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ABSTRACT

Discussed are some attitudinal, communication, environmental, and skills barriers faced by handicapped people seeking to gain vocational skills and to work successfully. The author describes the Vocational Training and Placement of the Severely Handicapped (VOTAP) project and the Overcoming Barriers to Mainstreaming project. (IM)

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THE NATURE OF BARRIERS & STRATEGIES FOR OVERCOMING THEM,

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THE NATURE OF BARRIERS AND STRATEGIES FOR OVERCOMING THEM

Peter R. Dahl

I. The Nature of Barriers

I would like to begin by using an example to illustrate a common-sense principle that we have found very useful in our work, namely, that barriers should be viewed as arising from the interaction of user capabilities and environmental demands rather than as being features of the environment alone.

A. Barriers as Interactions of Environmental Demands and Personal Capabilities

Let us take the case of Mike Hofius, a helicopter pilot in British Columbia to illustrate the interactive nature of barriers to career success. Mr. Hofius was severely injured in a crash that occurred when his helicopter was thrown upside down by high temperature patterns while fighting a forest fire.

After several operations and a period of convalescence, Mr. Hofius once again physically able to fly his helicopter, and ready to be reinstated.

Now, as it happened, scar tissue had developed on his vocal cords as a result of his crash injuries with two effects: he could speak with somewhat less volume than previously, and the dominant frequencies in his voice were altered. Still, his speech remained quite intelligible and was loud enough to be heard by anyone with average hearing or better.

Is there a barrier to employment present here? One would think not. After all, when one thinks of barriers one usually thinks of things such as buildings that are physically inaccessible to wheelchair users, or of unwarranted social rejection of a retarded person, or of some other gross block thrown into someone's career path in a usually accidental, thoughtless, or insensitive, and occassionally, malicious way.

But let us return to the case of Mr. Hofius. His job, flying helicopters, places demands on the individual. These demands may be considered part of the work environment for Mr. Hofius, or for any other helicopter pilot for that matter. One set of demands has to do with physical operation of the aircraft--no problems there. Another has to do with emotional stability, good judgment, and calmness under pressure--no problem there either. A third has to do with communication with the ground--and that is where the problem arose for, you see, the dominant frequencies in Mr. Hofius's voice had come closely to match certain of the major frequencies in the noise made by a helicopter engine.

Unsurprisingly, microphones in helicopters are designed to attenuate the major frequencies emitted by the engine. Thus, there is a demand here that usually goes quite unnoticed--the work environment requires the pilot to speak in a voice that has as its dominant frequencies something other than the major frequencies produced by a helicopter engine. Thus we have a barrier. But is the barrier caused by Mr. Hofius or by the environment? Well, the problem is caused by the environment in the sense that if the engine did not produce those particular frequencies there would be no problem. But by Mr. Hofius in the sense that if Mr. Hofius's voice was different, there would be no problem either. But neither of these really satisfies. Truly, it is the interaction of the unavoidable demand of speaking against the background of a helicopter engine and the equally unavoidable fact that Mr. Hofius could speak only with the voice he had.

Before moving on to solve Mr. Hofius's problem, I should like to digress to note that this situation is the same in outline as that involved in any type of barrier. For example, an architectural feature--

steps at a building entrance, say--constitutes a barrier only when a person unable to mount steps wishes to enter. It is the incompatibility between what the would-be user can do and what the environment demands he/she must do that causes the problem. The problem is in the interaction.

B. Strategies for Overcoming Barriers

Well, then, if the problem is in the interaction, one can do something to affect the interaction, to make the environmental demands and the capabilities of the individual compatible.

To do this, one could alter the environmental demands--say by putting in a ramp up the steps, or, one could alter the capabilities of the user--say by providing physical therapy and training in stair climbing to a person newly injured and fitted with leg brads who finds it presently impossible to climb steps using them. I will discuss several more detailed examples in a bit, but meanwhile, back in British Columbia, Mr. Hofius is wishing to fly.

Can the environmental demands be altered by installing a microphone sensitive to the frequencies in Mr. Hofius's voice? Easily. However, that would merely reinstate the problem of the speaker being drowned out by the engines, so that "solution" would be ineffective. Could we alter Mr. Hofius's voice by removing the scar tissue surgically? Yes, but the operation is regarded as medically very risky. In this case, the solution came exactly at the point of interaction--which makes it such a nice example. A device was developed by the National Institute for Rehabilitation Engineering that converts the frequencies of Mr. Hofius's voice into higher frequencies as he speaks, and these altered frequencies are "heard" by the microphone.

In this case, the environmental demands remained the same, as far as the microphone was concerned--it demanded the same type of signals as before. Yet capabilities had not been altered as far as Mr. Hofius was concerned--he spoke in the same voice as before.

C. Overview of Our Ongoing Research

Our present work at the American Institutes for Research is designed to identify ways of overcoming barriers, by augmenting the capabilities of individuals, by altering the environmental demands, by doing both, or by providing an assist at the point of interaction. I would like to describe two projects to you briefly.

II. The Vocational Training and Placement of the Severely Handicapped (VOTAP) Project

In July 1975 BEH contracted with the American Institutes for Research to investigate and assess the vocational training and employment possibilities of persons with severe permanent handicaps. The AIR project is called Vocational Training and Placement of the Severely Handicapped (VOTAP), and its purpose is to provide information which will help to increase the vocational education and employment opportunities for such individuals.

The VOTAP project included five major activities. First, an annotated bibliography of materials concerned with job training and placement of severely handicapped persons was prepared (Christensen, DuBois, and Austin 1975). Second, 333 training and placement programs serving the severely handicapped were surveyed to obtain descriptive data and to identify particularly innovative or effective practices. Programs were selected from nominations according to geographic location, size, type of institution (public or private), and handicapping

conditions of the clientele. Guidelines for recognizing effective, innovative practices were drafted by the VOTAP project staff and reviewed by the National Advisory Panel for the VOTAP project.

The third task was to prepare a handbook: Potential Vocational Opportunities for the Severely Handicapped. This handbook identifies and discusses major barriers preventing severely handicapped persons from gaining vocational training and employment, and includes a description of strategies that can be used to surmount these barriers. The handbook contains lists of jobs obtained from the VOTAP survey which severely handicapped workers presently hold in sheltered workshops and competitive employment; it also contains suggestions as to how potential jobs may be opened to handicapped persons by managing relevant barriers.

The fourth task was to prepare a second handbook: Vocational Education Programs and Placement Services for the Severely Handicapped. This handbook contains 2- to 6-page descriptions of 160 programs. Innovative or effective practices are highlighted. These practices were identified from survey returns by using criteria drafted by the AIR research staff and reviewed by VOTAP's 14-member National Advisory Panel and by BEH.

The last major task of the VOTAP project was to prepare a monograph entitled Recommended Research and Development Activities for the Severely Handicapped. This monograph synthesizes the project findings and offers recommendations for further research and development in the area of vocational training and placement of the severely handicapped. These recommendations are based on needs identified during the course of the project and on suggestions made by the National Advisory Panel.

III. The Overcoming Barriers to Mainstreaming Project

The approach of this project is somewhat different from that of the VOTAP project. In this case our efforts will produce a guidebook for vocational educators to help them serve handicapped students in their regular classes.

The purpose of the Guidebook will be to provide vocational educators with some of the tools they need to mainstream handicapped students effectively.

The approach to be taken assumes that vocational educators will increase their services to the handicapped if they have practical methods available for overcoming the genuine problems that mainstreaming presents. Specifically, the Guidebook will:

- present typical barriers from the point of view of teachers, counselors, administrators, and placement personnel
- show how vocational educators can assess local barriers to mainstreaming and develop realistic plans for overcoming them
- provide practical examples describing how vocational educators have applied their skills in extending vocational services to the handicapped, and showing how these solutions can be adapted to other situations

Thus, to achieve its major purpose, the Guidebook will show specific techniques for assessing and overcoming barriers. It will provide examples that illustrate how vocational educators can pool their skills to achieve practical solutions to problems associated with mainstreaming.

That is, the Guidebook will present practical approaches, rather than a theoretical statement. The conceptual approach to barriers that I discussed

earlier will be included in the sense that the Guidebook will present both methods and devices for augmenting student capabilities and ways for altering the environment in which the student is to learn.

IV. Some Barriers and Ways to Overcome Them

I would now like briefly to describe a few barriers to employment and some sample ways of overcoming them. These discussions are drawn largely from the results of VOTAP project research and represent a small portion of the discussions contained in one of the products of that project.

We broke the barriers down into four categories for discussion. These are not firm and fast and without overlap, but, rather, are organizers that we find useful.

- Attitudinal Barriers - barriers resulting either from unfavorable attitudes held by the handicapped person or by others
- Communication Barriers - in the sense of receiving, apprehending, and transmitting messages
- Environmental Barriers - for VOTAP purposes used in a more specialized sense of difficulties related to the design of the physical environment
- Skills Barriers - including lack of self-care, independent living, and work adjustment skills as well as specific job skills

Let me give an example of each.

A. Attitudinal Barrier: Low self-esteem, perhaps caused by repeated failure or lack of opportunity for success.

One strategy is to design situations in which the person experiences what might be called "guided success" in a realistic work setting. Realistic work-setting experience may be provided to the client either in a workshop setting or in a work station in industry. Supervision may be provided either by rehabilitation personnel or by the business or industry. Guided success in an actual work experience appears to be highly motivating. For example, the Occupational Training Center (O.T.C.) in St. Paul, Minnesota trained handicapped and multiply handicapped youths and adults for useful employment. New clients were evaluated by counselors and instructors on the basis of their performance during a three-week "testing-by-doing" period. If the O.T.C. could help a client, she/he was accepted and an occupational development plan was designed for her/him. O.T.C. used task analysis and job reengineering to facilitate training and placement of the handicapped. The Center entered into agreements with several private industries in order to place their clients in actual job situations for furthering their training. In order to prepare employees more fully for outside employment situations, the Center offered individual instruction units of grooming, community relationships, employer expectations, and personal and social attitudes (Durand, Nelson, and O'Brien 1973).

In this case the main focus of the effort is on the client. The purpose is to prepare him/her to function more effectively in the working environment.

B. Communication Barrier: Some barriers to communication arise primarily because of the configuration or operating characteristics of standard communications equipment. In these cases it is usually necessary to alter the environmental demands. Some example telephone modifications or add-on devices show what can be done.

Commercial telephone systems offer a wide range of off-the-shelf equipment for the deaf, the hard of hearing, the blind, those with speech impairments, and the physically handicapped (Smith 1975). In addition, custom equipment can be developed for those whose needs are not met by what is presently available. Presently available equipment includes: headset amplifiers; bone conduction receivers; extra loud or restricted frequency bells for the hard of hearing; a "code-com" attachment that converts sound into light flashes and vibrations, allowing coded signals to be transmitted; and devices that blink, or cause lamps to blink, for the deaf.

The use of auxiliary equipment may be illustrated in the case of telephone aids that allow normal telephone use by those whose movement capabilites are restricted. Semiautomatic dialers that dial numbers from preprogrammed cards are available for those lacking the dexterity needed to use the usual dials or pushbottons. Similarly, headsets and mounts that hold handsets, which eliminate the need to pick up the receiver when making or receiving a call, are available.

More sophisticated telecommunications systems, which allow telephone mediated teletype communication, are available. Such systems allow the deaf person to receive messages over the telephone at a rate as fast as

the person sending the message can type. The obvious drawback is that both sender and receiver must possess considerable equipment; the countervailing advantage is that messages are preserved on paper. Another convenient system for deaf telephone communication is the Manual Communication Module (MCM), a light, battery-powered portable. The console has a receptacle that is compatible with all U.S. handsets, a 32-character display for receiving incoming messages, and a keyboard for typing the message to be transmitted.

C. Environmental Barriers: Perhaps the most commonly remarked upon environmental barriers are those arising from architectural design: unramped curbs and entrys, narrow doors, unusable restrooms, and the like. These are serious indeed, but once the worker gets to the job he or she will frequently find that equipment may make demands on the worker that he/she cannot meet, but which are not inherently crucial to satisfactory performance. For example, many sewing machines are operated by treadles, but the critical factors in successful sewing should be positioning the cloth and moving it through the machine, not movement of the foot; treadles are used to control the needle speed only because they are convenient for most people. Motor speed can be controlled by switches operated by the knee, head, or mouth, and most equipment can be modified to permit this. (Of course, the "reverse" strategy will be needed for operation of machines with manual control by those persons with better foot than hand coordination.) Similarly, levers, handles, knobs, and buttons can be altered or repositioned to allow operation by those who could not formerly use them. Common alterations that may be needed include the following:

1. enlarged handles that can be more easily grasped
2. protruding buttons to replace recessed ones for those persons with poor fine-motor coordination
3. levers to replace knobs, thereby providing better purchase for the weak
4. push-pull or joystick controls to replace those that must be rotated, thus placing fewer demands on fine-motor coordination
5. controls that are repositioned to place them within reach of any unparalyzed extemity
6. rings or extensions that are added to wheels or levers so that they can be moved more readily by an amputee with a hook prosthesis

In some cases, "equipment modification" may mean not the actual alteration of an existing piece of equipment, but the judicious selection of standard equipment or the addition of an auxiliary piece of equipment to an existing device. A careful review of equipment catalogs may reveal items that are lightweight, shaped to allow an easy grasp, are automatic or semiautomatic, can be used with relatively imprecise movements, have large or high-contrast markings, or for some other reason are well-suited for a particular person. Examples include electric staplers for the weak or poorly coordinated; electronic calculators with large displays for the visually impaired; automatic center punches that allow markings to be made on wood, metal, or other materials requiring use of only one hand; and office equipment in colors that take advantage of residual visual capabilities.

D. Skills Barriers: Often, handicapped students lack basic background skills that prevent them from benefitting fully from regular educational programs. Various methods can be used to overcome this problem by way

prevocational training. For example, the North Central Institute's Program for Hearing Impaired Adults is mainstreaming deaf persons into on-going occupational training programs. Instructional materials were developed to improve the vocabularly abilities of the deaf. Because signs were nonexistent in many instructional areas, 8mm silent loop films with accompanying student workbooks were developed, each consisting of about 100 words, common to a specific instructional area. The films, showing the sign and the printed word along with the equipment being identified, were developed for the following instructional areas: printing, keypunch, account-clerk, auto body, math, drafting, nurse's aide, business machines, blueprint reading, machine tools, filing, and sewing. Instruction is provided in orientation and mobility, personal and home management, and communications and work adjustment services. Students attend a sixteen-week prevocational phase after which they enter occupational training programs, attend other institutions of higher education, obtain employment, or enter some other planned program (Lambert 1975).

V. Conclusion

In this talk I have just scratched the surface of things that can now be done to overcome barriers faced by handicapped people as they seek to gain vocational skills and to work successfully. Paul Cook will now describe some research and development activities that may be undertaken further to open the job market to the handicapped.