MovinCog

MovinCog Initiative

When it comes to child education, it's hardly surprising that some parents are willing to pay thousands of dollars for so-called 'brain training' programmes to help children with learning difficulties associated with neurological disorders such as ADHD or dyslexia. Unfortunately, there's been precious little scientific evidence to support the marketing hype. Until now.

Thanks to some new research at the University of Auckland, parents worldwide are about to be given access to a training programme that's not only based on robust scientific evidence – it will also be free.

Launched in January 2015, the MovinCog Initiative was born from the realisation that too few individuals and schools have access to the remediation programmes they need due to financial constraints or the lack of scientific evidence.

"Being scientists without financial incentives, we decided to implement a programme that would be free of charge and evidence-based" says Dr David Moreau, who jointly heads the project with Associate Professor Karen Waldie – an academic duo from the School of Psychology many years of experience through their respective interests in cognitive training and learning disabilities.

View of Cerebral Space. Features of the planet, such as oceans, trees and flowers provide direct feedback about cognitive performance. The eight mini games visible on the right side of the screen target different abilities critical to academic achievement.

At the heart of MovinCog is a clever software programme in the form of eight mini-games – known as 'Cerebral Space' – that have been designed to target specific learning disabilities associated with thinking, language and numeracy.

The computer games revolve around an initially unattractive grey and fragmented planet with lots of space junk. Children are free to explore whatever game they like and positive feedback is provided in the form of visual elements like flowers and oceans that help beautify the planet. In addition to being fun, the feedback incentivises participants to play different games in order to make the entire planet beautiful.

Different games address different conditions. For instance, Critter Count has been designed to target dyscalculia (dyslexia with numbers) by getting participants to count the number of eyeballs on a friendly-looking monster. Like any computer game, the degree of difficulty and speed increases as performance improves.

While the programme is potentially useful for anyone who plays the games, the intervention is designed to encourage the 'transfer' of general skills so that those children who may suffer from conditions like Attention Deficit Hyperactivity Disorder (ADHD) can pay attention can pay attention to the content that's being delivered to them inside or outside the classroom. As Dr Moreau explains, it's giving them a little boost at one point in time "to make sure that they can actually stay afloat and potentially use those new skills that we're training them on for other purposes."

It's clever, intuitive software which importantly doesn't require a diagnosis so that children don't need any potentially damaging labels. "The nice thing about the software is that it's still going to provide tailored content regardless of any pre-existing diagnosis. So we don't need to label those children," explains Dr Moreau.

The data can be tweaked to direct those who may be functioning above or below average, and because the individual games also involve a degree of overlap in terms of functionality (i.e. language and numeracy) the software can pick up on learning difficulties that may involve a cross-over between dyslexia and dyscalculia. "There might be children who are struggling in different abilities and might fall under the radar to a diagnosis, even though they still need help."

A critical component of the MovinCog Initiative is Physical Space which involves the provision of a high intensity workout as a pre-cursor to the intervention offered by the Cerebral Space. According to Dr Moreau, there's ample neurophysiological research to support the view that physical exercise stimulates the production of neurons that require subsequent cerebral activity for integration into neural networks.

Current trials involve a daily 10-minute workout followed by 20 minutes of computer games over a period of ten weeks. "The exercise is enough to give a boost in terms of arousal on the cerebral space, kids are more focused and more likely to perform well." Without the workout, evidence suggests that cerebral changes are less likely. And besides, David says "the physical exercise part is very general and leads to improvements for a lot of people."

In terms of the basic research, MovinCog has involved a combination of laboratory and field testing to measure different variables and validate the results. Participants undergo a battery of pre and post-test cognitive tasks for things like attention, memory and perceptual speed. Electroencephalograms (EEGs) in the lab look at differences before and after the training in terms of cognitive abilities.

"We want to know exactly what happens in the brain as you get better at a task, and what happens in the brain as you train on our intervention," says David. "We also want to make sure that those brain changes actually translate to what we call behavioural improvements."

The field trials have involved the voluntary participation of up to 500 children aged between 7 and13 years in schools across New Zealand who have been randomly assigned to either an intervention or control group.

Initial findings about the effectiveness of the programme are expected to be released in early 2017 and the early results show that it's promising, "It's working the way we think" says David. An app will then be made available to download online onto any device, along with appropriate guidelines which explain the conditions under which the findings were validated.

While MovinCog has taken almost two years to reach this point, in terms of its experimental design David believes that they've been very thorough in making sure that it's solid science "so that any inference that we make based on the results rests on solid foundations."

A lot of the disappointment around existing brain training programmes relates to overhyping the concept, and David says the US$2 million penalty paid earlier this year by the creators of the Lumosity brain training programme – for allegedly deceiving consumers with unfounded claims – is "a move in the right direction" to protect consumers from false advertising.

> ***"We're giving these kids a little boost where they need it so that hopefully they can then thrive in the school environment or outside of school."***

Given that one in five children are estimated to face learning difficulties, there's no doubting the need for suitable intervention tools. However, David points out that it's important for people to be realistic about what can be achieved through training. "We're not curing those kids, but we're giving them a little boost where they need it so that hopefully they can then thrive in the school environment or outside of school."

The MovinCog Initiative would not have been possible without generous philanthropic support from the Campus Link Foundation in conjunction with the Kelliher Charitable Trust and Perpetual Guardian (as trustee for the Lady Alport Baker Trust). That support has ensured that the training programme is free for anyone to use.

"We don't want financial means to be the difference between a child getting appropriate help and a child whose difficulties are unaddressed. Providing a valid tool to anyone who needs it is at the core of the MovinCog Initiative."

As for future initiatives, David believes that the enormous amount of data that will be gathered from the programme could help with the design of better diagnostic tools to identify learning disorders and also potentially answer different questions such as how the brain learns. ■