Considerations in the employment of blind computer professionals

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INTRODUCTION

According to sections 503 and 504 of the Rehabilitation Act of 1973, employers are required to hire qualified handicapped persons and, where necessary, to provide reasonable accommodations relating to accessibility to their actual job station and to work environs—including rest rooms, recreation areas, eating facilities, etc. Further, companies holding federal contracts are required to have an Affirmative Action Program to seek out qualified handicapped individuals as potential employees.

When a person is handicapped, there is a tendency for this potentially productive person to be excluded from the work force. Yet, given opportunity and ambition, these people rise just as far as they would under more ‘normal’ circumstances. Why, then, are they discriminated against? Perhaps one reason is lack of understanding of the considerations necessary when employing the handicapped.

In this paper, we will deal with the problems encountered by the blind in the field of computer science.

THE BLIND PROGRAMMER

It is assumed that we will be dealing with a singularly disabled, i.e. blind, reasonably intelligent and trained computer professional. The most immediate problem he or she will have is in handling the output from the computer. Obviously, the input to the computer is no problem, since keypunches and terminals are keyboard devices. There is only a slight inconvenience involved in learning the location of the special symbols, as each device differs somewhat. This, however, is also an inconvenience to the sighted programmer.

Historically, there are many solutions to the problem of output.1-3 The simplest is to have someone read the printed material. The drawback, of course, is that this ties up two people to do one job. This is, however, an adequate solution if two programmers are working side-by-side on the same problem, or if the blind programmer is acting in a consultant’s capacity for a limited time.

Braille, in which any blind computer professional should be highly skilled, is another common solution. The biggest advantage is that it allows the programmer independence. Further, several vendors produce a Braille print train, which, when installed in a standard printer, will imprint a series of raised dots on the paper. Terminal devices with Braille output are also available.4-6

Braille can also be produced on a conventional printer, using a software conversion program which converts print characters to a series of periods and spaces. These are printed on a printer which has a soft cushion of some sort (usually an elastic band) placed behind the paper. Thus, the periods, when printed, make dents in the paper, which when read from the reverse side, appear as raised Braille characters. The Braille characters are a matrix of dots, two wide and three high. Counting horizontal and vertical spacing between characters, 40 Braille characters would be 120 printer positions wide and four lines high when printed using this method. The disadvantages with Braille output are bulk of listings and expense of hardware print mechanisms (if that approach is taken). Further, stock printer paper is not as heavy as normal Braille paper and the Braille dots have a tendency to be flattened back into the paper, especially in very thick and heavy listings.

Morse code and musical chords have also been examined for their usefulness with varying degrees of success. If the programmer already knows Morse code and has been using it for output, it can be very useful. It requires no additional equipment as software drives the computer’s alarm bell. Learning so complex a skill in order to handle output, however, is an unfair request to put on an employee. Musical chords representing letters have even less promise as a solution and in effect have never really gotten off the drawing board.

A major contribution to the problem of reading printed material was made by Telesensory Systems Inc. (TSI) when they began producing the ‘OPTICON’ (Optical to Tactile Converter). With this system, a small camera is moved across a line of print. A tactile image of each character so scanned is presented to the reader’s finger through a matrix of vibrating reeds. The user of the OPTICON can, without assistance, read a printed page. However, it takes considerable training and a high level of dedication to learn and become proficient with the device.

From the collection of the Computer History Museum (www.computerhistory.org)
READING MACHINES

The author’s own research has led to the development of a talking computer terminal. It consists of a keyboard for input, a speech synthesizer for output presentation, and a microprocessor to drive the synthesizer. The microprocessor communicates with the host machine via an RS-232 interface. Input from the keyboard is sent through the RS-232 interface to the host machine. Output from the host machine, which normally appears on the screen or paper, is processed by the software in the microprocessor and sent to the synthesizer producing spoken English output. The device can be used as a terminal on any computer system which supports asynchronous RS-232 communications.

Through one or all of the above means, the blind computer programmer can conquer the problem of computer output. It is necessary, for the employer, to discuss what methods each particular programmer utilizes and set a clear understanding of what, if any, equipment this individual will need.

OTHER CONSIDERATIONS

A friendly and accessible secretarial staff is a large asset to a blind employee. This staff can provide valuable services by reading mail and memos, proofreading correspondence, etc. The few minutes of time necessary to glance at a memo or read the mail can increase the productivity of the programmer immensely. In an environment devoid of secretaries, a receptionist or keypunch operator could be asked to fill this need.

Another important consideration is the type of environment the blind individual will be working in. Team programming and group efforts are ideal atmospheres for very productive work. There is always someone around with whom the project can be discussed.

Finally, there is the problem of orientation. It will be necessary for someone to spend some time helping the new employee learn the location of equipment and rooms. This should take no more than a few days. Once oriented, a blind person can move about safely, freely and independently. There may be special problems pertaining to each individual. For instance, a Seeing Eye dog may accompany his master. In this case, it is necessary to locate an out-of-the-way area for the dog to be walked and to acquaint the rest of the staff with the animal. These dogs are extremely well trained and should not present any problems to fellow workers.

If the office is located in a building or complex with other businesses, it is helpful to be acquainted with the general location of these other businesses. This should require only a few minutes of additional time.

CONCLUSION

Usually, blind computer professionals will have educational backgrounds similar to that of sighted computer professionals. However, some may have attended special schools for the blind which offer training in data processing. While a blind individual may come from a slightly different background and may require additional tools for his trade, he should be given the same opportunities and trial period as a sighted employee. Thus, he can prove his merit (or lack of it) based on his abilities and performance regardless of blindness. He can be as valuable and productive an employee as any of his fellow staff members; therefore the criterion for hiring, promoting and firing should be the same for all.

It is presumptuous to try to offer a "guideline" for hiring the blind. Each individual and each job require a different set of considerations. As an employer, do not hesitate to discuss how the new employee would be expected to function, i.e., how he might handle a batch environment compared with an interactive system.

Housing conditions in the area also bear mention. The blind employee will want to live within walking distance, on a bus or train route, or where fellow workers can pool to work without sacrificing desirability of neighborhood or school system which are important to his family. It is not necessary to be hesitant to discuss cause of blindness. Frankness and openness during the initial interview can eliminate misunderstanding or uneasiness later.

The biggest problem facing a handicapped person who tries to enter the professional work force is not his education, training, or ability but rather the education and awareness of the rest of the world in accepting the handicapped individual and realizing his potential.

REFERENCES