Occupational Therapy Essay, Research Paper

We are a group of occupational therapists and a new client has come to our office with the following case history:

Don is a 63 year-old amateur poet. He has several of his poems published in the local newspaper but has not yet been accepted by any literary journals. Three months ago, Don had a cerebellar cerebrovascular accident that has given him significant fine motor control limitations. He is not able to hold a pencil or a pen, and when one is taped in his hand, he can not produce recognizable printing. He is able to reach a range of nearly 5 feet from side to side but cannot pick up a 1-inch cube from the table. When asked to use a keyboard, he is as likely to strike two keys away from the target as the key he is aiming for. He is able to put his finger reliably into a square that is 2 inches on a side wherever it is located within his reach. He is not able to accurately place his finger into a square that is 1.5 inches on a side, however, unless it is located directly in front of him (Anson, 1997, p. 104).

Don is frustrated by his condition and needs some assistance to continue his writing. We used the decision tree to evaluate which computer adaptation would be best for Don. We determined that Don has physical limitations to the computer but has full range of the keyboard. Due to his trouble targeting specific keys, it would be increasingly difficult to simultaneously press more than one key at once. The client has frequent accidental keystrokes because of the size of the small keys. His inability to strike a single key on demand led us to expanded range of motion. Having assessed that Don could strike larger keys accurately; we reached the alternative of expanded keyboards.

Upon researching expanded keyboards, we found a great variety in what each keyboard offered. The 32 key layout with 2.5- inch keys did not provide an adequate selection for Don’s writing needs. Most of the standard expanded keyboards with 128 keys only have 1.5-inch keys. Some examples are Key Largo and Unicorn Expanded keyboards. Key Largo is an expanded keyboard, which works through Discover KENX. It is useful for one with coordination problems. Unicorn Expanded keyboard established the standard 128 key expanded keyboard design. We had the opportunity (in A.T. lab) to try and compare the different expanded keyboards. We appreciated that a client with difficulty reaching small keys would find these keyboards more beneficial.

All keyboards require an encoder, which interprets the key. When pressed it converts it to a keyboard code, that the computer could understand. Some computers come with a built in encoder and some without. These keyboards with encoders can be connected directly to the keyboard port of the computer. Therefore no internal adaptation is needed for the computer and it doesn’t interfere with any software in the computer. This is beneficial because it can be used with any operating system and software the client may need. A disadvantage to this is that the keyboard codes are not readily adaptable. This means that the keyboard layout is fixed and can’t be changed by the clinician. Another consideration is that this keyboard can not be connected simultaneously with the standard keyboard.

Since plugging and unplugging the keyboard is not recommended, this option is better suited for a client who would be the sole user of the computer. Expanded keyboards that do not have the built in encoder, require an external device that would interpret the codes to the computer. Although this keyboard has the disadvantage of an external device, it offers flexibility in the keyboard layout and allows for various overlays that change the layout. An example of the latter is the Key Largo keyboard mentioned above.

The problem with 1.5-inch keys is the client’s inability to accurately reach a key of that size unless the keyboard is positioned right in front of him. An option would be to position the client in front of the computer with the keyboard mounted close enough for him to access. Although this alternative was a possibility we preferred to find a keyboard with 2- inch keys.

After researching this alternative on the internet, we found a product that matched Don’s needs more efficiently. The name of the product is Expanded Keyboard for Apple II+ and IIE. This keyboard operates as a standard keyboard with the choice of 1.5 or 2-inch keys. With continued research, this was the only product with a two-inch key option. This is a perfect size key for Don’s needs. This keyboard can be connected at the same time as a standard keyboard. This would allow other family members to use the computer without having to constantly connect and disconnect his keyboard. Sticky key option is included in this keyboard. The flat surface of the keyboard will allow the use of overlays. In addition this keyboard allows all the same functions as a standard keyboard. This is an important fact considering Don’s interest in writing. The dimensions of the keyboard are 14 by 32 by 1, with the weight of six pounds. The pricing range is listed as 750 to 875 dollars. The manufacturer for this product is EKEG Electronics Co Ltd.

An additional way to address Don’s problem of accidentally striking untargeted keys is the option of delayed acceptance. With delayed acceptance the key must be pressed for a certain amount of time before it produces any output. This prevents haphazard striking from having an effect, and error can be avoided. You can modify the amount of time delay. We would suggest starting at a minimal level of delay until the optimal level of performance is achieved.

A possible disadvantage to delayed acceptance, is that it delays the reaction time of each key pressed thereby slowing down the typing speed. Typing speed is a significant factor to consider with Don, since his purpose for therapy was to increase his typing abilities. However, if the disruption of constantly correcting mistakes due to accidental keystrokes is great, the overall typing speed may increase by preventing errors before they occur. This may be the case with Don and therefore we would recommend this option. Furthermore, most delayed acceptance adaptations are software; making it inexpensive, easily operated and deactivated. Delayed acceptance, under the name “slow keys”, comes included in Macintosh and Windows 95.

Sticky keys is another option which addresses the problem of simultaneously pressing two keys. For example pressing shift, releasing it and then pressing another key would have the same effect as pressing both keys together.

Another technology we considered is word prediction. As the client begins typing, with each letter the word predictor presents a list of words that start with the letters he has typed. When the client spots his intended word, he clicks on it and it will appear on his document. With each new letter the client types, new words are displayed until the word appears on the list or is completed by the client. While the purpose of word prediction is to increase typing speed, it usually does the opposite. In addition many clients find it irritating to constantly have to glance at the prediction list and look away from where their attention is focused. For these very reasons we would not suggest this adaptation for our client. Unless he fatigues, in which case this option may increase productivity.

Abbreviation expansion is an assistive technology device, which aids in increasing typing speed. It allows the user to assign an abbreviation to a longer phrase. When the user types the abbreviation, the phrase appears on the screen. One can create their own abbreviations, based on frequent words or phrases that they use. This would be very useful for Don. He could customize the abbreviations according to his writing style. Abbreviations are only recognized when spaced by themselves, and not when they are found in the middle of a word. In order to benefit from this, the user must have cognitive capabilities, as is the case with Don.

Another option considered for Don is Morse code. Morse code uses a combination of dots and dashes as a code for alphabet and punctuation. Simply using one switch or two switches, the user is able to fully communicate with minimal motor function. A purpose for using two switches rather than one is to separate the two signals in case the client has trouble releasing the switch at the appropriate time. (To separate dots and dashes). Using large jellybean switches will make it easier for Don to press. The cost of Morse code ranges up to 800 dollars (DADA Entry). One advantage of morse code is speed. For a person with motor difficulties this system provides an optimal speed. Another advantage is that the Morse code can become automatic with increased usage. A disadvantage to Morse code is that it has to be learned and the user has to be trained. Someone with learning problems may have difficulty. Being that our client has motor problems and not learning, this will not be a problem. The speed of typing is essential for his occupation and training may be a worthwhile investment.

In conclusion, After comparing and considering our two options of expanded keyboard versus Morse code, we concluded that an expanded keyboard would be the best access method for Don. Since the expanded keyboard (Apple II+ and IIE) addresses Don’s limitations we did not find it necessary to go through the required training for Morse code. However if expanded keyboard did not work, Morse code could be used.

We searched many websites and journals for a published reference on expanded keyboards, but to no avail. We did, however, find an article on Morse code and its prevalence in assistive technology today.