Teaching the Patient With Cognitive Deficits to Use a Computer

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Computer use by persons with disabilities is not new. Personal computers are used as augmentative communication devices and as therapeutic activities to improve manual dexterity and coordination skills. However, when a 57-year-old stroke patient with no previous computer or keyboard experience and with impaired cognitive skills and limited memory wished to learn to use a personal computer, we were faced with a challenge. We solved the problem using the flowchart method of instruction. This case report describes the method used and the way it was adapted to achieve a postdischarge treatment goal of independent participation in a leisure activity.

Patient History

At 54 years old, the patient, an active married man, suffered a severe right intracerebral hemorrhage that completely changed his life-style. He was forced to retire prematurely from his job as a paper machine operator and to give up his recreational activities of hunting, fishing, and gun collecting. The patient experienced grand mal seizures 6 months after the stroke; these attacks were brought under control with Dilantin and phenobarbital. In addition to experiencing side effects from the medication (concentration loss and drowsiness), the patient exhibited stroke residuals (left hemiplegia, impaired short-term memory, and constructional dyspraxia).

The patient was referred for outpatient occupational therapy 2½ years after his stroke because he had developed a painful subluxed left shoulder and continued to complain of problems with concentration and memory. He felt that he was a burden to his wife and he experienced frequent episodes of depression. Although the patient engaged in ceramics as a leisure activity and participated in the local Post-Stroke Support Group, he spent most of his day watching television. According to his wife, some marital tension resulted from the patient's inactivity. Although 6 months of weekly occupational therapy did decrease the pain and spasticity in the left arm, the patient continued to exhibit concentration and memory deficits as well as episodes of depression.

Just before the patient was discharged, the occupational therapy department acquired a microcomputer with clinical software for visual-perceptual and memory skills. The patient was evaluated while using this software, and he was able to perform all of the tasks presented to him with little difficulty. He enjoyed the challenge and stimulation of the computer activities.

Coincidentally, the department also acquired the services of a retired physician (the first author), who...
had volunteered to help patients learn to use the computer. Because the patient in this study had expressed an interest in computer activities, he and the volunteer seemed to be a good match. After visiting the home of another stroke patient who had been using a personal computer for correspondence, game playing, and creating graphic art, the patient bought a used Tandy Color Computer II. He wanted to learn to use the personal computer independently for a variety of activities, but especially for writing. We were encouraged that perhaps a purposeful activity had been found for this patient to increase his self-esteem and decrease his depression. Independent computer use was established as a goal for the home program. This was in addition to his outpatient occupational therapy sessions of neuromuscular reeducation of the left upper extremity and retraining in activities of daily living.

Home Program: Computer Instruction

The home sessions were limited to 1 hr once or twice a week, and the volunteer was careful to avoid fatigue or frustrating the patient because of the possibility of precipitating a seizure. The patient's neurologist, however, felt there was no contraindication to the patient's using a computer because the seizures had been well controlled with medication for 2 1/2 years.

With his nondominant left hand paralyzed and with no experience in using even a typewriter, the patient initially was slow at finding certain keys. He also had difficulty pressing two widely separated keys simultaneously with his unaffected hand. Therefore, he was provided with a stiff wire, bent to the proper length, to bridge the gap. His spelling, sentence construction, and arithmetic showed that he had only elementary skills.

The initial tutoring sessions also revealed that the patient's cognitive deficits precluded his studying and using the owner's manual. Furthermore, he could not remember any verbal instruction or commands for more than a few minutes. For the first few weeks, therefore, he was limited to doing simple arithmetic and playing a computer game.

When the patient was learning to operate the computer independently, a short list of simple instructions was sufficient to teach arithmetic and playing games. Once the patient became more familiar with the keyboard, however, he wanted to write letters. The patient acquired SCRIPSIT (Kilgus, 1982), the only word processing package made for the Tandy color computer. Like most word processing programs, this one is menu-driven. The main menu, with eight options from which to choose, completely baffled the patient because of his impaired memory and difficulty in comprehending the list. He needed a way to bypass or ignore the menu. Because of the deficits from the stroke and, possibly, the side effects of the anticonvulsant medication, the patient's ability to use the computer independently seemed questionable. Because of his impaired memory, concentration, and constructional skills, we found teaching him the many commands of word processing software to be a formidable challenge.

We devised a solution by designing a simple flowchart with colored symbols and very few words for the patient to follow (see Figure 1). By using this flowchart, the patient did not need to remember the previous command or the command to come. The flowchart also enabled the patient to avoid the frustration of decision making when a menu appeared on the screen. The flowchart's unique appearance resulted from the many revisions that were made until the arrangement of symbols, arrows, and words matched the patient's comprehension and abilities. We initially guided the patient step by step through the flowchart, and he soon could follow the flowchart and operate the computer by himself.

Results

Eight months after the patient began computer instruction, his affect was brighter and he appeared more tolerant of his disability. Using his computer, he was able to type letters to friends, politicians, and government officials. He derived the greatest pleasure from typing stories about his life experiences and sharing them with family and friends. This greatly improved his self-esteem. Interestingly, his stories reflect a maturation of his written language skills.

The patient believed that working on the computer improved his memory and quickened his mind. It also enabled him to pursue his leisure activities for hours at a time without losing his concentration. As a result of his increased self-esteem, his motivation to use the minimal function in his left arm increased. For example, the patient is now able to clean and load his pistols, a hobby he greatly enjoys. The patient feels strongly that his mental improvement resulted directly from his computer work, especially because his seizure control medication has not changed over the past 3 years.

Follow-up

The patient and his wife visited the occupational therapy clinic 6 months after his discharge from outpa-

1 Manufactured by Radio Shack, a division of Tandy Corporation, Fort Worth, Texas 76102.
tient occupational therapy. Both were quite satisfied with their life-style. The patient said his social and family life are more interesting and entertaining now because he can share his computer skills and play computer games with his family and friends. He has written more than 50 short stories about his life and he plans to write many more. At the time of this writing, two of his stories had been published by an outdoor-life magazine.

Discussion

The symbolic language of the flowchart is used in many fields, including industry and technology, to aid memory, simplify decision making, and standardize procedures (Graham, 1983). To be successful for patients with cognitive and memory deficits, the flowchart must contain few words, and the words it does contain must be simple, precise, and direct. No steps can be omitted. The symbols must be uniform and must be used consistently. Colored symbols are quite effective, particularly when a command or menu is repeated. Revisions of and corrections on the flowchart are made during the teaching program only as necessary, until the patient feels confident that using a particular arrangement of symbols and arrows makes the computer work for him or her.

The flowchart provides a method whereby persons with disabilities or other persons interested in learning to use the computer can do so without lectures, tutoring, or books. The seriously impaired adult stroke patient in this study learned to use word processing software with a 1-page flowchart instead of with a 76-page instruction manual.

Our application of the flowchart might be called a flow diagram because we disregarded certain customs of perfect flowchart design as used by such professionals as teachers and computer programmers. This is important, because when the patient first tried this customary type of chart, it was too complicated for him to use. But when he was exposed only to the first steps of the flow diagram sequence (e.g., turning on the computer and following the arrows from one symbol to the next) he soon reached the main menu. The symbol for the main menu, in his mind, is merely a stepping stone to the big green circle “TO WRITE.”

Figure 1. Flowchart for use with the SCRIPSIT (Kilgus, 1982) word processing program. Note: This flowchart has been simplified for publication. The complete version is available from the authors of this study.
In the big green circle the chart tells him to press 2, and then he is ready to write.

Instead of forcing the patient to conform to a rigid flowchart, we tailored it to his cognitive ability as he progressed. As he became confident using the flow diagram, we added more instructions to increase his computer ability. For example, we gave separate lessons so he could learn the sequences for deleting and inserting and for printing.

The patient in this study could not have learned to use his computer independently without his specially made flow diagram. We do acknowledge, however, that the individualized instruction and the special relationship that developed between the volunteer and the patient may have contributed greatly to the success of this case.

From this experience, we believe that the symbolism of flowcharts can replace the verbiage of instruction manuals when a person is learning to use a personal computer, that computer activities can have various therapeutic effects and provide patients with purposeful and fulfilling experiences, and that the flowchart can be a useful teaching tool in the rehabilitation of patients with brain injuries.

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References


Editor’s Note. To continue the Case Report department, we need and welcome reports that document the practice of occupational therapy for specific clinical situations. Guidelines for writing case reports are available from the Editor.