the world of the handicapped there is no organized plan (in fact, not even a disorganized one) which considers the situation as a whole."

Briefly, among the major findings were the following: incomplete assessment of needs, with inadequate consumer input; imbalances in research emphases (between complex and simple technology solutions) and far too small an economic investment in R&D, considering the scope of potential benefits and needs. In this latter respect, it was found that in 1976, among the civilian population, all Government R&D expenditures amounted to $2.92 per disabled person.

U.S. National Research Council Committee on National Needs for the Rehabilitation of the Physically Handicapped

In 1976, the above-named Committee also reported as follows:

> Society has responded to the needs of the disabled by creating a large number of organizations. Again, exact numbers are exclusive. The Directory of Organizations Interested in the Handicapped describes 225 organizations in an admittedly incomplete list. Some focus on certain age groups and others on specific diagnoses. There is considerable overlap in functions, many gaps exist, and competition for the same handicapped population is common. Robert Scott (1969), in his study of the blind, found about 800 agencies and programs in the United States concerned with this one disability group. A similar mosaic of organizations is

found in federal agencies and programs. The Office for Handicapped Individuals has identified 103 such organizations, with the same lack of co-ordination existing.

Communications and the Physically Handicapped

The above references relate to the total spectrum of R&D and programs in aid of the handicapped; that is, they address much more than the "communications" component of the picture -- encompassing employment, transportation, vocational rehabilitation, architectural barriers, etc.

This literature review seeks to deal only with "communications and the physically handicapped". Unfortunately, an attempt to describe the "state-of-the-art" for even this more modest perspective was victimized by the same sorts of problems as exist for researchers of the larger picture.

Furthermore, despite the incredibly large amount of literature which does exist on the handicapped, there appears to be almost no recognition of the contributions made to date to the "state-of-the-art" by communication technologies, systems and services, or of their future potential. Two very notable exceptions are a study conducted by the Alternate Media Centre in New York in 1978 and the White House Conference on Handicapped Individuals, held in May, 1977.

The Canadian Perspective

Unfortunately, the "state-of-the-art" of "communications and the physically handicapped" in Canada is no more advanced or coherent. The Bureau on Rehabilitation of the Department of National Health and Welfare points out, in a "Briefing Note on Rehabilitation Engineering in Canada", that with respect to research there is a need for better co-ordination at the Federal level. The Note states, "There are at least three Departments or Councils funding research in this area (the Medical Research Council, National Health and Welfare and the National Research Council) and no one setting priorities, identifying knowledge gaps or recommending research initiatives."

Thus, ironically, this literature review attempts, in a very modest and highly subjective way, to advance the "state-of-the-art".

A Brighter Future in the U.S.

While the above presents a somewhat gloomy picture to date, there is good reason to be highly optimistic about the future.

A rather interesting observation is made by a British researcher, from the Centre for Medical Research, who visited the United States only this past January. In her report, she comments as follows:

> In summary then the Americans seem to have moved almost overnight from a position where the handicapped were very much 'second class citizens' to a high level of awareness and at least a government acceptance of the needs of the handicapped. In comparison, the British attitudes seem to be much more middle-of-the-road with slower progress from a more advanced base.

This observation is substantiated by the fact that only this past November President Carter signed into law the "Comprehensive Rehabilitation Services Amendments of 1978", making significant changes in the Rehabilitation Act of 1973. Highlights included: (a) targeting of special programs to the needs of persons with developmental disabilities, the deaf, the blind and handicapped American Indians; (b) the establishment of a "National Institute of Handicapped Research" - to provide an expanded, comprehensive and co-ordinated approach to research as it relates to disability -, a national council on the handicapped, an inter-agency committee on handicapped research and an inter-agency co-ordinating council on affirmative action and non-discrimination; and (c) the authorization of numerous special projects and studies.

The Future in Canada

In Canada, the Bureau on Rehabilitation was recently formed within the Social Services Programs Branch of the Department of National Health and Welfare.

The Bureau is co-ordinating Federal Government input to the upcoming XIV World Congress on Rehabilitation (which will be held in Winnipeg in 1980) and the establishment of the Federal Government position for International Year of Disabled Persons (which has been designated by the United Nations for 1981). The Department of Communications is co-operating with the Bureau in providing information on "communications and the physically handicapped".

4. MAJOR CATEGORIES OF DISABILITY

Various Classification Systems and Overlaps

In the literature one finds various classification systems applied in identifying the handicapped according to disability groups. In the final analysis it appears that, whatever classification system is used, all headings are somewhat arbitrary, as the degree of impairment even within any one given disability group usually varies so widely as to require radically different treatment approaches and technologies. Furthermore, often a handicapped individual has more than one disability. For example, one estimate is that one third of all deaf persons have disabilities in addition to their hearing impairment.

Nevertheless, it is useful to attempt to designate certain major categories, regardless of how arbitrary this may be, in order to provide certain focusses for research and development programs and in order to ensure that some balance is achieved in the treatment among all the handicapped.

The categorization presented here is as follows: the visually-impaired; the hearing-impaired; the speech-impaired and the manipulation- and locomotion- impaired. A fifth category, which is a combination of one or more of the first four, is worthy of separate establishment; namely, the multiply-handicapped. These persons are deserving of a special focus all their own because of the severity of their problems, which is the direct result of the multiple factor.

The Visually-Impaired

This term encompasses persons with all degrees of impairment up to and including total blindness. It sometimes even includes those who are known as "print-handicapped"; that is, those who cannot access a printed page because of some other physical problem (e.g., stroke victims), although their eyesight may be adequate to otherwise enable them to read.

Figures from the U.S. National Center for Health Statistics released in 1971 revealed that the visually-impaired (of all degrees of disability) numbered 9,596,000, with 495,000 of those having impairment sufficient to limit their activities.

Technology has responded in many useful ways already for both the totally blind and those with low vision. One such example is the Optacon, which came off the production line in 1971.

To read with the Optacon a blind person moves a miniature camera along a line of print with one hand. Signals from the camera are converted into a pattern of vibrating reeds on a tactile screen, which the person "reads" with a finger of his other hand.

Other efforts, for the benefit of those who cannot use Braille, have focussed on machines which, through computer technology, turn print into speech. Computerized speech at a rate of 200 words per minute has been achieved. However, such machines are not yet perfected.

For the partially sighted, various systems and devices exist. Closed-circuit television systems are used to make ordinary print legible to persons who could only otherwise read enlarged print on paper. New electronic devices include Braille and talking electronic calculators, and compressed speech machines that allow for listening speeds up to two and a half times greater than normal speech production without change in voice pitch.

Another intriguing development is research currently being conducted in San Francisco on "talking signs", whereby signs in buildings or in the streets produce an audio taped signal that is modulated into an infrared FM signal which is heard only by a person carrying a special receiver.

For the future, the most fascinating possibility of all is the direct electrical stimulation of the brain. Experiments to date have conclusively established that even when eyesight has been lost the brain's potential for vision remains intact.

The Hearing-Impaired

This term encompasses the entire range of hearing-impaired persons; that is, the hard of hearing to the profoundly deaf.

Figures from the U.S. National Center for Health Statistics released in 1971 revealed that there were 14,491,000 persons in the U.S. suffering from some degree of hearing impairment, with 573,000 of those limited in their activity.

Historically, both in the United States and in Canada, the needs of the hearing-impaired have been seriously neglected by governments and society at large. This situation has quite rapidly changed over the past few years, with the hearing-impaired, particularly in the U.S., having formed a highly effective lobbying group which has already achieved considerable response from government.

In May, 1978, the United States Federal Communications Commission (FCC) established an inquiry into "the matter of telecommunications services for the deaf and hearing-impaired". The Notice of Inquiry invited comments on "the need for new services, standards, and research and development". In addition, the inquiry seeks to determine "the success of current and feasibility of new services". The FCC has not yet released its findings.

In the meantime, great strides are being made in the U.S. in one particular service area for the deaf; namely, the provision of what is called "closed captioning" of television programming. Essentially, closed captioning is a system whereby the hearing-impaired can "hear" by reading written captions which appear on the television screen, through the use of a technology that utilizes one of the television lines (line 21) which is normally not seen. Through the use of a special decoder, the hearing-impaired can see the captions which are not seen by (or "closed" to) others watching the same program on their sets.

A National Captioning Institute has been recently established which will caption programs on behalf of public television, ABC and NBC. It is expected that by the end of 1980 some 20-25 hours of captioned programs will be available weekly. The U.S. Department of Health, Education and Welfare is supporting the Institute's start up costs to the tune of more than $6,000,000 through 1982. This gives some indication of the degree of public commitment to meeting the television needs of the deaf.

The Canadian Radio-television and Telecommunications Commission in Canada, in its recent renewal of the Canadian Broadcasting Corporation's licence, for the first time formally acknowledged the public broadcaster's responsibility to respond to the needs of the deaf and urged action as funds become available.

Apart from television, currently the primary means of electronic communications available to a deaf individual is the TTY system. This abbreviation has traditionally stood for "teletypewriter". The TTY system operates on a dial-up basis over the public switched network. It is estimated that there are 15,000 - 20,000 TTY terminals currently in use internationally.

The inherent limitations of the traditional TTY system, however, render it less than optimal, as the terminal equipment used is incompatible with standard computer equipment and, secondly, the system makes very inefficient use of the telephone network.

The recently designed Visual Ear, the research funding of which was provided by the Canadian Federal Government, overcomes the first problem and has the potential to overcome the second. Production and marketing of the Visual Ear is being handled under contract with Northern Telecom and the first units will appear on the market within a few months.

An innovative communications tool called RTTY, or Radio-Teletype (a logical outgrowth of the TTY system), has been providing a general news service to almost 1,000 deaf persons in Philadelphia, Pennsylvania since 1976.

Nicknamed "captioned radio", RTTY is word information that is typed out on a special, modified teleprinter located in a studio. Events of interest to deaf persons are described on these machines, using a specially coded, punched tape. The completed tapes are fed through a device that changes the punched holes in the tape to audible tones. These signals are transmitted by telephone lines to a nearby radio studio, where they are mixed with a high frequency subcarrier capable of reaching an area within a 30-to 50-mile radius. By turning on a specially tuned home-radio receiver located near the teletype machine, the listener's TTY will respond to the signals it receives, accurately reproducing in words the messages prepared in a studio many miles away.

The Speech-Impaired

The term speech impairment is employed in a broad sense to cover all types of language, speech and voice disorders; i.e., communicative impairments where a technical aid might conceivably solve the problem or at least reduce the effect of the handicap.

Due to the fact that the speech-impaired have considerably different needs, depending upon the exact nature of their impairment, the number of persons in each sub-group in need of a certain type of technical aid is relatively small. This causes considerable economy-of-scale problems for producing and marketing possible products within any given country.

The Swedish Institute for the Handicapped, in collaboration with the International Commission on Technical Aids, Housing and Transportation (ICTA), one of the standing commissions of Rehabilitation International, therefore initiated a project in 1975 on technical aids for the speech-impaired.

Among the aims of the programs was to obtain and distribute information on research and development activities in various parts of the world and to provide information about technical aids. By promoting contracts between research workers in different countries, it was hoped that co-operation between nations would increase and that, as a consequence, the possibilities for production and marketing of well needed, reasonably priced, technical aids for the speech-impaired would be enhanced.

The project focussed on personal communication aids which are of two types:

(a) aids to facilitate communication via a person's own speech function; such as, artificial larynxes and speech amplifiers, and

(b) aids which replace a person's own speech function; such as, symbol charts, writing appliances and aids involving synthethic speech.

The importance of ICTA's work in this area cannot be exaggerated. As a result of their efforts, they have produced a literature review that comprises about 1,000 reference items on technical aids for the speech-impaired.

A good deal of work with the speech-impaired has taken place in the United States and in Canada, which will be discussed later in this paper under the more appropriate heading of "the multiply-handicapped".

The Manipulation- and Locomotion-Impaired

This category is an extremely broad one which includes all the numerous disabilities that limit a person's capacity to manipulate or move in his environment; these disabilities may be grouped into three sub-categories: deformities (including amputation), paralysis and skeletal joint destruction.

The classification is not an entirely satisfactory one for policy purposes, simply because it is so broad and heterogenous. Furthermore, this very heterogeneity accounts for the absence of any readily available prevalence statistics. This classification is somewhat useful, nevertheless, because it does serve to focus attention on certain important common denominators: the need for a wide range,of and highly individualized, interfaces to enable such persons to control their environment as much as possible, and the need for society in general to be aware of and to remove those transportation and architectural barriers which prevent a significant percentage of the handicapped population from participating in the mainstream of social life.

While a great deal of attention is given in the literature to this category of the physically handicapped, most of it does not relate to "communications". This is not too surprising when one realizes that, of the five physical senses employed by human beings for receiving information about their environment (i.e., communication-in), only two of the senses (sight and hearing) provide almost all this information.

In recent years, however, many communications experts have been examining the potential of communications as a substitute for or alternative to transportation for even the able-bodied. Rising energy costs and a host of other factors in a period of economic restraint are causing policy planners to explore this heretofore largely untapped potential, through computer conferencing, electronic mail, etc.

As long ago as 1973, it was estimated (O'Neill) that more than 50% of the substance of social services is information exchange of one sort or another and that this can be accomplished by telecommunications. Thus, how much greater a potential and incentive ought there to be for the manipulation- and locomotion-handicapped to exploit telecommunications technology to the fullest.

The Multiply-Handicapped

This category, as the foregoing ones, is highly arbitrarily defined and even more heterogenous. Nevertheless, this classification system is useful for the reason that it focusses on those handicapped persons who are usually very severely disadvantaged in their communications by comparison to all other persons, including those who have only a single, though severe, physical handicap.

Theoretically, a person who is multiply-handicapped could have a combination of impairment to any two or more of his sensory or motor capacities. In practice, however, the following instances appear to be most common: those who are deaf and blind; those whose speech and hearing is impaired; those who are non-vocal and severely physically handicapped (such as the cerebral palsied).

A. The Deaf-Blind

Persons can go blind first and deaf second, or vice-versa. Either sequence presents its own unique problems. Whichever way, however, the onset of the second loss is a major psychological trauma, because the residual sense upon which one leaned heavily has gone as well. Deprived of two senses, there is still another loss to endure - that of easy communication. Thus, deaf-blindness leads to isolation, which is worse than either deafness or blindness alone.

The causes of deaf-blindness in an adult are as varied as the causes of blindness and the causes of deafness. There are numerous kinds of congenital deafness. It is estimated that three to four per cent of deaf children have retinitis pigmentosa. Thus, this number will have deteriorating vision often resulting in blindness. In 1977, there were 183 persons in Ontario alone who were registered with the Canadian National Institute for the Blind as deaf-blind.

B. The Hearing- and Speech-Impaired

Persons who have originally had their hearing and lost it in later life generally do not have any serious difficulties keeping their speech intact. Those who have been deaf from birth or who went deaf at a very early age have difficulties in acquiring normal sounding speech, as so much of one's ability to articulate intelligible speech is based on learning from the feedback provided through the ear.

Some work on speech analysis to help deaf children is taking place at the City University Graduate Center in New York. Information is analyzed by a computer to see how the deaf child's speech differs from normal. The computer then synthesizes speech so that its output sounds like the child's. The characteristics of the synthetic speech can be modified until it is more understandable. Computer interaction is also being used at this Center to help children improve the syntax of their speech, again a particular problem for deaf children.

Extensive work on electronic analysis of speech has been done at Queen's University in Kingston and recorded in the March, 1979 issue of the Journal of the Acoustic Society of America.

C. The Non-Vocal, Severely Physically Handicapped

Severely disabled persons having a combination of both verbal and motor impairments find communication extremely difficult, if not impossible. One alternative which is having widespread application with a growing number of disability groups is Blissymbolics, a graphic, meaning-based communication system.

In 1971, at the Ontario Crippled Children's Treatment Centre, Toronto, Blissymbols were first used as an augmentative communication medium with a small group of cerebral palsied children who lacked the motor co-ordination to produce functional speech. In the following few years, Blissymbol usage has spread throughout the world to countries including the United States, Great Britain, Sweden, Norway, The Netherlands, Australia, New Zealand, France and Israel. The disability groups for which Blissymbols have been utilized include the retarded, the autistic, the aphasic and stroke patients. Blissymbols, because of their simple shapes and direct reference to meaning, are learned easily and quickly by all, including children in their critical early cognitive and language development period prior to the "reading readiness" stage, after which they will eventually communicate by using the traditional alphabet.

Parallel with the spread of Blissymbolics, has been the growing contribution made to its usage by technological aids, which at first consisted of simple display boards. A need remained for a more sophisticated device which could store at least 512 symbols and provide quick access, and accommodate different degrees of disability by permitting the use of a variety of "interfaces", such as pushbuttons, joysticks, "puff and sip" switches, etc.

Most recently, work has continued at the National Research Council (NRC) on the use of an existing home television set as the display unit of a Blissymbol Terminal. The Blissymbol Terminal is the result of collaborative efforts that have occurred among the Communications Research Centre of DOC; Norpak Limited, Pakenham, Ontario; the Blissymbolics Communications Institute, Toronto; and the NRC.

Another excellent resource centre that has done considerable work, in a co-ordinating capacity, in the area of non-vocal communication, is the Trace Research and Development Center for the Severely Communicatively Handicapped, University of Wisconsin - Madison. The Center has produced, and keeps up-to-date, a comprehensive Resource Book that provides invaluable information, which includes an illustrated digest of non-vocal communication and writing aids and an extensive bibliography on techniques and aids.

5. THE MASS MEDIA

Shirley Cohen, quoting from "Television and the Disabled: Mr. Rogers Shows How", had this to say on the subject of the disabled and the media:

> The problem is not that in its 25 year history television has portrayed the disabled child or adult cruelly, mockingly or insensitively. The problem is that it has not portrayed them.

She went on to say that that statement which was true in 1973 is fortunately less true today.

Public Television in the United States

In 1971, a letter was sent from the editors of "The Exceptional Parent", a magazine devoted to helping parents of the disabled, to the producers of "Sesame Street", urging the inclusion of a child with a noticeable disability as a resident of Sesame Street.

Meetings were held and changes made. Children with cerebral palsy were occasionally included on the program. In the 1975-76 season, a special segment designed for mentally retarded children was shown and mentally retarded children were featured in these shows along with the Muppets and other Sesame Street characters.

Mr. Rogers' Neighbourhood had long been a friend of the disabled. In 1972, Fred Rogers embarked on a series of projects with the disabled in mind. In a series of five programs the characters in Mister Rogers' Neighbourhood gradually learned to appreciate individual differences. These programs featured persons with disabilities in major roles.

Elsewhere in public broadcasting, progress was being made. "Zoom", an educational television program addressing the 7-11 year old age group, adopted a conscious policy of including disabled children in its guest segments. Featured in different segments were a deaf boy, a blind boy and a child with heart damage.

Action for Children's Television (ACT), in its Annual Symposium in 1974, had as one of its themes "Programming for the Handicapped". Subsequently, ACT produced a resource handbook on programming and handicapped children. The handbook was designed as a tool for broadcasters, intended to enhance the mutual understanding of handicapped and non-handicapped children.

Commercial Television in the United States

Cohen found that, whereas there has been lots of action in public television for children, the record of commercial television has not been as good.

She did find, however, that adult programming on commercial television in which disability is included is increasing. In the 1970's, a "Marcus Welby" episode dealt with the prejudice against people with

epilepsy. "Lucas Tanner" explored reactions to stuttering. Excellent documentaries began to appear with increasing frequency. Even a prime time spot announcement appeared in 1976, featuring a young man with cerebral palsy.

Mass Media Habits of the Handicapped

Dr. Paul Licker, who conducted a study for the Department of Communications, documented the mass media habits of handicapped respondents in Montreal and Ottawa. Among his findings were the fact that respondents generally had access to radio and television, but a sizeable proportion did not have access on a regular basis to the print media. Only 3% and 4% of the respondents could not access television or radio respectively, while 37% did not read a newspaper regularly; 50% did not subscribe to a magazine and 43% did not begin even one book a month.

Licker found also that television and radio consumption was quite heavy among the handicapped, with their viewing 3.5 hours of television and 3.7 hours of radio per day. Unfortunately, most of this consumption, Licker concluded, is not beneficial to the handicapped, as it serves to reinforce an already strong communication tendency of theirs; that is, of their being in a passive, receiver-only role. Licker believes that, since society casts the handicapped in a receiver role generally, the mass media, because of its heavy reinforcement of this phenomenon, cannot be regarded as serving the handicapped well.

Cable Television in Canada

Some good efforts have been made to date to meet the needs of the handicapped through companies such as Canadian Cablesystems Limited (CCL), which serves over 640,000 subscribers. For example, several of the Company's systems have made specific commitments to television programming for people with hearing difficulties, including the use of sign language and captioning. Metro Cable TV co-operates with the Canadian Hearing Society on "Quiet 30", a program produced by the deaf, for the deaf. CCL has also recently funded a research agency in Kitchener, known as the Deaf Television Resource Centre. Interpreted (i.e. "sign language") news for the hearing-impaired is presented on cable stations in Ottawa, Edmonton and Vancouver.

Radio Reading Services for the Blind and Print-Handicapped

A special radio information service exists in the United States and also in Canada for the blind and otherwise print-handicapped (e.g., stroke victims who cannot turn pages). These services consist of FM broadcasts of a wide range of programming, such as interviews, special news for the handicapped and phone-in shows, as well as the reading of newspapers, magazines and books.

The service is unique in that it is broadcast "piggy-back" on the main FM signal of a radio station and then decoded and heard only by those having a special receiver or adapter to their regular FM set.

The first such service went on the air in Minnesota in 1969. To day, there are over 80 such services in the U.S., offered in at least 28 states. Recently, Canada's first such service began in Burlington, Ontario,

over station CING-FM, in conjunction with the Oakville Public Library. The Department of Communications had urged the provision of such a service and was instrumental in paving the policy route for this inaugural service. Some problems (e.g., copyright) remain to be solved, however, which currently are inhibiting the spread of such services more widely.

6. TELECOMMUNICATIONS - CONCEPT, POTENTIAL AND SOME TECHNOLOGIES

Definition

Park and Pawlowski, in their book entitled "Planning the Use of Telecommunication in Vocational Rehabilitation", provide an excellent definition of "telecommunication" which is quite useful in the context of "communications and the physically handicapped".

They regard telecommunication as interpersonal communication by means of an electric or electronic system, transmitted over wires or fibre optic filaments or through the air via electromagnetic waves or beams of light. The stress is on interpersonal communication at a distance.

Telecommunication is thus taken to mean an interactive, two-way exchange using sounds, pictures, alphanumeric symbols, or combinations thereof. The technologies may be telephone, television, radio, electronic keyboards, facsimile, electronic blackboard or holograph. With the exception of transactions conducted via electronic keyboards which are linked with computer memory, these telecommunications are "live".

Thus, one-way signals emanating from broadcast television and radio stations are not considered by Park and Pawlowski in their treatment of telecommunication. They regard such signals as broadcasting, to be included in the concept of "mass communication", along with newspapers and periodicals.

Furthermore, they regard the outputs of videotape, video-cassette, audio tape devices and other recording and reproducing equipment, as audio visual equipment - which may be used to supplement a telecommunication system.

What is special about telecommunications as it relates to the handicapped are the modifications to accommodate the physical disabilities of the users. But the systems of telecommunications in which such accommodation may be imbedded are no different from any other system. These systems are to be used by both the handicapped and non-handicapped, in a manner that makes no distinction among the communications of the people using them. For example, the blind can use the telephone equally well as the sighted, and the locomotion-impaired can use electronic keyboards equally well as the not so-impaired.

Potential for Rehabilitation

Larger numbers of handicapped people are demanding more vocational rehabilitation services at a time when available funds and professional personnel are in short supply. The use of telecommunications can play a major role in vocational rehabilitation, by providing an alternative to transportation, thereby enabling the handicapped to be gainfully employed at home.

In an application of interactive television (IATV), eight severely disabled people in Peoria, Illinois, took part in an experiment to provide, through an IATV system transmitted on cable television, instruction in insurance claims adjustment and in the skills required for independent living.

A program to train severely handicapped persons for work in the computer industry was recently initiated at the Woodrow Wilson Rehabilitation Center, in Fisherville, Virginia. This program will train homebound computer programmers and computer terminal operators.

Another example of communications (although not "telecommunications", in the strict sense of the word) used in a rehabilitation setting is the development of prototype equipment to interface a blind telephone operator to a Traffic Service Position System (TSPS) console. A system has been successfully tested and, as a result, two blind persons have already been placed within the Pacific Telephone System. This latter example is, of course, an instance of the handicapped being brought to the job rather than the job to the handicapped in the home.

With regard to applications, such as the first two examples presented above, which involve carrying out rehabilitation services in the homes of the disabled, it may surprise some to learn that many rehabilitation professionals have deep concern at the psychological damage which they believe may be done by such approaches.

Charles Overly and others (1978), however, are equally disturbed by this attitude by these professionals. Overly states:

> No one can disagree with the importance of enabling human beings, whether able or disabled, to have opportunities for social interaction. But, there is a tradeoff function to be considered here. One could ask under present circumstances, how effective are present rehabilitation practices and policies in creating a meaningful and healthy social involvement for the severely disabled? One could also ask whether or not some psychological benefit might not derive from a sense of participation in gainful employment in an information job - a job in which the handicapped at least had electronic communications with others. One could argue that, given a job (in a society which still tends to value persons in terms of their work), the homebound handicapped might gain sufficient psychological strength (and some economic wherewithal) to find ways to achieve more live human contact than would be the case without a job.

Some Technologies

Some telecommunication technologies which have excellent potential for the handicapped are listed and described by Park and Pawlowski (1978), and are presented here in an edited form as follows:

> Telephone is well-known in its person-to-person mode, and even to some extent in its conference mode, where a group of people can converse together from a number of locations. Recently, however, there have been significant innovations in both technologies and systems which enable very large numbers of participants to hear each other with great clarity, and which incorporate simultaneously-used visual materials.

Interactive television enables all participants to see each other in full motion and to speak synchronously; this is "live" television interaction. The television pictures are transmitted via microwave systems, coaxial cables, newer technologies such as lasers and fibre optics, and - for very long distances - satellites.

Video one-way/audio two-way enables all participants to talk together and to hear each other all the time, but the pictures are all from one source. Some medical applications of telecommunications use this mode; the patient is the subject of the video, but patient, physician and others can converse at will. In some educational applications, the teacher (and whatever students are with her or him) is seen by all, but numbers of students at several locations can speak to the teacher and to each other.

Still video/audio two-way is similar to video one-way/audio two-way except that the pictures are motionless (stills); pictures may be transmitted in both directions or one direction depending on the needs of participants, and the mode is much cheaper to operate because pictures (produced by slow-scan television, frame-grabbers, or facsimile devices) can be transmitted on ordinary telephone lines.

Interactive radio, whether transmitted on citizens' band (CB), amateur bands or FM sidebands, is similar to telephone conferencing in that all participants can hear each other, but different in the organization of the transmission facilities. Organization of interactive radio transactions is different from telephone conferencing in that only one speaker (or other sound source) occupies the frequency at a time.

Computer-assisted instruction (CAI) enables learners at keyboard terminal devices to interact directly with lessons and games programmed through a computer. Recently, homebound students in Amherst, NY, a suburb of Buffalo, have been able to have CAI in their own homes (and some institutions, as well) because lessons are transmitted on the local cable system in response to signals sent from the home terminals on telephone lines to the computer. A similar system is being developed at Albertson, N.Y.

Transmitting/receiving keyboards (conference mode) are linked through a computer program so as to enable all participants in the conference wherever they are situated in the world to come into and out of the conference at will. One simply calls the telephone number of the computer network, couples the keyboard terminal through the telephone lines, provides proper identification, and can then ask for messages, review the statements made in the conference over any length of time, input messages for all conferees or specific ones, determine if any other conferee is "on line", and hold a "dialogue" in ordinary language with that person.

Transmitting/receiving keyboards (access mode) are linked to computer programs which give access to files such as client records; one can review such records and also add to them from remote locations.

One can also use keyboards to enter data in research files and to use computer-programmed mathematical and statistical procedures. Keyboard terminals can receive information either as hard copy (typed) or on a cathode-ray tube or television picture tube.

Computer-Assisted Learning and the Physically Handicapped in Canada

In May of 1974, a computer-assisted learning project began in a Winnipeg elementary school, involving 55 children ranging in ages 5 to 13 in grades 1 to 6. In the past several years, there has been some research in Canada using computers as an instructional and diagnostic tool for the handicapped - at the Vocational Rehabilitation Research Institute of Calgary, at the National Research Council and at Carleton University. Computers are also being used with children at the Ottawa Crippled Children's Treatment Centre. What makes the Winnipeg project unique, however, is that Winnipeg is the only place in Canada where classrooms of the handicapped are located within the regular school system.

7. COMMUNICATION AIDS AND DEVICES

Primary Information Sources

Any attempt to catalogue here the existing communication aids and devices for the handicapped would be a hopeless task. Even professionals feel that there is a critical need for more documentation, better co-ordination and dissemination of information on existing aids, devices and techniques.

The Bureau of Medical Devices in the United States has identified to date 1,200 categories of devices. Obviously, not all categories would relate to communications. Nevertheless, one can infer the problems of trying to identify and catalogue what surely must be thousands upon thousands of aids and devices.

What will be presented here is a listing of some primary information sources, including brief descriptions about them, to which the reader might wish to refer directly. Undoubtedly, even such a list of information sources will be incomplete, but it should provide a good starting point.

Canada

- The Medical Engineering Section of the National Research Council of Canada

  The Section conceived and organized a "Workshop on Communication Aids for the Non-Verbal Physically Handicapped", which was held in Ottawa in June, 1977.

- The Technical Aids Committee of the Canadian Rehabilitation Council for the Disabled (CRCD)

- The Canadian National Institute for the Blind, Ontario Division

  The Ontario Division has released "A Study for the Purpose of Developing Services for Deaf-Blind Persons in Ontario". The study contains a listing of aids and devices for deaf-blind persons.

Europe

- "Equipment for the Disabled", Mary Marlborough Lodge, Nuffield Orthopedic Centre

  "Equipment for the Disabled" presents information to professionals involved in advising and selecting equipment for handicapped persons of all ages. The series of booklets contain a separate one devoted to "Communication". Information is provided on call bells; alarm systems; intercom systems; remote control mechanisms and systems; telephones and telephone aids; radio and television; taped, filmed or large-print books; normal or mouth page turners; and much more.

- The Information Service for the Disabled of the Disabled Living Foundation, London, England

  Bi-monthly lists covering a wide range of equipment are available.

- The Swedish Institute for the Handicapped

  The Institute has published at least two separate documents on "Technical Aids for the Speech-Impaired".

United States

- The Trace Research and Development Center for the Severely Communicatively Handicapped, University of Wisconsin - Madison

  The Center publishes, and keeps up-to-date, an excellent "Non-Vocal Communication Resource Book", which includes an illustrated digest and master chart of such aids and a comprehensive bibliography on non-vocal communication techniques and aids.

Recurring Themes

Cost and Cost/Benefit

Cost of communication aids is considered to be the largest single barrier to their widespread application.

In one list reviewed of 67 commercial aids for the non-vocal, severely handicapped, 16 items cost under $500; 16 cost between $500 and $1,000; 14 were between $1,000 and $1,500; and 1 was between $5,000 and $10,000.

In evaluating the cost of existing aids, it is important to consider the cost/benefit tradeoff between providing a child with an expensive aid or placing him in an institution for special education.

It has been estimated that in the United States institutional care presently costs $18,000 per person per year. Viewed in this way, one could well argue that it pays to rehabilitate people, regardless of the expense of aids and devices.

Most succinctly and aptly perhaps, on the subject of cost/benefit and vocational rehabilitation, a "Comprehensive Needs Study of Individuals with the Most Severe Handicaps", conducted in 1975 by the Urban Institute in Washington, had this to say:

> The limitations of the benefit/cost calculations have not generally been recognized by advocates and critics of the Vocational Rehabilitation program. If Congress and the Department of Health, Education, and Welfare want to use benefit/cost analyses as important inputs to setting appropriations priorities, then additional data necessary to

develop accurate benefit/cost estimates must be collected. Alternatively, if Congress desires to set priorities on the basis of other considerations besides economic efficiency (i.e., if Congress desires to place higher priority on the severely handicapped because of their greater need for services), then more comprehensive data are not as vital.

Under-exploitation

A common misconception is that the problems of the handicapped cannot be met until more sophisticated aids or technologies are developed. Dr. Licker of St. Paul University found, and others invariably would agree, that much greater benefit could be derived by a fuller exploitation of existing aids and technologies. One of Licker's findings was that the handicapped whom he studied averaged only one telephone call placed and one received each day.

Balance

Some experts feel that the potential of simple aids is often overlooked by researchers who are tempted to pursue sophisticated approaches where simple ones may suffice.

A second danger of this type lies in concentrating upon aids that are either extremely simple or extremely sophisticated. The middle range should not be neglected.

A British researcher (Stocking, 1979), who visited the United States, wondered whether the severely handicapped there are receiving too much attention, to the neglect of those larger numbers of people who are suffering with disabilities of lesser degrees.

Consumer Input

The disabled need to be involved in assessing their own needs and to ensure the new devices will be suitable for their use.

Two factors are important to acceptance by the handicapped of aids and devices: the extent to which such are cosmetically attractive, so as not to discourage their use; and the success with which the new aid or device extends the person's sense of body image, so that he feels integrated in space with his aid or device, much the way a non-handicapped person feels while driving his automobile, having a clearly defined sense of extended space under his easy control.

These two factors of cosmesis and extended body image cannot be truly evaluated by the professional alone. Consumer input (i.e., from the handicapped person for whom it is intended) is critical in the R&D phase.

Other Design Criteria

In addition to the foregoing criteria, others are important. They include portability, simplicity of operation, reliability and adaptability, applicability (over a wide range of ages and educational backgrounds), versatility, speed of communication, feedback provision, correctability, provision for hard copy, ease of maintenance and serviceability.

8. CURRENT RESEARCH ACTIVITIES/RESOURCE CENTRES

As indicated earlier, there is no dearth of communications research activity going on in the world on behalf of the handicapped. The problem is, however, that it is fragmented, unco-ordinated and lacking in overall direction.

In this section, a list (with brief descriptions) is provided of those current research activities and resource centres which were uncovered during the literature review process. It is by no means an exhaustive list. It is hoped that this list will serve as a useful starting point to those who may be interested in pursuing their own personal research interests and at the same time provide a general picture of what is taking place and where, however incomplete this picture may be.

Canada

Federal Involvement

Department of Communications

The Department of Communications has co-funded research and development on the Visual Ear, a device which enables the speech- and hearing-impaired to use the telephone; been active in policy development in radio reading services for the blind and print-handicapped; sponsored research at St. Paul University, Ottawa; and in the future will remain active in social policy formulation to promote access by the handicapped to the same information and entertainment as the non-handicapped.

The Department of National Health and Welfare (NH&W)

National Health and Welfare provides research funds in this general area through the Health Research and Evaluation and National Welfare Grants. The Department has also participated in some research projects through the Vocational Rehabilitation Disabled Persons Research fund. Also, there is a number of reference documents available in the Social Services Resource Centre. The Resource Centre contains documents which have not been published or which are out of print, with special emphasis on the social services aspects of rehabilitation. In addition, a Bureau on Rehabilitation in the Social Service Programs Branch has been established to coordinate the Federal Government input to both the XIVth World Congress of Rehabilitation International to be held in Winnipeg in June, 1980 and the International Year of Disabled Persons in 1981.

The National Research Council (NRC)

The NRC has been active in bioengineering research and development for 25 years. Initially it was involved in pioneer work regarding aids for the blind. The establishment of a Rehabilitation Technology Unit in Toronto can now make available highly sophisticated technical aids to handicapped persons. The Medical Engineering Section of NRC sponsored a "Workshop on Communication Aids for the Non-Verbal Physically Handicapped" in 1977, and the published proceedings are available. Currently the Medical Engineering Section is supervising a contract with Norpak of Pakenham, Ontario, for the development of a Blissymbol terminal using a home television as a display device. Also, the Comhandi was designed by NRC, which enables severely handicapped persons to communicate through the use of a joystick, scanning grid and a typewriter.

Of great interest and value, expected to be published by NRC before the end of 1979, is a complete inventory of bio-engineering research currently taking place in Canada. This inventory will be up-dated annually and will contain information on all technical aids and devices for the handicapped, including the communications handicapped.

Provincial Involvement

Most provincial governments are involved in the provision of technical aids. In some instances, these aids are provided as insured or free services; e.g., Worker's Compensation Boards or Vocational Rehabilitation Services, or on a fee-for-service basis.

The Ontario Educational Communications Authority (OECA)

OECA is involved in research on television and the deaf; specifically, on closed captioning technology and programming.

Universities

Queen's University, Kingston

Designed Enco II, which provides control of five electrical appliances which can link up with Touch Operated Selector Control (TOSC). TOSC provides control of call bell, intercom, door lock, telephone, radio, TV and recording machines for a severely disabled person. Queen's is also currently involved in a research project for the Department of Communications to identify the communications needs of the hearing-impaired.

Other Universities where work on rehabilitation engineering research is being conducted include the University of British Columbia, the University of Waterloo, the University of New Brunswick, the University of Alberta. Detailed information on these activities can be obtained from the Bureau on Rehabilitation, NH&W.

The University of Western Ontario has recently produced Canada's first blind Computer Science graduate and has explored the potential of braille facilities involving microprocessors.

Other

Bell Canada and Northern Telecom provide services for special needs and special equipment which can be used by persons with hearing and sight losses, chronic ear defects, speech defects and motion impairment or weakness. Bell Canada has just completed the compilation of a "Directory of Telecommunication Aids for Disabled People". This directory is publicly available.

The Blissymbolic Foundation, Toronto in conjunction with the Ontario Crippled Children's Treatment Centre, is active in research and development of the communications needs of non-vocal, severely physically handicapped children.

The Canadian Communications Research Centre publishes a register of activities, some of which pertains to the handicapped.

The Canadian Rehabilitation Council on the Disabled (CRCD) is responsible for the organization of a major International Conference on Rehabilitation Engineering (ICRE) to be held in Toronto, June, 1980. A Technical Aids Committee was created by the CRCD and has been in existence since 1973. The Council has a resource centre and a directory of services also. It should be noted, too, that they are responsible for the organization of the 1980 World Congress in Winnipeg.

The Canadian Telecommunications Carriers Association (CTCA) have a special National Committee on Communications of the Handicapped. The CTCA also released a policy statement on "Communications for the Physically Handicapped" in June, 1977.

A Directory of Associations in Canada is published, under the direction Brian Land, by the University of Toronto Press. This directory includes a listing of the organizations in Canada of or involved with the handicapped.

The Kinsmen Rehabilitation Foundation, Vancouver acts as a secretariat to the CRCD Technical Aids Committee.

Technical Aids and Systems for the Handicapped (TASH), Toronto is a newly established non-profit company operating under the auspices of the CRCD, handling the marketing of devices through a co-operative effort of the private sector, non-profit agencies, industry and the NCR's Rehabilitation Technology Unit.

United States

Federal Agencies

The following are among the agencies involved with the handicapped, dealing not exclusively with communications concerns: Rehabilitation Services Administration, Veteran's Administration, National Institutes of Health, Bureau of Education of the Handicapped, National Science Foundation, Office of Handicapped Individuals and the Federal Communications Commission.

As result of the "Comprehensive Rehabilitation Services Amendments of 1978" (to the "Rehabilitation Act of 1973"), recently signed into law by President Carter, a National Institute of Handicapped Research and an interagency committee on handicapped research were established.

Other

The Alternate Media Centre, New York University School of the Arts, has done excellent research in the area of "telecommunications in vocational rehabilitation".

The Trace Research and Development Center for the Severely Communicatively Handicapped, University of Wisconsin, has published an outstanding resource book on non-vocal communication and is active on many fronts, including the co-editing and publishing of "Communication Outlook", a quarterly newsletter addressed to the community of individuals in the application of technology for the communication handicapped.

The Institute for the Future, Menlo Park, California, has recently begun research on the potential of telecommunication technologies for children suffering from "developmental disabilities".

Magazines and Services

"Accent on Living", published quarterly in Bloomington, Illinois, provides a computerized retrieval system that can search for information on some 400 subjects.

"Achievement", published in Miami, Florida, is a newspaper which provides information for the handicapped on a wide range of subjects.

"Green Pages", published in Winter Park, Florida, contains ads and addresses of companies manufacturing devices for the rehabilitation industry.

The U.S. Department of Health, Education and Welfare puts out "Programs for the Handicapped" which reports on what is happening in the field, new publications, medical research and other subjects.

Europe

Great Britain

Centre for Medical Research, the University of Sussex

An excellent report prepared by Ms. Barbara Stocking was obtained from the Centre, through the National Research Council of Canada, on current biomedical engineering research taking place in the United States.

"Equipment for the Disabled" is a series of publications which includes a separate one on "Communication", released by the Oxford Regional Health Authority, Old Road, Headington, Oxford.

The University of Southampton is engaged in research, led by Dr. A. Newell, on electronic aids for the deaf and is exploring with the Independent Broadcasting Authority and others the potential of optional subtitles on television for the benefit of the hearing-impaired.

Sweden

The Swedish Institute for the Handicapped has published at least two publications on "Technical Aids for the Speech-Impaired".

Norway

The Nordic Committee on Disability has published a "Registration of Nordic Projects Relating to Disability: 1977". This report is the fourth annual survey of current research relating to disability within Nordic countries. A total of 213 projects have been reported on in the Nordic languages and translated into English.

International

Rehabilitation International (RI) works for the establishment and improvement of programs to help the world's more than 450 million disabled people overcome their special problems. RI brought together in 1972 experts in the communications field and their counterparts in the

organization and delivery of services for disabled persons. This was the first international meeting of its kind; the report on the meeting is referenced in the bibliography section of this paper.

The International Commission on Technical Aids, Housing and Transportation (ICTA) is one of the standing commissions of Rehabilitation International (RI).

The International Project on Communication Aids for the Speech-Impaired will involve the collection and compilation of information, on a national basis, which can be fed into an international information bank; the collection of information on research and development projects; meetings and discussions to avoid overlap in the narrow and highly technical field; and the evaluation of equipment. The initial participating countries will be Canada, Sweden and the United Kingdom, and it is expected that the U.S.A. and other countries will join in the near future. The project will be part of the International Commission on Technical Aids of Rehabilitation International, and the International Secretariat will be based in London.

The project will provide a forum for discussion and exchange of information for all those concerned with communication aids for the speech-impaired and will eventually fill a vital gap in the field of co-ordination and co-operation. Other benefits from the project could be an improvement in communication aids for other types of disability.

9. SOCIETY, POLITICS AND THE HANDICAPPED

Historical Perspective

A brief historical background might provide a useful perspective for appreciating some of the things that are happening today.

Kristen Jull traced the history of man's genuine concern for and systematic efforts to help the handicapped back to about 200 years ago. He found that the spiritual impetus was mostly provided by Swiss-French philosopher Jean-Jacques Rousseau, who inspired the early pioneers with his writings.

For more than a century, most of the trail blazers were European. Abbé Sicard developed a sign language for the deaf and Louis Braille did likewise for the blind. Americans who wanted to work with the handicapped went abroad to study under the masters. Over the last fifty years, the situation has gradually been reversed, and the United States has become the undisputed leader in many aspects of services and programs for the handicapped.

Even though the handicapped have generally been faring better in the United States than elsewhere over the past fifty years, a quantum shift in emphasis as well as direction has occurred only in the last few years in the United States.

Legislation concerned with rehabilitation began with the National Civilian Vocational Rehabilitation Act of 1920. In the ensuing years rehabilitation emphasis was almost exclusively in support of handicapped persons with demonstrable vocational potential. In 1954, research provisions were included for the first time. The Rehabilitation Act of 1973 expanded vocational concerns by directing that special attention be given to those with the most severe handicaps. In addition, a one-million dollar grant was awarded for study of the severely handicapped population without vocational potential. This act also redefined the support for the Rehabilitation Research and Training Centers which were begun in that year. Support and expansion of the Rehabilitation Engineering Research Center concept were also stipulated. These programs were intiated in 1971. Today, new laws and public statements by rehabilitation agency officials are raising the expectations of the physically handicapped beyond that of pure vocational service. Expectations include assistance in education, transportation, use of public accommodations, recreation, health care and access to the election ballot, as well as communications.

More Recently, in the United States

As mentioned earlier in this paper, in March 1978, the Committee on Science and Technology, U.S. House Representatives, released its "Report of the Panel on Research Programs to Aid the Handicapped". This report had been based in turn on a number of prominent studies, including the "White House Conference on Handicapped Individuals" (May, 1977) and the National Academy of Sciences' report on "Science and Technology in the Service of the Physically Handicapped" (October, 1976). A curious phenomenon has existed

over the years and, even more curiously, continues to exist despite the increasing public concern indicated for the handicapped, namely, lack of accurate information on an increasing population.

In 1976 the Committee on National Needs for the Rehabilitation of the Physically Handicapped found as follows:

> There is no way to accurately cite the number of physically handicapped persons in the United States today. While there have been numerous data-collecting studies, inconsistency in the types of impairment included, patterns of classification, and criteria of significance have varied widely. For example, a conservative estimate derived from a study by the Urban Mass Transportation Administration was 13,390,000 handicapped persons, about 6 percent of the United States population. A more realistic estimate would be 10-12 percent of the population. A common finding in all the studies is that there are a significant number of disabled people in the United States and that this group is continually increasing. Today the severely injured are less likely to die, and formerly fatal diseases are often arrested.

These findings obviously were still true in 1978, as the above-mentioned Congressional Committee's report in March of 1978, which reviewed these findings, concluded that "... a major national research program must be progressively established to solve the debilitating problems which confront our handicapped fellow citizens."

It appears now that President Carter, in signing into law on November 6, 1978, the "Comprehensive Rehabilitation Services Amendments of 1978" (to the "Rehabilitation Act of 1973"), has taken concrete action toward the establishment of this "major national research program". A highlight of the new rehabilitation law includes the establishment of a National Institute of Handicapped Research, which will have as its goal to provide an expanded, comprehensive and co-ordinated federal approach to research, as it relates to disability.

Going even further, the new enactment established a national council on the handicapped, an inter-agency committee on handicapped research, an inter-agency co-ordinating council on affirmative action and non discrimination, and authorized numerous special projects and studies.

Remaining Social, Psychological and Economic Problems

Despite the passage of landmark legislation in the 1970's, many barriers remain. One such problem is turning legislated rights into reality. For, as Frank Bowe, Director of the American Coalition of Citizens with Disabilities and Mainstream Inc. said, "It is possible to legislate rights, and this has been done. But rights become reality only after political struggle."

Bowe says that more than half of all working-age disabled adults who could work are jobless and that there is systematic discrimination against those who do work, which keeps them in menial or futureless jobs. Across the United States, a network of "sheltered workshops" employs 200,000 handicapped people whose wages average under $1 an hour - far less than the minimum wage.

Similarly, Paul Licker, in his study for the Department of Communications, found that family income was quite low among the group he sampled, with a median of about $4400 per year. Three in four were unemployed and only one in six works full time, despite the fact that half have marketable skills.

The following excerpt from Psychology To Day (August, 1979) merits direct quotation here:

> ... the disabled must also cope with a kind of paternalism from their able-bodied allies that has long been discredited in race relations. Even today, many unprejudiced Americans accept traditional stereotypes about different kinds of handicaps. However, instead of reacting cruelly because of the fears and anxieties aroused by those disabilities, we take a more humane approach. We extend to handicapped people what seems to be an enlightened model of medical tolerance. Rather than blame them for their pitiful condition, we say that their social and mental incompetence is produced by a disease or a disease-like condition beyond their control to alter. We believe that, in a social sense, they are chronic patients; and that we owe them the same struggle with our fears and prejudices, the same understanding and tolerance, that we owe victims of any serious disease or injury.
>
> The problem with this analysis, from the disabled person's point of view, is that it allows him or her no scope whatsoever for leading an adult social life. As Talcott Parsons first noted, the role of a patient in middle-class society is functionally very similar to that of a child. We expect the patient to be cheerful and accepting, to obey doctors' orders, and, in general, to devote all his energies to getting well. When an able-bodied person falls sick, he ceases to be judged as an adult; in return, he is expected to work actively to get well. The area defined as his to control shifts to the sickbed. But in America a person labeled handicapped is assigned a specially destructive variant of the sick role. Not merely powerless because he is sick, he is defined as doubly powerless because he cannot master the job of "getting well". Unable to fill that role obligation, he is seen as socially powerless, deprived of a political identity - until he chooses to assert one.

The article continues, to state that many members of the civil rights movement for the disabled find that the annual cerebral palsy telethon symbolizes for them the deeply humiliating paternalism of society's medical tolerance toward handicapped people.

The U.S. Panel on Research Programs to Aid the Handicapped (1977) cited another problem of a socio-psychological nature:

> One other factor should be mentioned. The handicapped person's self and situation are comparatively fragile. Handicapped people are often in a very delicate balance with their environment. Many are in constant discomfort. Even the hardiest persons are deeply sensitive to the seeming inequities of their fate. And they have long, lonely hours to ponder and compare them. Such a little thing as a curbstone or a doorknob can be insurmountable. Merely getting up or going to bed can take hours. Handicapped persons see things in a very special order of magnitude which must be understood and respected in any effort to lighten their load. Taken out of context, their problems easily appear irrational and inconsequential and quickly get overlooked, the fate of too many past legislative efforts in their behalf.

Thus, it is most important to keep in mind that neither legislation nor technology alone will solve the problems of the handicapped.

XIV World Congress on Rehabilitation (1980) and International Year of Disabled Persons (1981)

In June of 1980, Canada will host the XIV World Congress on Rehabilitation in Winnipeg. Following, in 1981, International Year of Disabled Persons will take place.

As mentioned earlier in this paper, the Department of National Health and Welfare (Bureau on Rehabilitation of the Social Services Programs Branch) is co-ordinating the establishment of the Canadian Federal Government's position for both events and has established an Inter-departmental Committee for this purpose. The Broadcasting and Social Policy Branch of the Department of Communications is providing input to the Committee. Two of the main activities in which the Committee will be engaged over the next several months will be the planning, in collaboration with the Canadian Government Exhibition Centre, of an exhibit for the World Congress, and the preparation of a comprehensive document on the Disabled in Canada.

Communications Public Policy and Public Pressure

In almost all the literature reviewed, including those studies which claim to be "comprehensive", a curious phenomenon appears when needs of the handicapped are discussed. Key words and phrases such as access, transportation, architectural barriers, housing, education, employment, rehabilitation, etc., recur again and again. Almost no where is "communications" to be found.

One can only speculate on the reasons for this exclusion. Perhaps "communications" is so pervasive that the experts do not see any rationale for identifying it as a separate need. Or, perhaps there is still little widespread awareness, much less acceptance, of the potential for communications to serve as a substitute for transportation, for example, or as a crucial factor in providing "access".

Or perhaps, too, most people feel that, because there already exists a plethora of communication aids on the market throughout the world, the handicapped's needs have all been met. It is hoped that this paper, in some small way, illustrates the fallacy of such an assumption, if it does exist unconsciously in the minds of the public.

It is true, with the single exception of the hearing-impaired, that the handicapped are not yet lobbying in a way that could be construed as demanding "communications policy". It would be a mistake for public policy makers to assume, however, that this state will continue for long.

In the following and final section of this paper, a shopping list of possible public initiatives, of a concrete nature, are suggested to demonstrate the range of what might be achieved in the area of communications and related concerns regarding the physically handicapped, if resources are available and policy priorities are clarified.

10. SOME POSSIBLE FUTURE PUBLIC POLICY INITIATIVES

White House Conference on Handicapped Individuals

In May of 1977, the "White House Conference on Handicapped Individuals" was held in Washington, D.C. Delegates attended from all over the United States. One of the workshops of that Conference addressed communications issues.

These recommendations, in an abbreviated and slightly modified form to fit the Canadian context, are most useful to include in this paper, for the simple reason that they are excellent examples of specific public policy initiatives which could be taken by governments and others, if the funds and will exist to support them. For, although these White House Conference recommendations were obviously made within the U.S. political context, most of them appear to be equally applicable to the Canadian environment.

A. How should current mass communication systems be adapted to meet all the communications needs (including the need for emergency warnings) of handicapped persons?

1. Line 21 Caption Television

Television networks should be required to implement a system of closed captioning of all programs through the Line 21 adapted converter mechanism.

2. Establishment of Teletypewriter (TTY) Locations

TTYs and outlets for portable TTY machines should be placed at strategic public places to provide a means of communication for the hearing-impaired.

3. TV Captioning and Interpreting

Captioning or interpretation should be provided for the deaf of all news programs and public service broadcasts on commercial and public TV.

4. Teletypewriter Rates

Reduced rates should be provided for handicapped users of teletypewriters and other modified communication equipment.

5. Alarm Systems in Public Buildings

Visual/vibratory alarm systems should be installed in all rooms of all public buildings.

6. Free Telephone Operator Assistance

Specific categories of handicapped individuals (e.g., severely disabled and blind) should be exempt from additional charges for operator-assisted telephone calls or directory assistance.

7. Tax Credits for Communication Devices

Tax credits should be provided to handicapped individuals and incentives given for programming on commercial and public television to allow disabled persons to benefit from the media. Captioned TV and captioning decoders are an example of a system that could profit from such tax credits.

8. Informational Needs

The communications media should meet the special informational needs of the handicapped (such as information about new services, devices or barrier-free transportation and facilities) by developing "market-place commentaries" and other programming innovations.

9. Communications Technology Grants

The Federal Government should increase research grants in order to develop new communications technology (for example, the use of computer technology to produce braille media) and to adapt current communications systems to maximize communication.

10. Information Clearinghouse

A clearinghouse should be created to disseminate information through the media pertaining to educational, interpretation and other services; rights and benefits; employment; and barrier elimination.

11. Special Telephone Equipment

Special equipment should be provided for hearing-impaired customers at no extra cost.

12. Program Development

The development of specific radio and television programming relevant to the needs of handicapped individuals should be required. The networks should utilize individuals and knowledgeable experts as consultants in this program development.

13. Interpreter Symbol

Federal, provincial and local governments should label public buildings wth a symbol notifying deaf citizens when an interpreter is available to assist them in communicating their needs.

14. Listing of Handicapped Individuals

Appropriate public agencies should encourage the disabled through captioned public service announcements to identify

themselves, so that a listing of handicapped individuals is available to police and fire departments during emergencies.

15. Blinking Traffic Lights

Provincial and local governments should install blinking traffic lights to warn deaf motorists of approaching emergency vehicles.

16. Handicapped-Owned TV and Radio Stations

The Federal Government should fund the establishment of independent radio and television stations owned and operated by handicapped people.

17. Lower Signs

Municipal governments should develop a policy to lower signs and informational material to a readable height for individuals in wheelchairs.

18. Tactile Signals

Federal, provincial and local governments should require the use of tactile signals for visually-impaired individuals at hazardous areas.

B. Given the role of mass media in effecting attitudes, what should the industry do to promote accurate images of the abilities and problems of handicapped individuals?

1. Public Service Announcements

The communications industry should develop a consistent program of public service announcements designed to provide the general public with facts about different handicapped conditions.

2. Guidelines to Reduce Over-Dramatization

Communications, health professionals and consumer representatives should develop guidelines for the mass media designed to eliminate or reduce the amount of over-dramatization and sensationalism when portraying handicapped individuals.

3. Media Coverage

The communications industry should provide factual and impartial coverage of events pertaining to the problems and activities of handicapped individuals, including prime time TV coverage.

4. TV Awareness Programs

The communications industry should produce programs to increase public awareness of the needs of the handicapped.

Public utilities and private business should be solicited for financial support of these programs.

5. Federal Information Clearinghouse

The Federal Government should create a federal clearinghouse to provide information about handicapped populations to the media.

6. Disabled Persons as TV Program Characters

The television networks should cast disabled persons as characters in major regular television programs.

C. How can the costs of purchasing and using communication devices and systems for disabled persons best be met?

1. Teletypewriter Rate Structures

Special reduced rates should be provided for registered deaf teletypewriter users on long distance calls.

2. Provision of Standard Devices by Governments

The federal and provincial governments should fund the provision of standard devices (i.e., teletypewriters, optacons, closed circuit TV and other communication systems) to all handicapped individuals who need them.

3. Federally Subsidized Research

The Federal Government should increase federal research and development programs aimed at benefitting handicapped persons' needs in the area of communication devices through technological developments.

4. Tax Exemptions for Consumers

The Federal Government should provide income tax exemptions, deductions or credits to persons with communication disorders for the purchase of communication devices.

5. Revenue Sharing Funds

Revenue sharing funds should be used for community development projects relating to communication systems for the disabled.

6. Low-Cost Loans for Equipment

Low-cost loans should be made available to disabled individuals for the purchase of communications equipment.

7. Industrial Tax Deductions

The Federal Government should provide tax deductions for companies which purchase communication systems or devices for their handicapped employees.

8. Rental of Equipment

The Federal Government or communications companies should make expensive communication equipment for the handicapped available on a rental basis, with the rental fee applicable to the purchase price.

9. Services by Communications Companies

Communications companies should provide special communication services and systems to handicapped people as a public service.

D. What actions are needed to insure that all public buildings and facilities will provide appropriate communication devices and systems, including life-saving warning systems, which are specific to the communicational modes of all handicapped persons?

1. Communications in Public Buildings

Federal and provincial governments should require that all public buildings install appropriate communication devices and systems including life-saving warning systems for the handicapped.

2. Building Codes

Federal, provincial and local governments should include in building codes provisions for Braille markers for elevator floors, knurled door and crash bars, Braille markers and instructions on fire extinguishers, large print for emergency systems, Braille diagrams of entrances and exists, and emergency warning devices for all handicapped individuals.

3. Interpretation Bureaux

Provincial and local agencies should establish interpretation bureaux to be used by hospitals, courts, police departments and other municipal agencies to meet the emergency needs of persons with communication handicaps.

4. Telecommunication Centres in Public Buildings

Federal, provincial and local governments should establish telecommunication centres, including teletypewriters in all large area hospitals, health agencies, police and fire departments, transportation terminals, ambulance services, banks, nursing homes, and major companies for the benefit of the hearing-impaired.

5. Highway Emergency Devices

Federal and provincial governments should require the placement of emergency notification devices, e.g., crossing bells, for persons with communication disabilities on all highway and other public roads.

6. Post Office Boxes Adapted

The Post Office should adapt post office boxes for handicapped individuals (example: the blind, people in wheelchairs, etc.).

E. Given the cost factors, how can the priorities for the design and production of new or modification of existing communication systems and devices best be identified and met?

1. Communication Systems and Devices

Research is needed to identify, develop or modify special communication systems or devices.

2. Creation of Federal Institute Conditions

The Federal Government should create a new federal agency or institute which would develop a data bank, coordinate and publicize the awards of research grants in the communications field, develop a mass media public relations program, and carry out other research, development and service activities.

3. Incentives to Develop Communication Devices

The Federal Government should develop tax incentives, grants or tax credits to encourage the design, production and marketing of standardized communication devices for handicapped people at reasonable cost.

4. National Communications Conference

The Federal Government should convene a national communications conference to establish communications terminology, signage and graphics for use by all media, agencies, schools, and the general public.

5. Federal Evaluation of Aids

The Federal Government should evaluate all aids and devices for quality, safety and cost and should recommend improvements and cost reductions.

F. What research is needed to solve the communication problems of handicapped persons and how should it be funded?

1. Needs Identified Through Census

Federal and provincial governments should take a census to identify all persons with communication handicaps.

2. Public Relations

Federal and provincial governments should establish research programs about how to improve public information on the communication problems of handicapped persons.

3. Consumer Review Panel for Research Proposals

Funding agencies should have research proposals related to the handicapped reviewed by a consumer review panel to determine the usefulness of the research results to the handicapped community.

4. Federal Agency for Research

The Federal Government should establish a new federal agency to focus on research problems and act as an advocate for the handicapped.

G. How can transportation systems be adapted to meet the communication needs of handicapped individuals?

1. Arrival/Departure Announcements

Municipalities should institute both visual and auditory announcement systems in public transportation terminals.

2. In-transit Announcements

Transportation agencies should establish procedures whereby in-transit announcements are made both auditorily and visually.

3. TTYS Installed in Terminals

Municipalities should equip public transportation terminals with teletypewriters.

4. Special Travel Matters

Municipalities should establish a centralized service area within public transportation terminals where all special travel needs of handicapped consumers can be met.

5. Transport Systems Schedules

Transportation agencies should post standing notices in papers and on bulletin boards at vehicle stops of local schedules (e.g., bus and subway).

6. Travel Agencies

Travel agencies and staff should be informed of the special needs of handicapped individuals when traveling.

7. Bus Route Information for Blind Passengers

Federal, provincial or local funds should be made available to equip buses with automatic recording devices to inform blind passengers of the bus route. Colour coding of routes should be used for visually-impaired and retarded persons.

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