Early intervention and an innovative computer loan program helped Ryan develop his cognitive and physical skills.

By Lucretia Baumgartner, O.T.R./L.

As a child enters the world of therapy, numerous intervention strategies are sought to help him or her achieve maximum independence. One such approach is computer intervention. And as Ryan’s case illustrates, it’s never too soon to start.

Dan and Cheryl Buckley were overjoyed at the birth of their first child, Ryan. He was a true mix of mom and dad, and the first month of his life went as expected by any new parent: diaper, feed, play; diaper, feed, play.

Soon, however, Ryan’s parents began to worry that their son was not developing as he should. He lay on his back and smiled at them, but he did not move, babble or communicate in any way. His parents had no way of knowing what he felt or wanted. The Buckleys made numerous trips to the doctor, who assured them that they were just overanxious new parents and that Ryan would be fine if given time.

Finally, when Ryan was nine months old, the Buckleys transferred him to a new physician who gave them the news: Ryan had cerebral palsy.

The physician referred Ryan to the Children’s Therapy Unit (CTU) at Good Samaritan Hospital in Puyallup, Wash., for evaluations by speech, physical and occupational therapists. To boost Ryan’s developmental potential, the rehab team recommended that he receive each therapy several times a week.

From the age of nine months until he was 15 months old, Ryan received intensive weekly physical, occupational and speech therapy interventions. His rehab team worked on developing Ryan’s ability to gain better head, trunk and arm control to help
him look at, reach out for and interact with his parents and peers. As his head and trunk control improved, he began to develop his oral motor control-laughing, squealing and drooling. But he was still unable to sit alone, crawl or vocalize.

When Ryan was 15 months old, his occupational therapist requested an adaptive computer consultation to help develop his cause-and-effect skills and assess his potential for single switch skills. Given full support for sitting, Ryan could operate a single switch with 100 percent accuracy using his fisted right hand. For this evaluation, he was positioned in a modified, recycled car seat with pelvic, mid-chest and shoulder harness straps for sufficient positioning and support. A clear Plexiglas tray with numerous Velcro straps was attached to the car seat for ease of switch placement.

An Apple II GS computer with Adaptive Firmware Card (AFC) and Echo II speech synthesizer from Don Johnston Developmental Equipment was used throughout the evaluation. Ryan responded best to switches that offered some type of auditory feedback. Initially, a four-

A Cohesive Unit

The Children’s Therapy Unit (CTU) at Good Samaritan Hospital is a regional neuromuscular center with a 26-year history of service to children and their families. The CTU provides coordinated multidisciplinary assessment and intervention services for children with neurologic, orthopedic, developmental, psychosocial and behavioral impairments. It also provides community outreach services and educational programs for students, hospital staff and the community.

The CTU staff team includes pediatric specialists in neurology, orthopedics, rehabilitation, physical therapy, occupational therapy, psychology, communication, technology and orthotics. Services are provided on an outpatient and inpatient basis. Parents and others in the family are important members of the rehab team, and ensure that therapy is integrated into the child's daily activities.

Focus On Technology

A major component of the CTU is the Adaptive Technology Program (ATP), which provides adaptive and assistive technology services for staff, clients and the community.

The program uses available technology to improve client functioning in clinic, work, home and school environments. Specific areas addressed include:
- Seating and positioning;
- Toy adaptations and adaptive switch input devices;
- Augmentative/alternative communication systems;
- Aids for daily living;
- Home adaptations; and
- Alternative computer access.

The ATP team includes a speech, language and communication disorder specialist, adaptive technology specialist and adaptive computer specialist. Services are reimbursed through private pay, insurance and the Department of Social and Health Services of Washington State.

On Loan And On-Line

The Children’s Therapy Unit’s computer loan program is sponsored by the CTU and donations from community agencies and businesses. It provides a short-term, six-month loan of several types of used computers (Apple IIe, Apple II GS or Macintosh SE) to children receiving services at the CTU.

To qualify for a computer loan, the child’s primary therapist must provide a referral. We prefer that the child be actively using a computer during his or her weekly therapy sessions so that the loaner computer will assist in skill acquisition and complement the therapy the child receives in clinic.

Parents are assisted in acquiring commercial software, shareware and freeware programs that are developmentally appropriate for their child’s needs. Either the CTU or parents provide the child with the necessary alternative input devices. -L.B.
inch, round AbleNet Big Red single switch was used for input. The AFC was set to “normal” to allow for either keyboard or single switch input. A variety of early cause-and-effect software was selected to assess Ryan’s ability to focus and sustain his attention on the monitor, and to determine if he could track an object horizontally, vertically and diagonally.

Like most 15-month-old children, Ryan initially responded by playfully slapping at the switch to see what happened. By allowing him time to explore the switch mechanisms, we found that he quickly outgrew the low stimulus of just hearing the clicking switch sounds, and was easily cued to follow the colorful pictures displayed on the monitor by the cause-and-effect software. He laughed at the synthesized voice that called his name while flashing bright colors crossed the screen.

We chose Motor Training Games software for its program variability and age-appropriate stimuli. Ryan quickly progressed to programs that required minimal visual tracking and multiple input for game activation. CATS software(2) offered six programs that encouraged focused and sustained attention to the stimulus item, and required double input: a single input for game reset and a single input for game activation. Ryan was excited by the trucks, cars and rockets speeding around the screen. Within minutes he began tracking the stimulus items horizontally with 100 percent consistency. To decrease the switch target size, a one-inch-diameter Prentke Romich single switch was selected. Ryan’s accuracy rate remained constant.

Next, Don Johnston’s Make It Scan software was selected to test Ryan’s ability to anticipate the visual stimuli and produce a timely, desired response. He demonstrated an 80 percent response accuracy to these programs when they were activated at a slow speed, and he remained attentive to the monitor throughout the entire first hour of assessment, Ryan’s progress was encouraging to the rehab team: he had successfully advanced from using the large single switch with simple cause-and-effect software, to using the one-inch-diameter switch with double input single switch software.

During the second session, Ryan was given the return key, open apple key, and all arrow keys for input. We singled out the keys by using an ABS plastic keyboard cover molded to fit over the computer keyboard, with square holes for the selected keys. Plexiglas was not used as it tends to crack when you drill into it.

Ryan was again given the Make It Scan software to work on his double input and anticipation skills. He readily played with the available keys from the keyboard cover, and soon was visually engaged with the monitor during the appropriate cues. His accuracy of response with the open apple key was consistent, yet slower. It was apparent that this was the area where Ryan could continue to work on his skills and prepare for the next level of access, still using the open apple key.

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Since Ryan’s parents didn’t own a computer, he was placed on the list to receive one from the CTU’s computer loan program, which is sponsored in part by Egghead Software (see sidebar). Due to the limited computer availability, Ryan was initially given a Macintosh SE computer, ABS plastic keyboard cover, and selected early learning, visually stimulating software so that he could continue to practice accessing the open apple key for input.

Within a few weeks, he outgrew the limited software we had available. We reviewed his program to incorporate his current cognitive and functional needs and provide him with age- and skill-appropriate software programs. Through the loan program, Egghead Software donated an Apple II GS computer and the local Daffodil Valley Kiwanis Club donated an Echo II speech synthesizer, which Ryan was able to use at home.

With the help of Ryan’s weekly neurodevelopmental therapies, he has gained the balance needed to achieve moderately supported sitting in a Kaye Products Comer Chair. Ryan’s trunk control now provides him minimal to moderate anterior, posterior and lateral movements while in a supported sitting position. This, in turn, has freed his upper extremities for improved response accuracy while using the computer. As he demonstrates improved keyboard access using his extended index linger, he prepares the skills needed for eventual one-hand keyboard access.

Recently, Ryan began using the computer as a tool for developing his communication skills. A large, clear Plexiglas frame placed around the monitor offers Ryan visual choices for game selection. This concept develops Ryan’s visual scanning and choice selection for eventual use of an augmentative communication device. He clearly demonstrates the skills needed to visually cue to the selections and maintain his visual contact with the choice until the selection has been made on the computer.

Ryan is now 22 months old. Having an Apple II GS computer at home has enhanced his ability to access the early learning software with the open apple and arrow keys. These skills will better prepare him for eventual selection of an augmentative communication device and a home computer system. Ryan’s case is just one of many that we are beginning to see at the CTU, as more and more children qualify for a loaner computer to develop the skills outlined by their therapist.

**FOOTNOTES**

*The CTU uses pre-1981 Strolee car seats received from the Washington State Safety Coalition as an inexpensive seating and positioning alternative. They have a built-in seat angle that tends to be optimal for our clients. These car seats can be readily adapted, allowing for alternative pelvic, chest and trunk straps; leg extensions for increasing the angle of sitting; and fabrication of a clear Plexiglas tray.

For any questions about this adaptive seating system, contact Steven Shores, M.O.T., O.T.R./L., an adaptive technology specialist at the CTU.

*CATS Single Switch Activities software was developed as part of a Dept. of Education Grant # 6008630839. It can be obtained from The Capper Foundation, 3500 Southwest 10th, Topeka, KS 66604; 913/272-4060; or from The Colorado Easter Seal Society, Center for Adapted Technology, 5755 W. Alameda Ave., Lakewood, CO 80226; 303/233-1666.

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