Aids for the handicapped - **Passport to learning**

A portable communication unit, conceived and developed by the Division of Electrical Engineering, is another aid which forms part of the application of technology to the rehabilitation of the handicapped.

A suitcase sits on a crowded laboratory workbench. In appearance, it looks like any other — same size, shape, color. But there the similarity ends, for when it is opened, it holds not the usual paraphernalia of the traveller, but a passport to learning for hundreds of handicapped children.

Conceived and developed by the Division of Electrical Engineering of the National Research Council of Canada, this portable communication unit is designed to promote language and educational development for the non-verbal, severely disabled child.

"Our hope," says Mr. O.Z. Roy, research officer in the Medical Engineering Section of the Division, "is that the unit will help to ease the frustration that these children encounter when they try to communicate with others."

The unit's basic system consists of a visual symbol display, a subject-machine interface and an optional speech synthesizer. Each side of the case contains the visual display, 128 "squares" or addresses, for a total of 256 in all. Each address contains a symbol and the written word representing that symbol. Selection of a particular symbol is indicated by a small red light within the square. These Bliss symbols (called after their Australian inventor) are capable of conveying both subjective or objective life experiences that a child may wish to communicate to someone.

The total capacity of the display can be varied from 32 symbols, during the initial stages of learning, to 512 as a subject's vocabulary and comprehension increases. (The 512 is achieved by dividing each address into two segments and indicating which of the two is desired by either having the light on continuously or blinking.)

The subject-machine interface allows the child to control the display by means of a single switch or by any number and combination of switches. This flexibility enables the subject to use his or her abilities fully while utilizing the machine. A variety of interfaces can be used, from a mechanical switch to a light-activated joystick, thus allowing the display to be scanned in an up-down position, from left to right, or diagonally. A subject with a certain amount of dexterity could use the joystick while those with lesser dexterities could use an arrangement of large push buttons.

The display also has a memory which stores sequences of symbols and allows complete idea development. The memory can be read out on the display by selecting an assigned address in the single switch mode or by pressing a separate "memory read" switch. In its most automatic form, a single switch is used to activate the device. A scan pattern has been developed which first scans vertical columns, then horizontal rows and finally writes into the memory. With this method of operation, a time-based error correction feature has been incorporated. If, for example, the subject overshoots a column, by waiting a predetermined length of time, say one to ten seconds, the system automatically resets to "home" (top left) or to the first column first row address. If on the other hand an error is made in selecting a row, then the system resets to either

This preschooler increases her vocabulary through the use of pictures. When the teacher asks her to point out the word shoe, for example, she pushes on the joystick to scan to the picture of the shoe which will then light up. A Votrax system speaks out the word, thus reinforcing it in the child's mind. Cette enfant d'âge préscolaire augmente son vocabulaire en se servant d'images. Lorsque l'instituteur ou l'institutrice lui demande de désigner le mot "shoe" (chaussure), par exemple, l'enfant se sert de cette sorte de manche à balai pour que l'image d'une chaussure devienne lumineuse. Un système Votrax "dit" le mot ce qui renforce le nom dans l'esprit de l'enfant.



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