

Methods of increasing the accessibility of reading materials by the blind

J.M. Gill

A totally blind person has three main methods for accessing written information.

1. Use of a reading aid with the information in ordinary sighted form. The reading aid can be of either direct or indirect access type; the former involves automatic character recognition whereas the latter involves the user in skilled interpretation of the output. An example of a direct access type reading aid is the Textobrail and an example of an indirect access type is the Optacon.

2. The information can be recorded verbally in analogue form on magnetic tape or disc. This system has the advantage that it is compatible with the sighted community. The main problems are those of indexing and speed of data transfer.

3. The information can be in a tactile form. The most usual coding systems are braille or Moon, which are often embossed directly on paper.

This paper is limited to considering the problems concerning braille.

The previous speaker has described a system for increasing braille production by increasing the output of a skilled braille transcriber. Another approach is to use relatively unskilled typists and to use a computer to translate the text to an approximation to grade II braille. Since the demand for braille is greatly in excess of supply, it is essential to use all systems available to increase braille production.

The computer-based systems involve:

1. Input of text
2. Proof reading
3. Editing
4. Translation
5. Output

A basic system might be:

1. Input on punched cards or paper tape.
2. Listing on a line-printer for proof reading.
3. Editing on a visual display unit or even by correcting the punched cards.
4. Translation by a program such as DOTSYS III.
5. Output to an on-line embosser.

The advantages of such systems are that they are fast and do not require the use of highly skilled braille transcribers. Such systems are usually cheaper than employing manual transcribers.

There are applications where output in grade I braille is required. For instance a braille learner might want a list of football clubs playing the coming Saturday or the diary of events for the local darts club; however if this motivates the person to learn braille then it is worthwhile.

Input

Format information has to be included at this or the editing stage. Control characters are needed for paragraphs, forced new lines, running titles, centred headings and non-standard characters such as Greek letters. It may also be desirable to flag italics, foreign words and phrases, inflected letters and single letters other A, I or O. If footnotes are to be included in the main text, it will be necessary to flag the beginning and end of this text.

Tables

The major problem is material whose layout is an intrinsic part of the content, such as tables. The problem of tabular presentations is of the same order of magnitude as that of producing meaningful embossed diagrams. It is impossible to handle tables automatically in any but the simplest cases. However the problem of layout of tables and diagrams can be alleviated by using an interactive method on a visual display unit.

An example of this problem with tables is the O'Connor scan-column index; it is impossible to transcribe this into braille such that the user

can do a multi-column search.

Special codes

Further problems arise when inputting mathematics or music from an ordinary keyboard although feedback can be provided. For instance music can be coded using alphanumerics which can be directly displayed at the top of a visual display unit screen; underneath the music can be displayed in staff notation for checking against the original score. The data can be edited and then the braille can be displayed across the bottom of the screen.

Other modes of input

One method to reduce the cost of data preparation is to use prisoners. The text is input on a standard composers keyboard with the output on punched paper tape. The trade unions should not object to such an arrangement since it is not in competition with open industry. The prison authorities might view the system favourably since the prisoners would be partly trained for employment in the printing industry on their release from prison.

Computer-compatible composers tapes are possible input media but printers often make corrections on the type itself. Another problem is the variety of codes used by printers in this country but this is not insuperable since the pre-processor can be table driven.

However many organisations are storing digitally information which requires frequent updating such as internal telephone directories and bibliographies. Access to data bases such as ERIC, MEDLARS and INSPEC is very important to some professional blind people.

Optical character recognition is another mode of input but the accuracy and the range of acceptable typefaces are a function of bandwidth and therefore cost. At present OCR is not economically viable for this application.

Indexing

A sighted person with an inkprint textbook may use a number of different ways for locating a specific item:

1. The subject index at the back of the book.
2. Chapter titles, then serially through the chapter.
3. Subject headings which are repeated at the top of each page.
4. The reader may remember that it was "near the front of the book and mid-way down the page".
5. The reader may look for a diagram which he remembers is physically near the item he requires.

There are obviously other methods but the important aspect is that the system, or combination of systems, used is chosen by the individual reader although the choice will depend on what has been provided by the publisher.

The provision of indexing facilities for non-visual information systems deserves attention since it is an area which has tended to be neglected in the design of transcription systems.

Translation

A variety of computer programs have been written to produce an approximation to grade II braille. These programs will translate up to 25,000 words per minute although speeds of 1000 to 4000 words per minute are more common.

If there was a rigorous mathematically unique definition for grade II braille, the program could work directly from this definition. It is possible to consider translation to a grade II, which is not context dependent, being done on a microprocessor. This may be particularly relevant to developing countries since the cost of a microprocessor and the necessary peripherals may be less than the cost of training and using manual transcribers.

