Master mind

Seven schools describe how they are applying research in neuroscience and the cognitive sciences to student learning

FAST FORWARD

Braemar College, Woodend, Vic

Braemar College is a coeducational day school with 780 students from Years 5 to 12. Principal: Mr Russell Deer.

Until relatively recently, the consensus was that lower brain and neocortical areas were immutable in structure after childhood, the implication being that students who fell behind their peers were doomed to struggle academically. This belief has been challenged by new brain research findings which suggest that all areas of the brain are 'plastic' or 'malleable' well after childhood and, in some cases, well into old age. While it is still broadly accepted that the brain does 'map' functions to specific locations, according to neuroscientists those regions are fluid and the borders are blurred.

While much contemporary neuroplasticity research has focused on applications in science and medicine, some researchers have applied their insights to education. Fast ForWord®, a computer-based training program developed by Dr Michael Mezernich and his colleagues at the University of California, San Francisco has been found to enhance brain function and language skills for everyone – the neurotypical, the language impaired, the learning disabled, sufferers of brain dysfunction caused by brain injury, those diagnosed with autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) – and, in most cases, is effective regardless of age.

The success of Fast ForWord Literacy and Literacy Advanced in remodelling the brain has been independently demonstrated by a team of researchers at Stanford University using functional magnetic resonance imaging (fMRI). This has demonstrated that adults and children with dyslexia change the brain regions they use for processing of auditory information after completion of the Fast ForWord programs. Many of these people also improved their performance on standardised, norm referenced tests without undertaking any additional language instruction.

Fast ForWord Literacy and Literacy Advanced have also been found to be successful with children diagnosed with autism and Asperger's Syndrome. Early data compiled by the SciLearn Corporation from research involving children with ASD showed one- to three-year gains in receptive and expressive language skills, auditory perceptual skills and auditory memory after six weeks of training on Fast ForWord.

It was with the knowledge of these independently verified results in mind that Fast ForWord was first implemented at Braemar College in 2008. The College is non-selective with an open entry enrolment policy and up to 20 feeder schools in the surrounding area and this demographic had provided the impetus to investigate options for assisting the students. Mrs Shirley Wallace, Learning Area Leader – Individual Needs, has been the driving force behind the program for the past three years.

Initially, the program had a target group of 40 students from Years 5 to 11 who were deemed to be at risk academically, including: students who were performing below their peers in class; those who performed poorly on the 2007 Achievement Improvement Monitor (AIM) tests or standardised, norm referenced tests; those who had lost school time due to ongoing health problems or family dislocation; and those with behavioural difficulties, including a number of students with specific diagnoses of ADHD, ASD, dyspraxia, mild intellectual disability and borderline intellectual disability.

During Phase 1 students were withdrawn from regular classes on a rotational basis. At this stage Fast ForWord Literacy and Literacy Advanced were offered as an additional program to the Direct Instruction Decoding Reading and Spelling Mastery programs that had formed the basis of the College's Literacy Support program for the previous three years. All participants completed the Reading Progress Indicator (RPI) before starting each of the programs and again at the end of the second program. Statistical analysis of those results showed that the average improvement across the group was 15 months.

There were different patterns of improvement. Some students made

gains ranging from three to four years; others made gains of three to six months. Anecdotally, it seems that the students with ADHD and ASD diagnoses made fewer gains in performance on the RPI, but were the same students about whom the most positive feedback was made by staff and parents, who noticed changes in the students' attitude, self esteem, relationships with others, performance and organisation.

During Phase 2 (2009) targeted students worked with staff to identify a subject or subjects to drop for the time they were in the Fast ForWord program. The lessons of the previous year had demonstrated that the students who were withdrawn from classes were those who could least afford to miss instruction, especially as their classroom teachers expected them to catch up the work they had missed.

The decision was taken to introduce the Fast ForWord Reading programs for students whose performance, on their last RPI, indicated that they were still not operating within two years of their age peers or fell below the twenty-third percentile on national profiles.

Because these students were being re-enrolled into the program, they completed another RPI, and it was found that they had all made further improvements, ranging from a couple of months up to a couple of years. Again, the students with ADHD and ASD made the smaller gains. One student, diagnosed with dyspraxia, made the largest gain of just over two years. During this phase, depending on the perceived needs of the individual students, Fast ForWord Literacy, Literacy Advanced and Reading 1-5 were offered. As students finished Literacy Advanced an assessment was made regarding whether, or when, they should start the Reading programs.

In 2010, the Direct Instruction Decoding Reading program was replaced with Fast ForWord Reading 1-5 for students who needed specific reading interventions. This decision was made for a number of reasons: the programs allow progress at the pace appropriate for the individual; the return of students (after an absence) does not impact the program or progress of other students; the use of a computer adds a degree of rigour (not easily achieved with a group of students who have well-developed avoidant behaviours); students in the one room can be working on any number of different programs simultaneously without impacting other students; and students are able to take more responsibility for their own learning.

Given the successful outcomes – both academic and behavioural – of the program in 2008 and 2009, in 2010 all Year 7 students completed Fast ForWord Literacy and Literacy Advanced. The full impact of this initiative will not be seen until the end of 2015, but there have been some very encouraging outcomes so far.

Statistical analysis of the results showed that the average improvement across the group was 10 months. This was despite the general perception that they were an accomplished group of students. The greatest individual improvement was four years and three months. Using the national percentiles as a reference point: eight students were on the ninety-ninth percentile on the RPI pre-test and 18 on the final test; five per cent of students were below the twenty-third percentile, but only one per cent on the post-test; 25 per cent of students were below the fiftieth percentile, but only 14 per cent on the post-test; and 80 per cent of students were below the ninetieth percentile, but only 65 per cent on the post-test.

While we do not have the resources to use fMRI research to validate our results, there have been observable academic and behavioural improvements in students who were targeted for interventions. Most importantly, students themselves are able to articulate the ways in which the programs have changed their perception of themselves as learners. □

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See www.soniclearning.com.au; www.fastforword.com.au; www.scilearn.com.

Braemar College students at work on a Fast ForWord® program.