Special World

for special education teachers, therapists & schools everywhere

Embodied cognition: Can classroom exercises improve learning?

iPad add-ons: Mounts, cases, switches and more

Show-stoppers: What to see at BETT and ATIA

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Roger Bates is a founding Director of **Inclusive Technology**. Prior to this he taught in a variety of school settings and in 1981 was seconded to developing assistive technology solutions, later becoming Manager of the UK's Northern **ACE Centre**. In his current role as Information Director of Inclusive Technology he has been involved in hardware and software development as well as developing the companies information and training services.

Sanja Denić is a special educator in Belgrade, Republic of Serbia and co-author of Obrazovanjem do digitalne inkluzije dece sa višestrukim smetnjama u razvoju (Education by digital inclusion of children with profound/multiple disabilities) published by the University of Belgrade.

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Marco Iannacone is a moonlighter and hacker with 20 years of international experience related to the Internet, TLC and application development. He now focuses on supporting children with SLD/SEN through his startup, **Digitally Different Srl**, which he founded to develop smart solutions.

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Dr Elizabeth McClelland is the developer of the **Move4words** literacy programme and ran a private practice supporting children with SEN until 2009. She is an educational consultant, an academic visitor at the Department of Physiology, Oxford University and a Fellow of the **Royal Society for the encouragement of Arts, Manufactures and Commerce**.

Sal McKeown is a freelance journalist and author of several books, most recently **Brilliant Ideas for using ICT in the Inclusive Classroom**. Prior to this she was a lecturer and in the special needs team at Becta, the UK's former government agency for technology in education.

Joan Tanenhaus is a speech-language pathologist with over 25 years' experience as a technology specialist, providing consultant services in New York/Long Island, USA. She is founder and executive director of Technology for Language & Learning, Inc., a non-profit organisation, and the author of DISKoveries articles which have appeared in **Closing the Gap** and elsewhere for over 25 years.

EDITORIAL

Editor Mick Archer

'At the time of writing we have amassed more than 12,500 subscribers and we are attracting new readers every day.'

Welcome to Issue 2 of Special World and to 2015.

Four months ago we published our first issue with the aim of providing an online forum for all those involved in the field of special educational needs. Would it work, we asked ourselves. Would professionals write about their work? Would the special needs community subscribe?

The answer has been a resounding, 'Yes'. At the time of writing we have amassed more than 12,500 subscribers and we are attracting new readers every day. We have enjoyed fantastic support from sponsors and our reach is truly international. And we have already attracted a broad range of contributors writing about issues that both concern and excite them.

Our second issue testifies to all this. Dr Elizabeth McLelland disputes the assertion that dyslexia is a verbal and not visual disorder, arguing for 'embodied cognition' which links body and mind. Lauren Archer examines the incredible impact of 16-year-old Musharaf Asghar, whose speech impediment

gripped a TV-watching nation, and the McGuire Programme, which is challenging stutterers to 'face the fear'. Barry Carpenter and Jo Egerton warn of the mental health risks faced by children with SEN and explain how schools can help build resilience.

We report on the legacy of SENnet, a three-year project funded by the European Commission to further the use of technology with children with special needs, and the SEND Gateway, a free portal that supports teachers. Roger Bates and Joan Tanenhaus, from the UK and USA, describe some of the features, accessories and adaptations that make iPads and tablets accessible to all, while Marco Iannacone from Italy explains why and how he has designed a dedicated tablet for children with dyslexia. Kristin Krumm from the USA extols the use of Skype to link school and community and Sanja Denić from Serbia spells out how all software can be made inclusive.

And there is news, highlighting some of the major stories you may have missed, including disturbing evidence of the increased use of drugs like Ritalin

with pre-school children in both the UK and Australia.

This issue of Special World also includes previews of two of the most important education and technology events of 2015: BETT and ATIA's 15th Anniversary Conference. What's more, Special World will be at both of these events sourcing stories, sitting in on workshops and assessing the latest products. And we would love to meet you, our readers.

Perhaps you would like to discuss an article you have in mind, news you would like to relay, a forthcoming event you would like us to publicise, a product you think we should know about, a book you would like to review or simply comment on what we have published so far. Whichever it is do get in touch.

You can contact me by emailing **Mick.Archer@SpecialWorld.net** or via **Twitter** or **Facebook**. Much of what we see and hear will find its way into future issues, so sign up now for your free subscription and don't miss out. Meanwhile we wish you a successful and happy 2015.

NEWS

Mencap survey reveals huge discontent with SEN provision in mainstream UK schools

Two-thirds of UK parents who have a child with a learning disability are not confident that teachers understand how to teach such pupils at their son or daughter's mainstream school, a Mencap survey reveals.

Mencap conducted a survey of almost 1,000 parents who have a son or daughter with a learning disability in a primary, secondary or further education setting. Parents of children with a learning disability in mainstream education told the charity that:

- 81 per cent are not fully confident that their son or daughter's place of education is helping them reach their full potential
- 65 per cent think the way that the education system works means that their son or daughter receives a poorer education than children without SEN
- 35 per cent of parents said that teacher training needs to improve

The charity, which supports inclusive education, says that only when mainstream schools provide a good quality of education for all children, will the demand for specialist support in segregated settings.

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A different brilliant

Autism Spectrum Australia (Aspect) has released a positive awareness campaign on its Facebook, Twitter and LinkedIn pages called, *a different brilliant*.

The campaign includes a centrepiece film and **microsite**, which celebrates human difference by introducing viewers to seven quirky real-life characters on the autism spectrum in a positive and inspiring montage.

Adrian Ford, CEO of Aspect, said 'So often wonderfully talented, brilliant people with autism spectrum disorder are overlooked by society as being odd, or quirky, or obsessive. With our a *different brilliant* campaign, we hope to inspire a wider understanding and respect for how people on the autism spectrum are just like you and me, in many ways, but with their own uniquely brilliant take on the world.'

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Neuronal signalling implicated in autism

A defect in communication between the two halves of the brain may be responsible for some cases of autism, according to a study by researchers at the Stanford University School of Medicine.

The study offers a possible explanation as to why the communication centre of the brain, called the corpus callosum, is often abnormally small in people with ASD.

Although most research has focused on neurons, this study also implicates oligodendrocytes.

Oligodendrocytes coat the signalling arms of a neuron with an insulating substance called myelin, which enables electrical signals to move quickly from one neuron to another.

'This is our first glimpse of autism's underlying biological framework, and it implicates a cell type and region of the brain that have not been extensively stud-ied in this disease,' said Michael Snyder, PhD, professor and chair of genetics.

'Until now, we've suspected that autism could be the result of defects in the neurons themselves. Now it appears that the oligodendrocytes can contribute to the problem by inhibiting neuronal signalling through poor cellular differentiation and myelination.'

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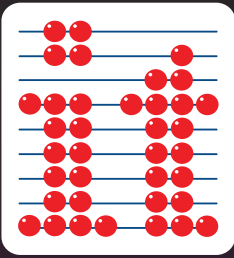
ChooseIt! Numeracy

Numeracy contains over 230 activities with over 6,000 pages of simple multiple choice activities.

Each activity consists of a graded sequence of 20 to 40 simply presented multiple choice questions. Correct answers result in a short animated sequence with music and spoken reinforcement while a fun 'monkey story' game adds to the motivation.

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ChooseIt! Literacy

Literacy contains over 250 activities with over 5,000 pages of simple multiple choice activities.

The Apps include simple performance reporting, so you can record student progress. Designed by a teacher with over 20 years' experience in primary and special schools, the series is ideal for pupils at the Foundation Stage and KS1 as well as those with special needs who need extra practice.

Download on the App Store

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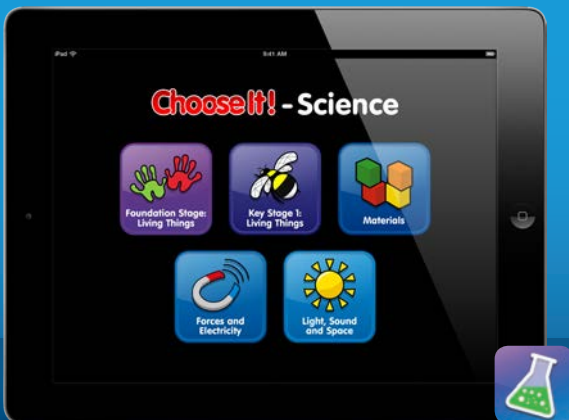
ChooseIt! Science

ChooseIt! Science contains over 160 activities with over 3,000 pages of simple multiple choice activities.

A simple and consistent presentation, clear language, switch accessibility and full audio support which has made them a valuable resource for children with special needs. Performance reporting is built-in.

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Study confirms echolocation acts as 'sixth' sense for blind people

A study by neuroscientists at **Western University's Brain and Mind Institute** has confirmed that human echolocation operates as a viable 'sense', working in tandem with other senses to deliver information to people with visual impairment.

Echolocation is used by some blind people to find their way around, either snapping their fingers or clicking their tongue to bounce sound waves off objects. It is often associated with bats, which use it when flying. The research team investigated how much echolocation in humans has in common with the way in which sighted people use their vision. They demonstrated that echolocators experience a 'size-weight illusion' when they use their echolocation to get a sense of how big objects are, in the same way as sighted people do when using their normal vision. The size-weight illusion is what you experience when a small box containing a kilogram of lead feels like it weighs more than a big box containing a kilogram of feathers.

Melvyn Goodale, Director of the Brain and Mind Institute, said: 'This new study shows that echolocation is not just a functional tool to help visually impaired individuals navigate their environment, but actually has the potential to be a complete sensory replacement for vision.'

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Retinal implant may help restore sight
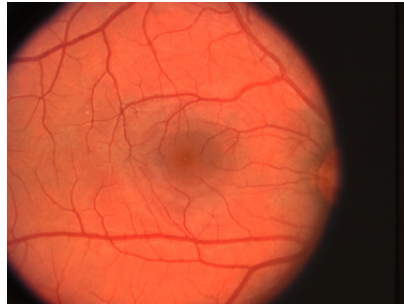
People who have lost some or all of their sight due to retinal degeneration may eventually see again thanks to new research in nanotechnology.

Researchers at Tel Aviv University, The Hebrew University of Jerusalem, and Newcastle University have developed a film that when implanted on the retina can replace damaged photoreceptors and re-sensitise the retina to light.

The experiment involved attaching the film to a newly born chick's retina before it had become light sensitive. The adapted retina then produced a photogenerated current—a neuronal signal that can be interpreted by the brain.

'The greatest significance of our work is in demonstrating how new materials can yield a new system suitable for efficient stimulation of a neuronal system,' co-author Yael Hanein, Professor at Tel Aviv University, told **phys.org**.

The researchers are working with a retina surgeon to develop an implantation and testing procedures with the aim of conducting human trials.

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French film divides deaf community

A french film that has been hailed as the country's next international hit has unleashed a storm of protest from members of the deaf community.

La Famille Bélier portrays the farming family of deaf-and-mute parents Gigi and Rodolphe and their 16-year-old hearing and speaking daughter Paula, an accomplished singer who decides to leave the family home to pursue a singing career.

But the actors chosen to play Gigi and Rodolphe are not deaf and were given a crash course in sign language for their roles – a decision that has angered the film's critics.

Writing in the *Guardian* Rebecca Atkinson, who was born deaf, described the resulting performances as, 'an embarrassing and crass interpretation of deaf culture and sign language' and compared it to white actors blacking up.

Now the row looks set to go international. La Famille Bélier, which is on general release in France, has been sold to 85 countries.

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Baidu announces breakthrough in speech recognition

Researchers from Chinese internet firm Baidu say they have made a breakthrough in voice recognition delivering a system that outperforms others in standard benchmark tests.

The US-based team led by Andrew Ng drew on 'deep learning', a branch of Machine Learning, to develop their system, which they call Deep Speech.

While the science behind Deep Speech is complex, the system is based on two key elements: the training of a large recurrent neural network (RNN) using multiple GPUs and the processing of thousands of hours of labeled data.

When trained from large quantities of labeled speech data, the RNN can learn to produce readable character-level transcriptions with improved accuracy.

The dataset used to train Deep Speech consisted of over 7,000 hours of conversational and read speech.

The research team performed two sets of experiments to evaluate the new system: one assessing conversational speech and one assessing noisy speech.

While Deep Speech outperformed four other commercial systems, including those of Google and Apple, on both tests it was in its handling of noisy speech that it really excelled.

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Top 10 autism research stories of 2014

Autism Speaks, the world's leading autism science and advocacy organisation, has published an end-of-year list of its 'Top Ten Autism Research Stories of 2014'. The list, based on readership and social media shares, includes some of the most important advances of the last 12 months, covering genetic research, non-genetic causes of autism, early indicators and ways of easing symptoms.

Autism Speaks regularly publishes autism research news **here** and you can also subscribe to its biweekly **Science Digest**.

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Over 3,000 toddlers now prescribed Ritalin in Australia

Australia has seen a 320 per cent increase in seven years in the number of two- to six-year-olds being given Ritalin, according to a report in Sydney's *The Daily Telegraph*.

The paper says that new government figures show that 3,527 toddlers are now being given the drug, up from 821 in 2007.

There are also 29,523 schoolchildren aged between seven and 11 on ADHD drugs, compared to 16,423 children aged between six and 10 in 2007, since when age groups have changed.

National Health and Medical Research Council (NHMRC) clinical practice points from 2012 state that for children under seven, drugs should be a last resort.

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IN CASE YOU MISSED IT

Our round-up of some of the key disability/SEN stories you may have missed

A biological thought-marker for autism

Psychiatric disorders of thought, such as autism, are usually diagnosed on the basis of a clinical assessment of an individual's verbal and physical behaviour, but researchers from Carnegie Mellon University (CMU), Pittsburgh, USA believe they've discovered a new tool capable of predicting autism diagnoses with 97 per cent accuracy.

The CMU study, published in **PLOS One**, asked whether, by detecting changes in the way certain concepts are represented in the brains of autistic individuals, it is possible to distinguish them from control participants.

The research team, led by Marcel Just, used functional magnetic resonance imaging (fMRI) to study the brain activation patterns of 17 young adults diagnosed with high-functioning autism and a matched control group. Participants were asked to think about the referent of eight social interaction verbs – compliment, insult, adore, hate, hug, kick, encourage, humiliate – from two perspectives: as the agent of the action and the recipient.

The study found that when asked to think about persuading, hugging or adoring, the neurotypical participants put themselves into the thoughts – they were part of the interaction. For those with autism, however, the thought was more like considering a dictionary definition or watching a play.

'We found that we could tell whether a person has autism or not by their brain activation patterns when they think about social concepts,' Just said. 'This gives us a whole new perspective to understanding psychiatric illnesses and disorders. We've shown not just that the brains of people with autism may be different, or that their activation is different, but that the way social thoughts are formed is different. We have discovered a biological thought-marker for autism.'

Dyslexia – what works?

There's no shortage of screening methods, diagnostic processes and support measures for dyslexia, but which of them, if any, are backed up by scientific evidence? To find out the Swedish government commissioned the Swedish Council on Technology Assessment in Health Care (SBU) to carry out a systematic review of the various tests and interventions available in Sweden (more than 50 according to the European Dyslexia Association).

The review conformed to the **PRISMA Statement** and included literature found in four different international databases – PubMed, PsycInfo, ERIC and LLBA – until September 2013. The SBU team found that while there's sufficient evidence that teaching children with dyslexia how to associate speech sounds (phonemes) with letters (graphemes) in a structured way benefits reading comprehension, reading speed, spelling and phonological awareness, there's insufficient evidence in respect of other forms of literacy training or assistive technologies such a mobile apps.

The researchers say that in the light of the growing societal demands on individuals to read and write more should be done to find reliable tools to assess and assist individuals with dyslexia and that parents and individuals diagnosed with dyslexia may need help coping with the expectation that help is available, as this hope is often awakened during the evaluation process.

The benefits of universal newborn hearing screening

Rafael Ben-Ari/Chameleons Eye

Permanent childhood hearing impairment (PCHI) is the most common sensory disability, affecting 1 in 750 children. It is present at birth in more than 80 per cent of cases.

Research has shown that children with PCHI who are identified before nine months of age thanks to universal newborn hearing screening (UNHS) enjoy significant benefits to their language and reading at 6-10 years of age compared with those identified later.

To date, however, there has been an evidence gap as to whether these benefits persist into teen years and include functional outcomes, such as comprehension.

Now a follow-up study published in **Archives of Disease in Childhood** has tested the language and reading of 114 teenagers aged 13–19 years, all of whom were tested aged 6-10. Seventy-six of the study group had PCHI and 38 had normal hearing. Half of them were born in periods with UNHS.

Each participant was assessed by a trained researcher, unaware of their audiological history. The preplanned primary outcome of the study was their reading comprehension score.

The researchers found that, 'the teenagers whose PCHI had been confirmed early had maintained their level of performance relative to the hearing controls whereas the late confirmed teenagers had not: the gap between the early and late confirmed groups had doubled between the two assessments.'

The study concludes, 'This strengthens the case for national governments to fund UNHS programmes that increase the rates of early confirmation of PCHI in the many developed and developing countries where UNHS for PCHI is currently under discussion but not yet adopted as national policy.'

Cancer treatment could reverse behavioural symptoms of autism

Daisy Daisy

People affected by Fragile X Syndrome could be helped by a drug that is being tested as a treatment for cancer. Scientists from the University of Edinburgh and McGill University in Canada have identified a key molecule - eIF4E - that drives excess protein production in the brains of Fragile X patients.
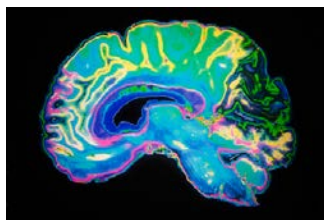
This can cause behavioural symptoms that include learning difficulties. It can also lead to more serious intellectual disabilities, delays in speech and language development and problems with social interactions.

The scientists found that eIF4E regulates the production of an enzyme called MMP-9, which breaks down and re-orders the connections between brain cells called synapses. This disrupts communication between brain cells leading to changes in behaviour.

The team found that treatment with a known naturally occurring chemical called cercosporamide blocks the activity of eIF4E, and therefore reduces the amounts of MMP-9, and reverses the behavioural symptoms in mice with a version of Fragile X Syndrome.

Cercosporamide is being tested as a treatment for lung cancer and acute myeloid leukemia. The new findings suggest that it could also have a use as a treatment for patients with Fragile X Syndrome.

Fragile X Syndrome is the most common genetic cause of autism spectrum disorders. It affects around 1 in 4000 boys and 1 in 6000 girls. Currently, there is no cure.

Time in child care linked to behavioural problems

A major national study has found that the length of time a child spends at a childcare centre in the first three years of life is associated with a particular set of problem behaviours by ages 4-5 years.

The study, conducted by researchers in the University of Adelaide's School of Population Health, found that children who spend longer in centre-based childcare are more likely to be hyperactive, disruptive and aggressive at school age.

However, the study also found that these children were less likely to be withdrawn, anxious or depressed.

The research was based on data of more than 3,200 children from the Longitudinal Study of Australian Children and involved surveys of parents and teachers. The project looked at children's development following time spent at different types of childcare.

PhD student Angela Gialamas, from the University's Better Start Child Health and Development Research Group, says this research adds to the growing understanding of how childcare affects the behaviour and development of Australian children: 'Much of the childcare research is coming from the US or the UK, but it's important to see what is happening in the Australian context. We need to better understand how childcare is contributing to children's learning, development and transition to school.'

Training the physical to improve the cognitive

Dr Elizabeth McClelland takes issue with the sit-down-and-learn camp and argues that 'embodied cognition' offers a more successful approach for many children classed as having special educational needs

By Dr Elizabeth McClelland

Can physical activity really have any impact on learning, especially for children with special educational needs (SEN)? You've probably heard positives and negatives being said on this issue over the years, with the 'establishment' being firmly in the sit-down-and-learn camp.

The first issue of *Special World* included an article on Bad Science (page 56) which stated that there is a consensus view among researchers that dyslexia is a verbal not a visual disorder, which is best dealt with by interventions that target underlying weaknesses in phonological language skills and letter knowledge. My colleague, Professor John Stein of Oxford University, and many others, would contest this view.

New developments in cognitive science suggest that the brain depends far more on its interaction with the body than was previously supposed. [Claxton, G. (2012). Turning thinking on its head: How bodies make up their minds. *Thinking Skills and Creativity*, 7, 78-84.] This idea is called 'embodied cognition' – the concept that our systems of complex understanding

are rooted firmly in bodily awareness. [e.g. Barsalou, L. W., Kyle Simmons, W., Barbey, A. K., & Wilson, C. D. (2003). Grounding conceptual knowledge in modality-specific systems. *Trends in Cognitive Sciences*, 7, 84–91., e.g. Gallese, V., & Lakoff, G. (2005)]. The brain's concepts: The role of the sensory-motor system in conceptual knowledge. *Cognitive Neuropsychology*, 22, 455-479.] Research scientists are now showing, for example, that experience gained from learning accurate muscle control in order to achieve physical tasks helps to build the child's ability to achieve more abstract goals, including reading and maths. [Boncoddo, R., Dixon, J. A., & Kelley, E. (2010). The emergence of a novel representation from action: Evidence from preschoolers. *Developmental Science*, 13, 370-377.]

Embodied Cognition offers an exciting new tool to support school learning for pupils who currently struggle and have been classed as having SEN.

Impact

I have been developing and researching this idea one-to-one with pupils with SEN, with whole school classes in schools and with various academic colleagues for the past 10 years. My experience suggests that there are some specific areas of physical activity which do have a real and significant impact on learning for many pupils. It is necessary to provide physical activities which actually require the child to focus their attention and to learn self-control. The activities need to train eye-tracking skills, and seem to be most effective when carefully designed to follow a sequential pathway, starting very simply and gradually developing in complexity over a 12-week period. Rhythm and timing of movement are very important, too. I've put together a 12-week video-based programme, now trialled with over 2,500 pupils. I call this **Move4Words**, and it is available to schools through a not-for-profit social enterprise. The wonderful Professor Sir Tim Brighouse is our patron.

I have authored the first peer-reviewed scientific article on the use of this exciting new method to help pupils in school classrooms, due to be published imminently in the journal **Improving Schools**. [McClelland, Pitt and Stein, 2014. Enhanced academic performance using a novel classroom physical activity intervention to increase awareness, attention and self-control: Putting embodied cognition into practice. *Improving Schools*, 1-19, in the press] The article presents strong evidence for significant impact of controlled body and eye movement on academic performance, particularly for pupils who are performing in the bottom 20 per cent. Other, as yet unpublished data, shows dramatic improvements in reading age and reading speed. For example, 38 pupils who had made virtually no progress in reading in an average of four years at school (reading age of five years, but actual age nine years), made 14 months progress in reading during the three-month intervention period.

Teachers reported many improvements during the trials: stuck learners seemed to be switching on at last; reading, maths, concentration and engagement all improved.

I have personal experience of the power of focused physical and visual activities to help reorganise the brain and to train learning. In 1997, I was a Geophysics Lecturer and research scientist at Oxford University, at the top of my profession. Then I was struck by a viral infection which affected my brain, and caused acquired dyslexia. Life transformed to a nightmare where I struggled to read. Two exhausting years later, I finally found a solution to my own problem by using some rather bizarre physical and visual exercises which had a rapid and dramatic impact. Since then, I have been passionately interested in exploring the reasons behind this amazing effect, and to developing simple, effective and easy-to-use tools for school teachers.

A large body of evidence is growing showing that physical activities do have real and important impact on literacy and learning, maths and thinking skills. The field of literacy has the richest literature on this subject. Children who are not good at clapping to a rhythmic beat at age six typically go on to be poor readers, and this correlation lasts up to age 11 or more. [David et al, 2007. Rhythm and reading development in school-age children: a longitudinal study. *Journal of Research in Reading*, 30 (2), 169–183] Rhythm and literacy are linked because the developing child needs to be able to hear and analyse the rhythm in speech before they can work out where one word in a sentence ends and the next one starts, let alone split up an individual word into phonemes. [Holliman et al, 2008. Sensitivity to speech rhythm explains individual differences in reading ability independently of phonological awareness. *British Journal of Developmental Psychology*, 26 (3) 357-367]. Finally, engaging in rhythmic training actually does improve literacy skills for poor readers [Moritz, C., Yampolsky, S., Papadelis, G., Thomson, J., & Wolf, M. (2013). Links between early rhythm skills, musical training, and phonological awareness. *Reading and Writing*, 26, 739–769.]

Eye exercises

Reading is a visual task, and the brain has to process the visual signal in many complex ways before the words emerge in our awareness. Researchers have shown that visual attention is at least as important as phoneme awareness in early reading, and becomes far more important as reading matures. [Bosse and Valdois, 2009. Influence of the visual attention span on child reading performance: a cross-sectional study. *Journal of Research in Reading*, 32 (2), 230- 253.] This is not just academic theory, but can be used to help poor readers. Regular eye exercises involving tracking and convergence significantly improve reading for poor readers, particularly those with dyslexia. [Clisby et al., 2000. Outcome of treatment of visual problems in children with reading difficulties. *PATOSS Bulletin Nov.*, 9-14.]

There seems to be an evolutionary thread underpinning these links and many other connections between the physical and the cognitive. It is now thought that human language developed from gesture [Gentilucci, M., & Corballis, M. C. (2006). From manual gesture to speech: A gradual transition. *Neuroscience & Biobehavioral Reviews*, 30(7), 949-960.]; clear evidence for this is that brain scans show that the brain is highly active in the areas which control physical movement, when the subject is listening to language, speaking or reading [Tettamanti et al, 2005. Listening to Action-related Sentences Activates Fronto-parietal Motor Circuits, *Journal of Cognitive Neuroscience* 17, 273–281]. What's more, the areas which light up are closely linked to the meaning of the language being processed; for example, when hearing the abstract concept of 'delegating responsibility' our brains will reproduce the hand and arm gestures of handing a physical object over to someone else. [Glenberg, A. M., Sato, M., Cattaneo, L., Riggio, L., Palumbo, D., & Buccino, G. (2008). Processing abstract language modulates motor system activity. *Quarterly Journal of Experimental Psychology*, 61(6), 1–15.]

I'm not the only one to have had positive results when using inclusive classroom exercise programmes to help children learn more effectively. Researchers from the University of Aberdeen found that primary school pupils performed better on cognitive tests after regular classroom physical exercise. [Hill, L., Williams, J. H., Aucott, L., Milne, J., Thomson, J., Greig, J., & Mon-Williams, M. A. R. K. (2010). Exercising attention within the classroom. *Developmental Medicine & Child Neurology*, 52, 929–934.] Scientists from the University of Kansas found that academic achievement improved when primary school lessons were made more physically active. [Donnelly, J. E., & Lambourne, K. (2011). Classroom-based physical activity, cognition, and academic achievement. *Preventive Medicine*, 52(Suppl.), S36–S42.]

Why is this important? In UK schools, one in five children are classified as having SEN, five times the European average. Only 13% of UK children with SEN, including dyslexia, receive diagnosis of their condition, so 1.5 million SEN children do not receive support tailored to their specific needs. This is a huge number and a very worrying statistic. It leads to our education system failing far more children than elsewhere in the developed world.

Is this because we are one of the very few countries which start pupils sitting down and concentrating when they are far too young? Many specialists think this is the case, and I am inclined to agree. Researcher David Whitebread, of Cambridge University Faculty of Education, along with another 130 early childhood education experts, called for the UK Government to delay the start of formal schooling until the age of seven, in line with the rest of our European counterparts, who have higher levels of child well-being and academic achievement. Unfortunately the UK Government simply stated that this report was 'misguided' and are pushing full steam ahead with plans to allow children as young as two into formal schooling.

Received wisdom

I'm sure there will be a lot of people out there who don't like the ideas I've discussed here. The received wisdom in the academic

world of literacy research is that the only thing that is needed to improve literacy is more and better phoneme awareness training. I believe that the proof is in the pudding; we need to find what actually works in practice, never mind whether it is underpinned with a theory which is mainstream and accepted.

In the 1980s, I did some geophysics research which went against the status quo in my field. Luckily, my international colleagues were open minded and allowed my ideas to be published, although I got a lot of ribbing at conferences for going off the wall. Eventually, more than 10 years later, technology moved on to the stage where sophisticated electron microscope techniques allowed the behaviour to be observed. I turned out to have been right, and the accepted theories had to be completely overhauled! I don't mind being out on a limb – let's hope that these ideas can really help children with SEN achieve happier and more successful lives in the future. •

'Th-Th-That's all folks!'

Lauren Archer looks at our changing attitudes to stuttering and at the McGuire Programme which has helped reshape our views

By Lauren Archer

For countless families huddled around their television sets each evening, the stammering conclusion of the Warner Brother's classic *Looney Tunes* cartoon was a source of endless amusement. Porky Pig, the stuttering, bow tie- and suit jacket-clad star of the animated series, suffered from a hugely hyperbolic speech impediment, with **one study** finding he would stumble over a disproportionately high 23 per cent of his words and display atypical and exaggerated speech patterns.

Porky's stammer, like that of so many characters before and after him, was used as a source of amusement, and as a convenient shorthand for a weak, nervous character.

A Fish Called Wanda

Actor Michael Palin, inspired by watching as his father, tense and frustrated, struggled daily with his stammer, is one of a number of public figures advocating for a better representation of people with speech impediments in popular culture. Palin teamed up with John Cleese to produce one such character: stuttering hit-man Ken Pile, of *A Fish Called Wanda*, a man whose speech impediment was not his defining characteristic, who was intended to be as three-dimensional and well-rounded as every other character in the ensemble.

Palin's carefully crafted character pushed stammerers into the spotlight, although opinions on abrasive underdog Ken were understandably divided. Some were pleased to see a character with a stutter at the heart of a cult classic, but others, such as **Jeffrey K. Johnson**, felt that Ken's trajectory was as painfully predictable as countless stuttering stereotypes before him.

Over the course of the film, Ken learned to physically stand

up to anyone who dared to mock his speech, eventually overcoming his cowardice and, in turn, his symptomatic stutter. For many, the transformation of his cautious character was yet another heavy-handed approach to a sensitive subject.

Four years after Ken's big screen debut, Palin was contacted by an affable businessman who had struggled with a stammer since childhood. Travers Reid invited Palin to a meeting with himself and speech therapist Lena Rustin. They spoke about stammering, about therapies, and about Palin's experiences growing up with a father unable to confront his struggle with fluent speech. Just 12 months later, in 1993, the **Michael Palin Centre for Stammering Children** opened in London.

Tense, insecure and fearful

The problem, as many of the patrons visiting the Centre will find, is that a patronising perception of stammerers and stutterers persists far beyond our television screens. Johnson's study cites Barry Guitar, author of *Stuttering: An Integrated Approach to Its Nature and Treatment*, who says that, 'research has shown that most people, even classroom teachers and speech-language pathologists, stereotype people who stutter as tense, insecure, and fearful.'

Though a recent wave of pop culture icons with

speech impediments may have helped change the discourse around stammering and stuttering, there is still some way to go. Famous figures like UK *Pop Idol* contestant **Gareth Gates** and King George VI, as played by Colin Firth in **The King's Speech**, are at the forefront of better, more considerate portrayals, not reliant on us mocking or pitying those who stammer, stutter or stumble over their words. But all too often, speech impediments are still seen as endearing personality quirks, rather than symptomatic of the debilitating anxiety issues that can lie beneath.

Jake Céileachair is a 22-year-old student from London who struggled with slurred and stammering speech as a child and now campaigns around disabled rights and other issues affecting young people. He thinks that although the portrayal of speech impediments in the media has become kinder, people who struggle with their speech are still not being taken seriously enough. 'I think it's being fetishised and seen as something cute

to an extent,' he says. 'When it comes to my impediment, people find it adorable or feel compelled to correct me, even though I can speak fine most of the time.'

A turning point

2013, however, heralded something of a turning point when over 11 million people tuned in to British TV and watched in awe as Musharaf Asghar, a 16-year-old boy from Yorkshire, gave a speech to his school assembly, having previously struggled to say almost anything at all. According to Guardian TV editor Rebecca Nicholson the two-minute clip was 'one of the defining moments of television in 2013'.

Asghar struggled with an acute stammer which, despite regular speech therapy sessions, was proving difficult to cope with and was threatening to quash his chances of passing the oral component of his English GCSE (General Certificate of Secondary Education). It wasn't until his English teacher watched *The King's Speech* and suggested Asghar listened to music through headphones while he spoke that he was able to focus on overcoming his speech impediment.

Asghar passed his English GCSE and is now at college continuing with his studies. But for Richard Whincup, a staff trainer for the **McGuire Programme**, a course taught by recovering stammerers, the speech that inspired millions was a source of frustration. 'I was yelling at the television, and social media was

buzzing with stammerers saying: "You've got it all wrong!" '

Although the musical method can work temporarily, Whincup says, it has no permanent benefits, and isn't a quick cure for a speech impediment. It was out of this frustration that the McGuire Programme, which has helped improve the lives of thousands of former stammerers or 'graduates' worldwide, contacted Asghar and filmed the one-off **'Stammer School: Musharaf Finds His Voice'**, following the then 17-year-old and four other young people on one of the McGuire Programme's intensive four-day courses.

The McGuire Programme

Iain Mutch joined the McGuire Programme at the age of 33, and is now one of its regional directors. Up until his first session, Mutch had let his stammer dictate his life, leaving him

embarrassed in social situations and forcing him to live in fear of public speaking. Then, in 2000, he avoided giving a eulogy at his father's funeral, because he was worried about stumbling over his speech. Five days later, in August 2000, he was in Bournemouth on his first McGuire Programme training course.

'I think fundamentally the McGuire Programme is unique in that it's all involving people that have been through it themselves, everyone in the programme has stammered themselves,' he tells me. 'The coaches, the management, everyone on the programme is someone who got to a point of saying, "Enough is enough, I've got to do something about my stammer".

'Our approach is very intense. It's a four-day residential course with about 50 hours of coaching, meaning it works out as the equivalent of a year of weekly hour-long sessions.'

The McGuire Programme markets itself as a holistic

approach, tackling the fear and anxiety that causes and is caused by impediments, rather than simply working on the symptoms evident in speech.

'It's something I think we do to ourselves,' Mutch says. 'It's that chicken-and-egg moment; nobody has an answer. There might be a genetic trigger, or something out of our control, but somehow we start to alter our behaviour to avoid the sound we struggle with. It just knocks our confidence. Then we start finding ways not to speak and not to engage in the speaking process.

'Lots of programmes believe society needs to change to accept the 1% of people who stammer, but we believe that the 1 per cent need to confront what's stopping them speaking like the other 99 per cent. It's like having a broken leg: if you have a broken leg you do something about it.'

Everything the programme does, from the public speeches given by its graduates to the videos shown of its directors, now fluent speakers, in their stammering days, is about creating role models for people with speech impediments. In Bournemouth 14 years ago, Iain Mutch sat down and watched Richard Whincup give the course's opening speech. He was inspired. 'I thought, "I can see what I want to be – I can see a fluent speaker." It gives you hope; you can see a way out. I thought: "If he can do it, so can I".'

Now Mutch, like the thousands of other McGuire Programme graduates all around the world, is standing up and giving the speeches, a different person to the one who, 14 years ago, would shy away from social situations for fear of tripping over his words. The McGuire Programmes encourages its graduates to aim for eloquence, rather than mere fluency, and many are involved in public speaking associations like **Toastmasters**, **Association of Speakers Clubs**, and **Rostrum**, going on to regularly win public speaking awards.

With confrontational, innately televisual approaches and characters like these making it onto our screens and into our conference halls, speech impediments are becoming harder and harder to ignore. The only thing left to do, McGuire course leaders argue, is to stand up, take a deep breath, and face the fear. •

From vulnerability to resilience

Children and young people with intellectual disabilities are at greater risk of mental health problems, argue Barry Carpenter and Jo Egerton. Schools need to be alert to the signs and take steps to build their resilience

By Barry Carpenter and Jo Egerton

The [United Nations Convention on the Rights of the Child, Article 24](#), states that mental health is of over-riding importance in the quality of life for children and young people. Among all children, 20 per cent may have a mental health problem in any given year, and about 10 per cent at any one time ([The Fundamental Facts](#)). For children with intellectual disabilities, the figures are even greater and the consequences more bleak.

This group of children and young people can experience the full range of mental health problems. However, educators often confuse the signs with diagnoses, eg attributing acute anxiety to autistic spectrum disorder (ASD), communication difficulties, challenging behaviour or lifestyle (eg an unsettled home life)

[[Meeting the helath needs of people with learning disabilities](#)]. Yet it is estimated that over one-third (36 per cent) of children with intellectual disabilities have diagnosable mental health problems [[The Mental Health of Children and Adolescents with Learning Disabilities In Britain](#)].

Seven in 10 children with an ASD and nine in 10 children with fetal alcohol spectrum disorders will experience at least one mental health issue [[Mental Health of Children and Adolescents with Intellectual and Developmental Disabilities A Framework for Professional Practice](#)] [[Take Another Look: A Guide on Fetal Alcohol Spectrum Disorders for School Psychologists and Counselors](#)].

Schools and educators are part of the first level response to mental health issues. While educators now recognise that, 'underpinning success and achievement for any student of any ability is the quality of their mental health' [**Mental Health: The new dimension in the curriculum for children and young people with special educational needs**], they need targeted training [**What About Us?**]. Schools need to develop whole-school and individualised early identification and intervention strategies as well as clear support and referral procedures. Coughlan et al's [**Module 3.4 Emotional well-being and mental health**] online training module provides excellent guidance.

Signs of mental health problems

All children and young people with mental health problems experience significant changes in thinking, emotions and behaviour (eg eating, sleeping, personal care, level of interest, etc.) which impact on their everyday behaviours and ability to function. For those with moderate to profound intellectual disabilities, signs of mental problems may be different including:

• Loss of skills (eg communication)
• Increased obsessive activity (eg requesting reassurance)
• Hyper-arousal (eg tremors, fast pulse, sweating).
• Outbursts of aggression, destructiveness or self-harm
• Disruptiveness, non-compliance, anti-social behaviours
• Loss of bowel or bladder control
• Sexualised behaviour
• Persistent aches and pains without physical cause
• Restlessness, wandering or searching
• Unusually fearful behaviour without cause
• Return to persistent developmentally young behaviours (eg bed-wetting)

[**Clear Thoughts**] [**Developing Mental Health Services for Children and Adolescents with Learning Disabilities: A Toolkit for Clinicians**] [**Candle (CAMHS And New Directions in Learning Disability and Ethnicity) Project**].

While some mental health problems pass quickly and can be addressed by schools, others become long term and serious. Concerns should be raised if these signs do not respond to well-designed, consistent, school-based interventions, if they occur for longer than two weeks and if they are seen across different environments (eg school, home, etc.). Extreme behaviours (eg self-harm, running away, or not wanting to go on living) need urgent professional help.

School-based interventions

The challenge for educators is to lift children from vulnerability to positions of resilience. It is important to identify and put in place school-based interventions that can alleviate the impact of mental health problems.

When children are feeling emotionally vulnerable, their emotional turmoil may affect their ability to focus on, understand and begin a task. Coughlan *et al*. [**Module 3.4 Emotional well-being and mental health**] and Carpenter ['Navigators of learning', *Special!* March 2010, 22-23] suggest that educators can support children by helping them to acknowledge their feelings about their class work, structure it by breaking it down into a sequence of small steps and, building in strategies for asking for help.

Case study – Stephen

[**Engaging Learners with Complex Learning Difficulties and Disabilities A resource book for teachers and teaching assistants**]

Stephen is 11 years old and currently attends a mainstream secondary school. He transitioned from primary school with a statement to support his learning needs due to complications with speech and language communication and behavioural, emotional social development needs. His parents are currently investigating the possibility that he falls within the Autistic Spectrum.

Mental health concerns were raised due to his behavioural outbursts and difficulties in engaging within the curriculum. The support he is provided with now allows for appropriate educational strategies to be put into place.

However, there is a growing concern for Stephen's emotional wellbeing as he is becoming less motivated by learning and interacting within his environment. These concerns are heightened by verbal outbursts from Stephen, including suicide threats, comments about his own mental state and self-injury.

The school is implementing strategies which have been shown to benefit children's mental health – increasing the amount of exercise he can access, involving him in peer mentoring, and giving him time with trained staff to allow him to discuss his difficulties. They are also working with Child and Adolescent Mental Health Services (CAMHS) and the speech and language service to investigate Stephen's issues and appropriately support him, enabling him to focus on learning once again.

Pre-empting mental health problems

It is important that the people who work and live with the child or young person with intellectual disabilities are aware of any signs, symptoms and changes in how the child behaves, feels, communicates and goes about their daily life. They can [Candle (CAMHS And New Directions in Learning Disability and Ethnicity) Project]:

- Maintain awareness of the at-risk child's mental health through systematic observations in collaboration with colleagues and family
- Build a picture of what 'normal' functioning is for them (including any idiosyncratic behaviours)
- Personalise approaches and strategies to enable the child to understand and express what they are feeling (eg through mind maps, flow charts, feelings thermometers; personal tutorials, etc.)
- Recognise and respond to their learning and communication needs (eg providing visual structure and communication systems)
- Create an exercise programme, and ensure they have a Health Action Plan to promote and monitor health, diet and medication.
- Pre-empt anxiety by preparing the child in advance for difficult situations and developing with them personalised coping strategies (eg social stories)
- Reduce stresses on young people and their families through early intervention and support programmes.
- Arrange access to therapeutic approaches if necessary where there appear to be limitations in the curriculum-based approaches.

It is important that the child or young person with intellectual disabilities is involved in this process. They have a right to be consulted, and they might have different and useful opinions about what has been happening to them [Mental health nursing of adults with learning disabilities]. They also need accessible and sensitively managed information about their difficulties, experiences and disability.

Developing protective factors

From early years, and throughout school life, it is important to work with all children and young people with intellectual disabilities to increase their resilience against mental health problems by specific teaching in [Mental Health of Children and Adolescents with Intellectual and Developmental Disabilities A Framework for Professional Practice]:

- Using an effective, personalised communication system
- Understanding communication from others
- Knowing and applying the rules of social interaction flexibly
- Expressing and recognising their own emotions and those of others
- Self-regulating emotions, behaviours, etc.
- Understanding and sharing their experiences
- Developing a sense of self and building relationships with others
- Goal setting and problem-solving
- Coping strategies (e.g. for stressful situations, bullying, etc.)
- Developmental/age appropriate life skills.

Conclusion
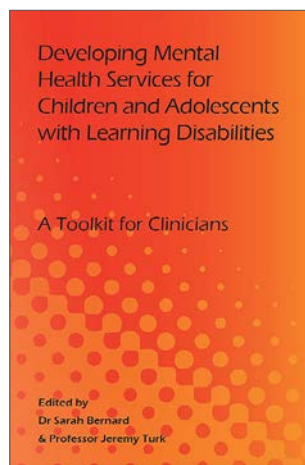
Although school-based interventions do not substitute for trained clinicians or specialists, they are an effective first step intervention in increasing children's resilience. In responding to possible signs of mental ill health in a child or young person, it is important to:

- Acknowledge the issue, and don't ignore or dismiss it; other colleagues might not have noticed. Early intervention increases chances of full recovery
- Keep a written record of the signs, your concerns and the time/context/date.
- Assess the risk of harm for the young person or others
- Consider other possible causes of the behaviours than a mental health problem
- Talk to line managers, colleagues, the young person and their family about your concerns and keep them appropriately informed
- Support the young person to keep mentally well, and provide self-help strategies

[Clear Thoughts] [Developing Mental Health Services for Children and Adolescents with Learning Disabilities:A Toolkit for Clinicians].

To address mental health risks for children and young people with intellectual disabilities, schools must put themselves in the front line and address their needs through a responsive and personalised 'emotional wellbeing' curriculum, with a paramount goal of strengthening emotional resilience. ●

Transforming lives

Special World spoke to Project Co-ordinator Roger Blamire about the legacy and future of SENnet – a European Commission funded project on the use of technology to improve access to learning for children with special educational needs

By Special World

I n his office in Brussels Roger Blamire is putting the finishing touches to a report on **SENnet** for the European Commission. The three-year project, whose funding finished in November, has the ambitious goal of connecting, informing and supporting those using technology to improve access to learning for young people with special educational needs (SEN). As the funding comes to an end it's Blamire's task as Project Coordinator to document its achievements and suggest possible next steps.

SENnet is one of a number of projects that have their roots in **European SchoolNet**, a not-for-profit network of 31 European Ministries of Education, established in 1997 to promote innovation and the use of technology in classrooms.

'European SchoolNet's steering group set up a working group on special needs in 2009-10 because it felt it was an important issue that had been overlooked in the rush to innovate and spread the use of technology in mainstream classrooms,' Blamire says. 'That working group met a couple of times, but obviously without funding and time it could only do so much. So we applied for funding from the European Commission to create a network and we were successful in that.'

Blamire says European funding for projects on inclusion is important if the community is to meet the needs of the 15-20 per cent of its student population with SEN – a significant part of its future workforce. There is also the long-standing com-

mitment to inclusion embodied in UNESCO's 1994 Salamanca Statement and subsequent legislation, which has prompted a move away from special schools in many European countries as governments seek to meet the needs of more students with SEN in mainstream settings. One of SENnet's aims is to equip teachers and classroom assistants in mainstream schools with the knowledge and support needed to meet this influx.

As with similar projects, European SchoolNet invited its member states to take part or to nominate an organisation in their place. The result was a group of eight organisations chosen to reflect the diverse educational challenges students with SEN face across Europe. The group is headed up by European SchoolNet and includes representative organisations from Portugal, Austria, Italy, Turkey, Estonia, Denmark and Belgium. With a modest budget – each partner received about €30,000 annually – they set about their work.

SENnet drew up a series of seven work packages and it is the outcomes of these that Blamire's report aims to summarise. They include raising awareness of accessibility and inclusion issues, research, building a network of policy-makers and teachers, developing support materials for teachers and establishing a resource database.

Assets

The tangible assets generated by this work are considerable and freely available via SENnet's **website**. Highlights include 22 **video case studies**; a series of thematic and annual reports focusing on innovation; over 600 resources in the **SENnet Collection**, which forms part of the Learning Resource Exchange (LRE); and a set of teacher education modules. Blamire says one of the things SENnet hopes to do in the future is to highlight a group four or five useful resources from the SENnet Collection each month or so that are thematically linked and therefore more immediately relevant to those searching for materials on specific topics.

Less tangible, but no less important, is the increased awareness SENnet has generated and the networks it has built over

three years. 'My impression of special needs internationally is that it is quite fragmented and that there's not much going on cross-border even though the problems are the same,' Blamire says. 'So this small amount of money has helped open a lot of doors, which would haven't happened without European funding.'

While the emphasis has been on developing links between the eight partners' countries, including peer learning visits to schools and organisations, SENnet has also drawn in practitioners from other countries through its website, Facebook group and a series of workshops and seminars. These have provided a platform for some of the innovative practices taking place in Europe, some pioneered by the parents of children with SEN. 'In our workshops over the three years we have provided a platform for small businesses, because there are quite a few start-ups in special needs,' Blamire says. One example is the work of Marco Iannacone of EdiTouch, who presented at a recent seminar on the use of tablets with children with SEN. His work is featured elsewhere in this magazine.

Sustaining and expanding this network is now one of the project's principal aims. 'The main route now is to grow our **Facebook group**, which is pretty active and now has 200+ members,' Blamire says. 'This has no barriers to entry and people use Facebook anyway. It is an excellent way of democratically involving people and sharing information, photos, images and ideas in an informal way. People write in their own language so people access what they can and what interests them.'

Blamire stresses that with SENnet's funding at an end its future plans need to be realistic. He says he suspects a lot of partners are already giving their own time 'because of their commitment to doing something for special needs'. Alongside the Facebook page SENnet plans to provide regular updates to its website and keep a monitoring eye on research and new products. Hopefully in time new project opportunities will emerge.

SENnet's member countries have also established their own networks and these will play an important part in carrying on its work. 'There are always language problems in Europe, which can be under-estimated,' Blamire explains. 'Although decision-makers tend to speak English and move freely across countries it's not true of teachers, particularly primary school teachers, and that has to be accepted. European SchoolNet is currently carrying out a survey of IT co-ordinators in Europe and they are saying the same sort of thing: they would join a network much more willingly if it was in their language rather than another language. It's the same with special needs and we have to accept that. National networks may well be more dynamic than an international one.'

Another idea for sustaining SENnet's work is to appoint its own ambassadors. 'It's an idea that has gained traction,'

Blamire says. 'In **eTwinning**, for example, which is the biggest schools projects in Europe – over 130,000 schools and millions of students – countries have eTwinning ambassadors. The idea is to have somebody locally, on the ground who knows about these initiatives and can be champions for them and mediators for teachers. So we suggested to SENnet that the same could apply. To work effectively this person would need to be full time, would need a high profile and would need a marketing budget so it isn't something that will happen overnight.'

So where, I ask, does he hope things will be in three years' time. Blamire is candid about the enormity of the task inclusion champions face. 'Mindsets are quite difficult to change. You seem to have won a battle and at the next meeting there's no mention of inclusion and so on. You are trying to change a default setting, move a supertanker a few degrees.

'It's very hard to make changes in a Continent of more than 24 languages and six million teachers in schools but I would like some simple steps such as statements of inclusivity on publicly funded websites and built in to the design of materials the notion of **Universal Design for Learning** and multiple modes of access.

'This week I am speaking at a conference in Brussels on the use of video. It's so simple these days to add captions of transcripts. Why isn't it automatically done or why isn't it obligatory? Why doesn't any organisation that claims to be inclusive not do this? It sounds like a small battle but if we could make some headway on that in three years' time I think it would make a difference.'

Meanwhile there is the Commission report to complete and a dissemination brochure to write. Published in five languages it will be downloadable from SENnet's website. How would he sum up its message?

'One of the things we found in SENnet is that technology has a transformative effect in a way that perhaps it doesn't in mainstream. It does things for many students that completely change their lives and becomes totally essential. As educators and citizens we need to make sure that happens for everyone that needs it.' •
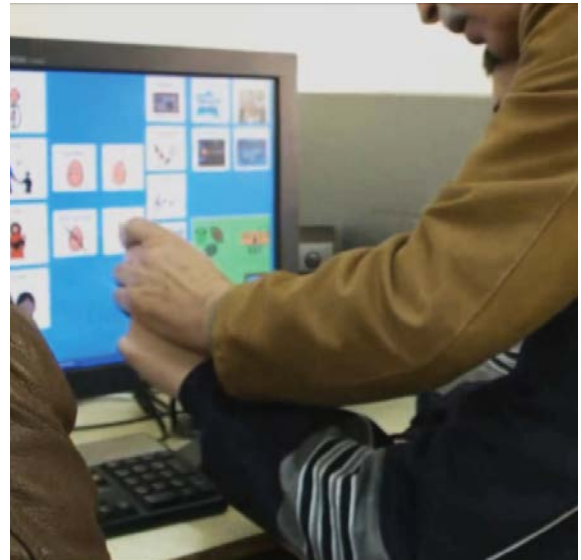
Designing for dyslexia

Dissatisfied with the software and hardware solutions available in Italy for students with dyslexia Marco Iannacone decided to design his own. The result is EdiTouch

By Marco Iannacone

Dyslexia cannot be prevented or cured, but it can be managed with special instruction and support. Early intervention to address reading problems is important. Children diagnosed with dyslexia, are entitled by law in most European Union (EU) countries to receive specialised educational and support services. Italy was late to adopt this approach (L.170/2010) but we are starting to pay attention to this in almost every school. Currently in Italy a dyslexic child:

• can do specialised exercises with speech therapists and neu-

ropsychiatrists to acquire some of those mechanisms that a typical reader automatically attains; specialists are often provided by the Italian public health care system (Azienda Sanitaria Locale or ASL) but with long waiting lists

• is entitled to have a Personalised Didactic Plan (PDP) which will include exemptions and compensatory tools (such as laptops)

On the last point we have to consider that:

• younger children find traditional PC-based compensatory

tools complex to use

- use of the computer in class is often rejected by the child who feels 'different' from his friends
- a tool as complex as the PC is sometimes a source of distraction for children who are struggling to concentrate on what they need to do
- some teachers are not familiar with the PCs and find it difficult to teach younger children how to use them
- PCs are not optimised for readability by default: default text to speech libraries are not good in reading aloud Italian, fonts are small and do not simplify reading
- the traditional compensatory tools and PCs are a major cost for families
- the loss of self-esteem during primary schools has a negative impact on subsequent educational levels.

EdiTouch

EdiTouch™ is the first tablet to support the learning activities of special educational needs (SEN) and specific learning difficulties (SLD) students.

It originally started as a personal project. As the father of a dyslexic child, not being fully satisfied by the solutions for SEN/SLD students available on the market, I decided to build something for my son. Subsequently the interest aroused by my work, together with the desire to make available to others what was helping my son, drove me to self-fund a startup that would provide a complete solution (hardware-and-software) at a price comparable to that of tablets already on the market (which, are not equipped with specific software for SEN/SLD students).

Its interface and the main programs have been designed with the support of speech therapists and specialists in learning disabilities, in addition to the contribution of parents of SEN/SLD children who every day try to find new ways to facilitate their children's education.

Design Principles

We wanted EdiTouch to be a simple, light and low-cost tool supporting children with their studies from the early years of school.

We therefore chose a large format similar to school notebooks. Due to the type of device and the user friendly interface, it presents a way of working that eventually overcomes children's opposition and gives them gratification, increases motivation and, as a result, facilitates academic success. For the packaging, communication and user interface, we used the outline of a child, drawn as a cartoon that would be familiar and acceptable to both boys and girls. Also the icons of the programs are large, colourful and designed in the same style.

Minimum Viable Product is the mode of development we adopted: an iterative process during which the initial idea is continuously modified and adapted after feedback received from initial users (so-called early adopters). This process goes on until the desired product is obtained.

The development and evolution of applications is driven by the information provided by speech therapists, psychiatrists and teachers involved in the project, but also from the comments received from the dozens of parents who use our products every day with their children.

Comparative studies conducted in different countries have shown that some fonts are more readable and pleasing to SLD subjects. In general, sans-serif fonts are preferred, but research has also highlighted other features. In Italy, the most widely used fonts are EasyReading® and Biancoenero®, used for their high readability (on paper) and also recently the font TestMe. Non Italian ones worth mentioning are Dyslexie and OpenDyslexic – open source fonts created by Abelardo Gonzales from Spain. We designed EdiTouch so that specific fonts can be used in order to validate their effectiveness also on tablet: these fonts are preinstalled and applied to every app!

Through a mechanism of parental control, the teacher or parent can decide which applications are immediately accessible to the child during the study time , allowing them to limit possible distractions from the planned activity.

Currently, EdiTouch is available in several models (all running a customised version of Android OS).

EdiTouch Primary School
Processor: Cortex A9 Quad Core 1.60Ghz
RAM: 2 GB DDR3
Screen: IPS capacitive (1920x1200 px)
Connectivity: Wi-Fi b/g/n, Bluetooth 4.0
Memory: 16 GB (expandable to GB)
Camera: post, 5 MPx (con LED); ant. 2 MPx
Ports: 1 mini HDMI, 2 micro USB, 1 earphone
Audio: 2 casse interne
Battery: 7.600 mAh

EdiTouch Lower Secondary School

Processor: MediaTek Quad Core 1.2Ghz

RAM: 1 GB

Connectivity: Wi-Fi, Bluetooth, 3G (only EdiTouch 1025s)

Memory: 16 GB (expandable to 64 GB)

Camera: post. 5 MPx; ant. 1.3 MPx

Audio: dual speaker Dolby DS1

Battery 18 h. standby

EdiTouch High School

Processor: Snapdragon Quad Core 1.6Ghz

RAM: 2 GB

Screen: IPS capacitive (1920x1080)

Connectivity: Wi-Fi, Bluetooth, 4G (HSPA+)

Memory: 16 GB (expandable to 64 GB)

Camera: post. 8 MPx; ant. 1.6 HD MPx

Ports: wireless HDMI (miracast), 1 micro USB

Audio: 2 casse Dolby, 1 cuffia 3.5

Battery: 9.000 mAh al litio

Field testing

In the Rome territory where the ASL Roma D (the local public health care organisation) operates, there are no structured programs connecting students affected by SLD, the school environment, teachers and parents that enable the use of 'compensatory' tools such as PCs.

The traditional compensatory tools (a combination of PC and commercial software) can be extremely costly for the family of a SLD-affected child and can amount to considerable sums (ASL estimated the cost at €2K). This problem not only slows down the accessibility to the software for the students, but is a further source of inequality in access to learning and increases social inequality in access to education. Additionally when families individually adopt computers and software there is a very high rejection rate (only 25 per cent of those who buy these products still use of them after six months). For this reason, the ASL Roma D, having become aware of EdiTouch, decided to launch a scientific trial in eight schools in its territory.

In the school years 2012-2014, a multidisciplinary team composed of doctors, nurses, neuropsychiatrists and speech therapists (ASL Roma D) along with biopsycho-social research methodologists (University of L'Aquila) and information technology professionals (**Digitally Different Srl**) conducted an 18-month long trial to assess the psycho-educational effectiveness of a tablet specifically designed as a compensatory tool. Among the technological solutions ensuring the use of educational support (**L.170/2010**; **DM 5669/2011**) a tablet which could provide a variety of software in a single technological solution, matches

the criteria of 'competence', 'congruity' and 'contextualisation' if implemented in a knowledgeable and all inclusive environment.

For this purpose, about 400 students from eight primary, secondary and high schools in the hinterland of Rome were involved in the trial. The research design and assessment methods were based on a target group 'A' (placed in a facilitated learning environment by EdiTouch tablet) consisting of primary and secondary school children (9 to 16 years of age) with SLD certification in the absence of cognitive impairment and pre-existing psychopathological disorders. The control group B (100 with and 50 without SLD) was chosen for chronological age and socio-economic conditions. The method for assessing the psychological well-being and the skill levels was evaluated in an A:B:A design consisting of a pre-test (at the beginning of the project), a treatment (present-absent) using the tablet equipped with specifically designed and tested software, and a post-test (follow-up 18 months from starting the project). The method-

foto Armando Rebatto

ology included both individual case-studies and multivariate modes by type of treatment.

Phase 1 of the survey (effective prevention capacity of a 'facilitating' environment versus the secondary discomfort) involved the cross-sectional analysis, by different classes in which the compensatory device was inserted, study styles, the basal psychopathological state after complete diagnosis of SLD, from the third class of the primary school to the second class of high school.

This cross-sectional analysis was performed in a longitudinal study in order to verify the desired change in the psychological well-being as well as in learning, and the increased motivation to study. Everything was compared longitudinally with a control sample that was not as massively exposed as the previous group to compensatory standardised measures.

The research design also allowed us to evaluate the effectiveness of the new instrument (EdiTouch) and to collect specific recommendations from teachers, pupils and parents in support of a more widespread use.

The assessment battery enabled us to observe teaching effectiveness aspects, psychological well-being and skill levels improvement, tested during the whole trial, at the beginning when we provided the compensatory instrument, after six months and at the end of the project (18 months later).

The evaluation followed the action research model, which aimed at activating a process of change through the contribution and the participation of the subjects involved. The longitudinal research design allowed the systematic observation of individual and context variables, during the experience, interpreted according to the modelling of risk and protective factors in childhood.
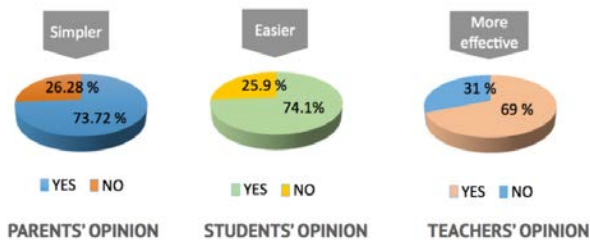
Essentially the planning of a capillary 'computer literacy' program for pupils, parents and teachers (a feature lacking in other similar experiences reported in the literature) was innovative in order to create a facilitating environment at home and at school thanks to a collaborating network (teachers/students/parents).

About half of the students with SLD had previously used compensatory software on a PC. Seventy-two per cent of the group of teachers was aged more than 40 years old.

Conclusion

Efficacy of studying with this tablet as compared to other compensatory instruments available in the market (Ericsson, Anastasis, LeggiXme, Ballabolka)

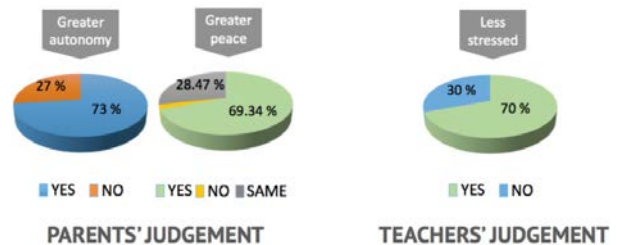| Simpler	Easier	More effective
26.28 % / 73.72 %	25.9 % / 74.1%	31 % / 69 %
YES NO	YES NO	YES NO
PARENTS' OPINION	STUDENTS' OPINION	TEACHERS' OPINION

The results obtained in the sample examined indicate that the personalised method of study, centred on the use of the EdiTouch tablet in a knowledgeable environment, favours improved results in a short time in terms of academic performance, higher self-esteem, autonomy and motivation. This encourages us to believe that this improved school achievement will also be obtained consistently in the future.

From an educational point of view, more than 70% of the subjects in all three categories involved (teachers, students, parents) had no hesitation in declaring the greater effectiveness of this tool compared to other PC compensatory tools available in the market. •

Variation of some psychological elements of SDL students with tablet vs previous year.

Greater autonomy	Greater peace	Less stressed
27 % / 73 %	28.47 % / 69.34 %	30 % / 70 %
YES NO	YES NO SAME	YES NO
PARENTS' JUDGEMENT		TEACHERS' JUDGEMENT

ablenet® technology

Connect™
Innovative Access Solution for the iPad

Connect is an innovative solution for the iPad that provides switch access, powerful sound output, and iPad protection in one sleek package! With Connect, you unlock the true power of the iPad for users with significant physical disabilities. Whether Connect is used as a dedicated speech generating device or used as an access solution to use the entire iPad, Connect is an essential tool that every classroom using iPads must have.

HiFi Sound

Amplified stereo sound output for AAC, enjoying content on the iPad, or auditory scanning prompts.

Switch Access

Use one or two wired, wireless, or built-in proximity sensor switches.

Control

Control the entire iPad with iOS Switch Control or a single app with switch access built into the app.
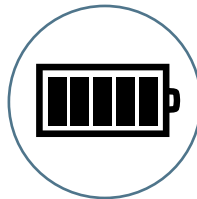
Mounting

Easily mount to a wheelchair, table, or bed with your favorite AbleNet mounting arm.

Mobile Users

The shoulder strap accessory makes Connect easy to carry and transport.

Power

An internal rechargeable battery provides enough power for all day use.

LEARN MORE

Accessorise

The iPad's features make it the ideal mobile device for those with special educational needs, but as Roger Bates explains to make the most of it you may need to accessorise

By Roger Bates

Although small portable technology had been available for some time, it was only with the arrival of the iPod Touch in 2007 that it became apparent that this type of device would become widely adopted.

The locked down system may not have appealed to many diehard computer enthusiasts, but the simplicity, reliability and consistency of the interface proved attractive to all users and offered a great deal for those with access difficulties.

Over time the accessibility options have improved as a result of user feedback and a recognition that many of these options are of general benefit.

The popularity and portability of the Apple devices soon led to the development of carrying cases, protective covers and mounting accessories for those who could not bear to be parted from their devices.

In fact the beautiful slim design made it almost essential to have some kind of holder as it could otherwise so easily be dropped. With the number of iPad holders and mounting accessories running into thousands, including many designed to help those who need additional support with access issues, making a choice can take some time.

Factors to consider

In order to choose suitable iPad accessories we need to consider how the user interacts with their iPad, where and when they need to use it and the type of application they will benefit from using. It is also advisable to check that the accessory you choose is suitable for the particular model of iPad you wish to use it with.

- If access is principally by touch does the user touch it gently or do they press firmly on the screen?
- Do they need help with holding their device?
- Do they need to use it while walking/standing?
- Is it liable to be dropped or get other rough treatment?
- Will you want to move it from one mounting situation to another, such as from a wheelchair to a table?
- Is it mainly to be used with an external keyboard or switches?
- Do they need to be close to the screen to see the display?
- Are they wanting to carry and use any accessories such as loudspeakers?
- Are they concerned about style and appearance?
- Can it stay in the case or do they wish to be able to take it out easily?
- Do they want easy access to connectors, cameras and the ear phone socket?
- Is extra sound volume needed?

Before choosing an iPad case it's important to look carefully at the prospective user, to assess their abilities to access it and to experiment with the benefits of positioning, angle, seating and so on. Finding a good mounting position and the right case to provide the best operating environment can allow the user to make the best use of their iPad.

The motivation provided by many iPad apps and the child's wish to use what he sees everybody else use can have a huge impact on access. Don't be afraid first of all to experiment using different apps and holding the iPad in different places to find out what is the best position for the user and for the device. If they are able to hold the iPad and use it themselves they will be able to find their own best position, thus helping in the choice of holder.

Categories of iPad cases

There are many different holders and cases designed to offer a range of features and degrees of protection and portability. These include:

- Basic protection and ease of carrying/holding, often designed to appeal to children by being made in different colours. Many are fitted with either a detachable or built-in stand and carrying handle.
- Rugged cases offering increased protection, often including moisture or waterproofing as well as improved screen-protection. A good option especially if the iPad is required for out-door use.

- Cases with integrated keyboards (Bluetooth) can be a good way of providing an easily portable writing system for anyone who has difficulty using the on-screen keyboard.
- Some cases provide sound amplification, using acoustic principles that can usefully boost the volume without demanding additional battery power.

Specialised cases have been developed aimed mainly at users of AAC applications. These include additional amplification to make them audible in everyday situations and facilities for attachment to adaptable mounting solutions.

Holders and frames

The popular 'soft' holders **Big Grips frames** and **Kensington SafeGrip** make access much easier for users who may find it hard to hold their device without that hand

Kensington SafeGrip

also touching the screen area, thus preventing the screen responding to their other hand. The soft holders also offer good protection to the iPad if it is dropped, allow controls and cameras to be used, are easily removed when not needed and can be cleaned if required.

They are made from a light material adding little extra weight, which may make all the difference for some users who may find heavier cases too much to manage. The Kensington SafeGrip has a built-in handle which doubles as a two-position, angled stand. The stands available for the Big Grips can hold the device at a good angle for viewing but would not withstand a strong press on the screen. A carrying case with shoulder strap, the **Hipster**, for the Big Grips makes for easy carrying as well as providing space for other bits and pieces.

Both these holders have proved very useful as general purpose classroom accessories giving simple low-cost protection to iPads in day-to-day use.

Cases

There is a wide selection of carrying cases offering a range of features from the inexpensive **TTS iPad case** with a useful hand-strap, great for access on the move, up to extra strong rugged cases. As

GoNow Rugged Case

well as offering extra protection for outdoor use these cases are designed to protect the iPad when they are dropped, a real benefit for users with mobility and motor difficulties.

Portability and durability are of particular importance for users of communication applications. The **GoNow cases** offer this as well as the benefit of improved audio without requiring extra amplification. The additional accessories of case and carry strap may be useful for transportation and availability when required. Weatherproof cases often use covers to protect the ports and earphone sockets, which may prove hard to open if required.

Amplified cases

Two cases that meet the requirement for much greater sound output in a single unit, principally for communication use, are the **iAdapter** and the **Connect for iPad**. These both contain an additional amplifier

Connect for iPad

(provided with its own charger) and speakers, as well as fittings for mounting systems. They are offered as an attractive alternative to traditional purpose-built communication devices by offering both communication and access to iPad apps.

While all iPads can be accessed by the various Bluetooth switch-control systems the Connect offers the additional feature of inputs to take standard wired switches, meaning there is one less device to keep charged.

Cases with keyboards

There are very many cases incorporating a Bluetooth keyboard, either fixed or as an easy-to-carry package. Importantly most of these involve a way of positioning the screen to create an ergonomic system. There are two that are worth singling out as they both incorporate additional features that

Grip Case Scribe

may provide better access for some users. The **Grip Case Scribe** is in two pieces with the keyboard fitting onto the case and acting as a screen protector for carrying. It also has an acoustic chamber to help increase the sound volume – useful for users who need audio feedback.

The **ChesterKeys** and case is an all-in-one system that is available with two keyboard options with either colour-coded keys or black keys with a bold font for better visibility. Both options include extra keys that give direct access to some basic iPad functions.

Ergonomics

The size and lightness of the iPad makes it easy for many users to get it in a good position to suit their needs, whether they are

iRizer

using it with touch, switches or an external keyboard. There is however a danger that many children will use their iPads flat on a table or on their knees, which often results in them adopting a poor posture. Many cases do have some form of stand and if this is not available or suitable the **iSlope** or **iRizer** stands can provide a sloping platform that encourages a better posture.

When more flexibility in positioning is needed a mounting system may be required. These usually take the form of a holder for the iPad that can be attached to an adjustable arm and fixing system. Depending on where and when the iPad is needed, the mounting can be fixed to a desk or table edge, part of wheelchair, etc. For greatest flexibility the **Bamboo system** is available in a range of options or a bespoke wheelchair set-up can be designed from photographs to meet an individual situation.

The strength and rigidity of the mounting arm system required can depend on how the iPad is used; those who operate their iPad with a firm direct screen touch will need a rigid system that can maintain its position. Users who operate their iPad with switches, an external keyboard or with a light touch may find the flexible mounts such as the **Flexzi 3** or **Gooseneck arm** sufficient.

While it is important to check than your device is compatible with the accessory you wish to use, the **Ram X-Grip arms** and holder system has introduced a new level of choice and flexibility by offering a series of spring-loaded holders that can accommodate different devices within each size range. This could be a big advantage as it can cater for

Ram X-Grip

changes in the size of the iPad or to allow you to fit another tablet. The flexibility and convenience of the iPad, which can now provide excellent accessibility options combined with an extensive range of apps for all ages and abilities, make it a powerful tool to help people communicate, access information and interact with their environment. Combined with the right accessories it can open up so many opportunities. •

Connecting with your community

Staff at Archbishop Damiano School in New Jersey have used Skype to bring the community to students with special needs. Kristin Krumm reports

By Kristin Krumm

Social media avenues such as Skype, Twitter, Facebook and others are continually on the rise in popularity with new ones seemingly in development almost daily. These are ways to be connected with another individual or group of individuals for socialisation and communication. Students with special needs are no different in having access to these platforms, albeit with the assistance of some additional assistive technology. In fact, through the use of Skype,

Archbishop Damiano School in New Jersey, USA, has established and begun several connections with community individuals. What began as one connection with a famous children's author has grown to include many other professionals as we bring the community to our students.

Technology in action for Skype chats. An iPad is programmed with greetings and questions using a communication program along with a mini speaker for sound amplification

Socialisation and communication is an important part of everyone's daily lives. It is what helps to build our confidence, self-worth, and makes us happy. Socialisation opportunities lead to the creation of memories. Actively using our brains allows us to create and foster personal connections. Through the use of assistive technology, students at Archbishop Damiano School used items such as **BIGmack** switches, **TapSpeak** on the iPad and simple eye-gaze picture icons to form questions. These devices were then utilised during live interactive Skype sessions. Each student individually accessed his/her device with pride and enthusiasm.

Why Skype?

Why Skype you ask? It allows for learning experiences that may not usually take place to happen in a classroom setting such as virtual field trips to a museum, another country, visiting an author or rocking out with a musician. For students with special needs, some medically fragile, this is a particularly advantageous benefit. We are able through the use of a computer connected to a **SMART Board** to have the sights and sounds of a live Skype session appear right before our eyes. A webcam allows us to zoom in closer on each student as well as scan the room for a panoramic view. The SMART Board provides a large visual display for the students and staff; often there is not a bad view anywhere in the classroom.

Preparing for a Skype session is a collaborative effort. Archbishop Damiano School special education teachers, occupational therapists, physical therapists, speech therapists and assistants each play a role in developing materials. Someone

in the team is the initiator of contact for a Skype session, usually the teacher or occupational therapist at our school. Once contact has been established, a mutually agreed upon time and day is set.

When setting up Skype sessions you must remember time zones, both yours and the one you are Skyping. This can be confusing, especially for a school setting with a limited time frame. I have found most professionals are willing to work with you when provided with various options.

Speech therapists, teachers and occupational therapists collaborate on the types of assistive devices to use and program the questions decided upon with the students' input. On the day of the Skype session, physical therapists assist with positioning and assistants support the use of technology with the students. A joint effort leads to a successful and satisfying Skype conference.

Our experience

Our experiences at Archbishop Damiano School have been nothing less than stellar. We have developed a friendship with children's author, **Laura Numeroff**. She is the well-known author of *If You Give a Mouse A Cookie* and many other books. An email following a lesson-filled week of Numeroffs' books led to an initial Skype session in February 2013. We are still Skyping regularly and even had a visit from Ms Numeroff to our school in April 2014. How honoured we were to have the chance to meet her and show her our campus! She took the time to read to classes, sign books and pose for photos. Our Skype chats are filled with joy in keeping up with each other's lives and she so graciously takes the time to remember students' names with care and respect.

Author Laura Numeroff video chats through Skype with students. It is wonderful to promote literacy through live interaction with authors

Motivation finds its way into our students' hearts through music. Music – 'vocal or instrumental sounds (or both) com-

bined in such a way as to produce beauty of form, harmony, and expression of emotion'. The students and staff of three classrooms were able to experience this first hand via a live interactive Skype session with famous violinist, **Christian Hebel** in June 2014. Christian is a professional violinist who tours the world playing with various musicians, records some of the biggest film scores, and is concertmaster for the Broadway musical *Wicked*, among many other interesting projects. He generously gave of his time for questions regarding his career, hobbies, and interests. Perhaps the most exciting was the impromptu violin performance Christian delivered. As he entertained us with his violin, we were all mesmerised by the soothing sound. Mr Hebel demonstrated humour, compassion, and patience throughout our Skype. Music evokes many different feelings and the therapeutic benefits for students with special needs are boundless. We hope this Skype relationship continues.


Violinist Christian Hebel treated students to a musical gift during a Skype session. He performed an original piece to sounds of excitement from all involved

Other professionals from the community offer opportunities to interview and discuss careers. We had the chance to interview **Carl Azuz**, CNN Student News Reporter, in July 2014. Students view the daily reports from CNN Student News during morning routines on the SMART Board. A Skype chat with Mr Azuz showed his witty humour and interesting knack for developing the show's puns. The atmosphere was lighthearted, casual and informative. Our interactivity during the session continued with question-and-answer banter. Mr Azuz acknowledged each student with respect. We could not have anticipated a more lively video discussion.

Skype in the classroom

School settings can provide a wide variety of possibilities to interact through social media such as Skype. The connections sought are limited only by your imagination and occasionally financial resources. For educational professionals, **Skype in the classroom** is an excellent free website to join. It enables its users to collaborate with other classrooms, find guest speak-

ers or enjoy a mystery Skype. The site contains a searchable index of available lessons. Some include music, holiday themes, multicultural, science, and language arts. Students can interact with each other and discover virtual pen pals across the globe. Teachers and staff can assist in linking curriculum topics with a Skype conversation.
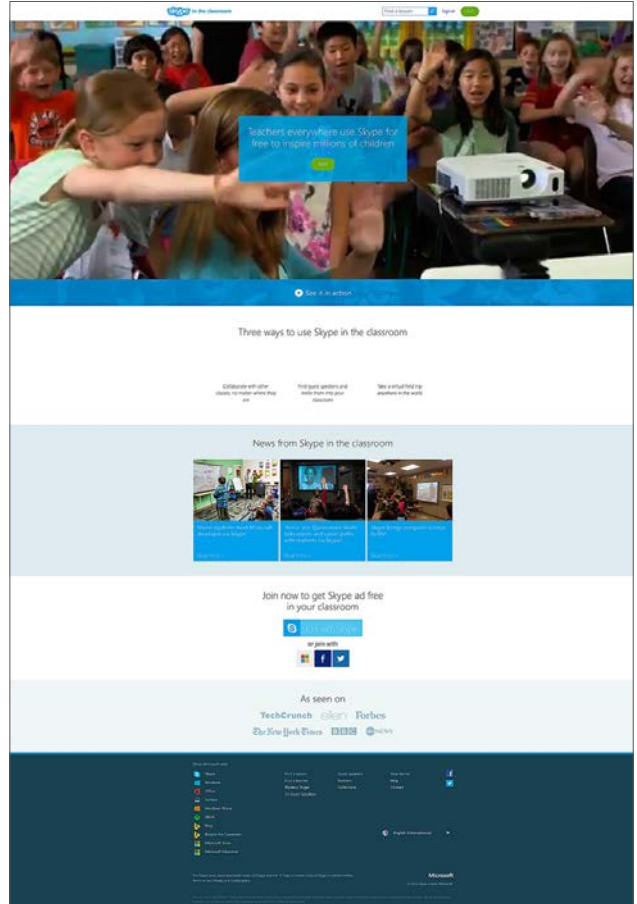
At Archbishop Damiano School staff seek out opportunities to connect with the community through websites such as this and others. When examining specific topics such as music, it is beneficial to explore reaching out to various musicians. Nothing ventured, nothing gained…remember to send thoughtful, succinct emails to those musicians or individuals through their websites. You may be surprised with the positive results. However, always be able to accept rejection or being ignored. Some may charge fees per Skype session and if this is not built into your school's budget, the many other avenues can be pursued.

Skyping is a social media platform of our future and it only makes sense to involve our students now. By bringing community individuals to our students with special needs, we are not only building socialisation and communication, we are developing mutual respect in relationships. ●

Adapt and thrive

Joan Tanenhaus explores some of the features and adaptations for Apple and Android tablets that make them accessible to those with special educational needs

By Joan Tanenhaus

Photo by AbleNet

When Steve Jobs and Apple announced the iPad in January 2010 none of us imagined the impact that this device would have on the computing world, on special educational needs (SEN) or upon the world of technology in general. As of September 2014, there were over 1.3 million apps in the App Store with over 75 billion (yes, that's thousand million) downloads. With so many of those being educational apps, the iPad can be said to also have changed the way children learn and communicate.

Switch control with scanning

Then, in September 2013, when Apple announced iOS 7, it once again greatly impacted how the iPad could be used by those with special needs. This new system and its subsequent upgrades have many new and exciting features, but the most impressive for those for SEN was the inclusion of switch control with scanning. This feature enabled single-switch use with row-column scanning and dual-switch step scanning. It also created guided access, which locks in one app and prevents the use of the home button to exit the app, an important educational feature. In November 2014, it was announced that Android's new Lollipop would have switch access [more about this in our next issue].

There are many video tutorials online that will help you

connect your switch and set up switch control in Apple devices. Here are a few links to start with:

Switch Control in iOS 7

iOS 7 Switch Control - An Introduction

iOS 7 Switch Control - Set Up A Single Switch with Auto Scanning

iOS 7 Switch Control - Set Up Dual Switches with Step Scanning

For excellent print resources:

How can I set up Switch Control for one switch scanning using an external switch?

iOS 7 Switch Control: The Missing User Guide

In addition, there are many apps that have switch access built into them by the developers. Some of these include:

Ablenet

AssistiveWare

Attainment

Computerade

Creative Communicating

Inclusive TLC

Inclusive Technology Ltd

Judy Lynn

LifeTool Solutions

Marblesoft

RJCooper

TapSpeak

Therapy Box

Switch interfaces

Of course, in order to use a switch with the iPad you will need a switch interface. Here are a few that are available:

- **New Blue2 Switch** (**Ablenet)**.

The NEW Blue2 Bluetooth switch interface provides single or dual-switch access to all idevices (iPad, iPad Mini, iPhone) running iOS7 or later, as well as to Apple desktop or laptop computers running OS X Mavericks, and all switch accessible apps or software on iOS, OSX, Windows and Android. A nice feature of the New Blue2 Switch is the inclusion of wall adapters for all different outlets – two round pins (Europe & Asia), two flat angled blades (Australia, New Zealand, Fiji, China), two flat parallel blades (North and South America, Japan) and three prong rectangular blades (Africa, Hong Kong, Great Britain, Ireland). Adapter plugs allow plugs to fit into international outlets – they do not convert electricity. The new Blue2 contains two switch activation surfaces that are easy to press – or connect your individual switch/switches via two switch jacks so that any and all switches can be used to control the interface. You can also use it with switch-adapted apps, as mentioned above. If you are using an iOS device with Blue2, activating the keyboard toggle button, located on the side of the interface, will bring up the on-screen keyboard.

- **APPlicator Switch Interface** (**Inclusive TLC**). This Bluetooth switch interface provides access to both apps and music, with up to four switches. Switch sockets default to the most frequently used settings (space, enter, 1, 3) but you can also re-program them into 24 mouse/keyboard commands (ie, up arrow, down arrow, play/pause, volume up, down, mute, and others). It can also be set to Timed Play – 10 seconds – which can be used for cause & effect. You can use a switch and the APPlicator to take pictures with the iPad, and the APPlicator will also let you bring up the on-screen keyboard manually at any time. The APPlicator works with iPad, IPad mini, iPod (3rd & 4th generations) and the iPhone (iOS 5.0 and later).

- **J-Pad Joystick Interface** (**Pretorian**). This Bluetooth interface lets you use the joystick control along with left and right buttons to do manual scanning on your iPad. You can access apps, music, iBooks, the camera, on-screen keyboard, home button, and more, with one or two switches.

Other speech interfaces are available from **RJCooper**, **Tecla**, **Therapy Box** and **Pretorian**.

iPad users with physical disabilities may still require additional help and/or adaptive equipment to take advantage of touch access.

Assistive touch

This is a feature found in the Accessibility options. Its main goal is to help those with physical disabilities who need help in using the regular gestures and commands. It allows them to do these (ie, pinching, zooming, etc.) with alternative touch requirements. For additional information visit the Apple support page **here**.

Adaptive equipment

An amazing collection of adaptive equipment created and produced by Ivo Beckers from the Netherlands is available from **Shapedad/Etsy**. Ivo designed and makes these assistive devices for iPads and other capacitive devices. Thanks, Ivo for the time and effort you have taken to help those with SEN. With fulfilment locations in Europe and the US, fast and economical shipping is available. If you want to know more about Ivo, you can find information **here**.

- **Steady Stylus:** This T-shaped stylus is excellent with those who have difficulties holding a regular stylus but who are able to firmly grasp with their hand. It is available in two sizes: regular and junior. The junior is geared towards younger children and uses Chewy Tubes as it core and a grip made from transparent rubber wrapped around a wooden stick. The pointer is made from aluminium with a conductive fabric sock plug as the tip.

- **Strap Stylus:** This consists of a longer stylus that is placed between the index finger and the thumb with a strong Velcro strap that holds it in place. It does not need to be grasped or held, but it moves in sync with the hand.

- **Flex Stylus:** This stylus can be held with the knuckles. It is made of a flexible metal strip that can then be bent to the exact angle that works. The metal is covered with a braided cotton sleeve and a silicon tube for extra grip.

- **Mouthstick Stylus:** This stylus contains three parts: the mouthpiece, the stick and a conductive plug (tip). The mouthpiece is made from a durable food-safe plastic and comes with a set of silicone caps for a snap-fit connection with the stick. The stick is 12" (30 cm) long and made from anodised aluminium. And the conductive plug uses the same conductive fabric stylus sock concept as all ShapeDad's other capacitive styli. There are two versions: a regular fixed 12" version and a Pro version that telescopes from 9" to 17" in length.

- **Head Pointer & Stylus (incl. 12" tube pointer + 13" flex pointer):** This fully adjustable head-mount helmet fits hat sizes 6.5 through 7.8 and includes a stainless steel mounting plate with pointer of choice (four alternatives include a 12" and 14" tube pointer and a 13" and 15" flex pointer). Ready to use in a minute; adjust the headband, mount the pointer and go!

- **Swiss Stylus:** The Swiss Stylus addresses many (special) kinds of gripping needs. It is a strong brass strip covered with transparent tubing and creates a natural extension of your finger or hand. You can hold and control it in many ways.

- **Balltop Stylus:** This ball-shaped stylus has a solid birch wooden ball grip and strong aluminium pointer covered with a highly conductive fabric tip. No drag or pressure required. It works for people who have difficulties holding an object like a pen, but who are able to firmly grasp something with their hand. The grip diameter is 45 mm, the stick length (including the tip) is 95 mm and the tip diameter is 9 mm.

Also worth considering

• **Table Top Suction Mount** (available from **Ram Mounts**, **Inclusive TLC** and **Inclusive Technology**).

This RAM mount system provides a strong, stable and moveable mount for tablets on any flat surface, such as desk, lap-tray or table. There is a twist-lock suction cup at the bottom that attaches the mount securely to any flat surface (glass, table top, desk, etc.) and it can easily be removed and re-installed to another area, as needed. This makes it an excellent choice if you are using your tablet in different locations with different users throughout the day and need to have it securely placed each time. It suctions and releases in seconds. The rubber-ball-and-socket system allows you to adjust for different positions and viewing angles. The tablet can be placed in either portrait or landscape orientation and provides access to all controls and jacks. The holder is available in a wide range of sizes and types (Android, iPad Air, iPad Mini, etc.) and can easily be changed. If you prefer to attach this mount permanently, change the base to the one with pre-drilled holes that can be screwed into the table top's flat surface. You can also get a dial combination lock which provides safety against theft. Ram Mounts has a large collection of mounts for your iPad, iPhone, iPod Touch, Android and mounting systems for table edges, round bars, beds, wheelchairs, etc.

• **BubCap Pro for iPad** (available from **RJCooper**) This is a cover that fits over the Home button of the iPad. It is a small aluminium tab that adheres to the Home button and keeps it from being pressed by the student. It prevents students from exiting out of apps that they are working on. RJ has adapted the commercially available product to make it easier for the professional to use to exit.

• **The Hand Glider** (available from **The Hand Glider**)

This accessory will help those who have difficulty pointing and selecting because they accidentally input to the tablet with the palm or side of their hand. This is a specially made two-finger glove that covers parts of the wrist and palm, pinky and ring finger and keeps them from being detected by the tablet. It lets the user rest their hand on the tablet. It comes in three sizes and can be used on both the right and left hand.

This article is a brief overview and not meant to be an exclusive list of adaptive equipment. There are keyboards, styluses, protective cases and covers, projection devices, etc. If you need something special, it's probably out there, so keep looking or ask one of the above companies for help. If all else fails I can be reached at **DISKoveries@aol.com**. •
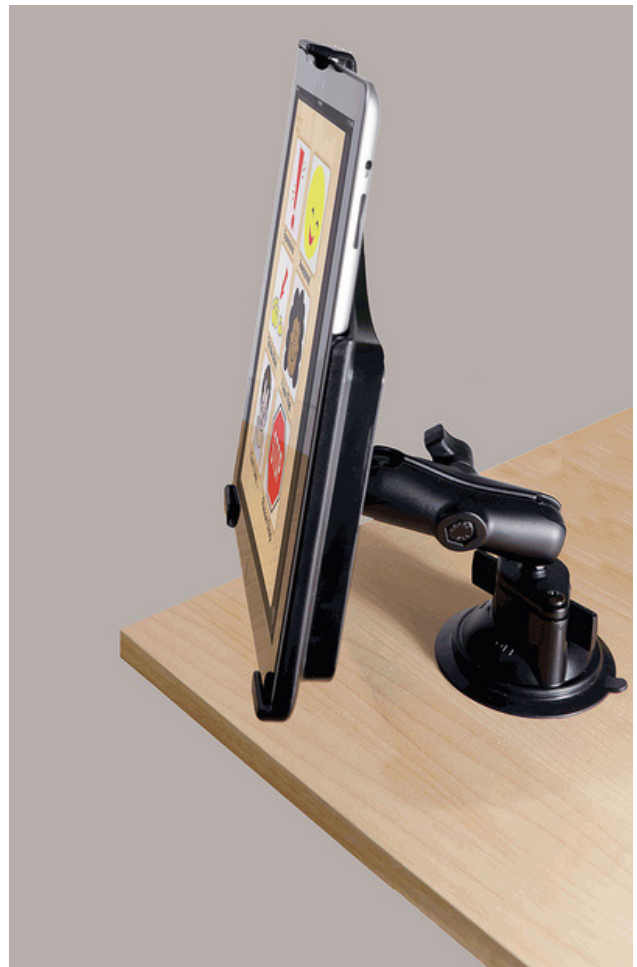
Games for all?

Many of the online games targeted at children are inaccessible to those with special educational needs. But, as Sanja Denić explains, with a few simple adaptations they could be truly inclusive

By Sanja Denić

Computer games can be used to both stimulate and educate children. As well as the positive impact they can have on a child's abilities and skills, and on the quality of the mastered curriculum, they can boost independence, confidence, motivation and mood. For the successful digital inclusion of children with special educational needs (SEN), and to strengthen their abilities and skills, teachers and therapists need access to a wide range of computer games to establish through trial and error what works best with each child.

The digital inclusion of children with SEN is a relatively new area of research and practice. It is largely pursued by people of good will who devote time and knowledge to creating computer games that will help realise the goal of inclusion and enable children with SEN to participate in the same activities as their peers. However, most game designers/developers have little or no knowledge of the capabilities or abilities of these children. Some may receive help from parents of children with SEN, or even a practitioner who has been trained to work with them — someone willing to get involved in a relatively new area of work, with an inadequate research base and methodology, in which they will have to rely largely on their own creativity, resourcefulness and drive.

For digital inclusion to encompass all children, including those with SEN, multidisciplinary teams are needed. Ideally, these should include special educators, psychologists, artists (art, music), web designers, IT technicians, etc. These teams should be involved in designing and creating websites, multime-

dia, interactive content, games, educational software and apps specifically for children with SEN that encourage independent working, increased participation, heightened self-confidence, greater satisfaction and equal access.

When working with children with SEN each educational or therapeutic resource being used, including computer games, needs to be adapted to:

- The goals of the child's individual education plan (IEP) or programme of work
- The abilities that the child already possesses
- The knowledge that the child has already mastered
- The child's sphere of interest

The goals of the IEP specify what we want child to learn next. This has to be based on the child's existing abilities, as well as the knowledge already mastered. This is true for all children, including those with SEN. An example that illustrates the link between a child's IEP and his/her abilities and the knowledge already mastered is that we cannot teach a child to write if that child does not have a developed grip (ability) and has not yet mastered the prewriting phase (mastered knowledge).

Adapting the content to the child's spheres of interest is very important because it is the only sure way of attracting his/her attention and encouraging engagement with the work being presented. If we offer a child content that insufficiently stimulating our work as educators or therapists will eventually prove unproductive and will not enhance the child's progress. A child's sphere of interest should be used as a motivational tool that raises interest in the content that is being presented and encourages the child to work.

Adapting content to previously mastered skills, abilities and knowledge is also very important because setting unrealistic goals that don't align with what the child already knows will not result in the child's progress. To be successful when using computer games as an educational or therapeutic tool it is necessary to personalise, to adapt the content of the computer game to the child's individual abilities. Because this is so important, let's look at some examples of how it can be achieved.

Adaptation of computer games according to the type of impairment:

For a child with a **motor impairment** the following types of adaptation should be considered:

- **Adapting the speed of the object's movements.** This is necessary because of the presence of tremors, spasms, lower reaction time, etc. Regardless of the type of input device that is being used a child with a motor impairment may be slower in organising his/her movements for any of the reasons listed above. The inclusion of this type of adaptation in a computer game will give the child the opportunity to respond according to the time that he/she needs to carry out the task.
- **Adapting the size of the objects.** Targeting with the cursor via an input device can be very difficult and complicated for a child with SEN (as well as with a motor impairment, reduced intellectual capacities, visual impairment). This adaptation allows mastering targeting, and therefore the use of the input device.

For a child with **reduced intellectual capacities** the following types of adaptation should be considered:

- **Adapting the number of objects shown on the screen.** For a child with

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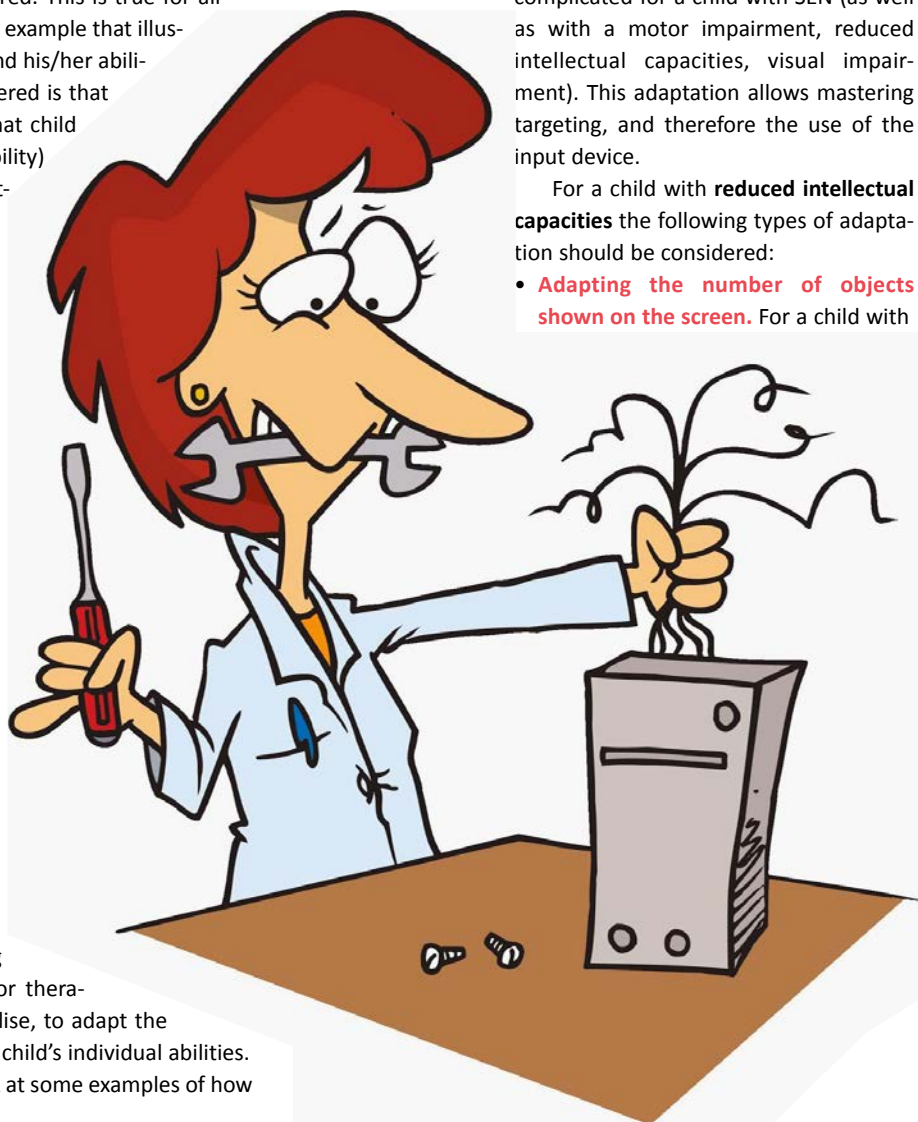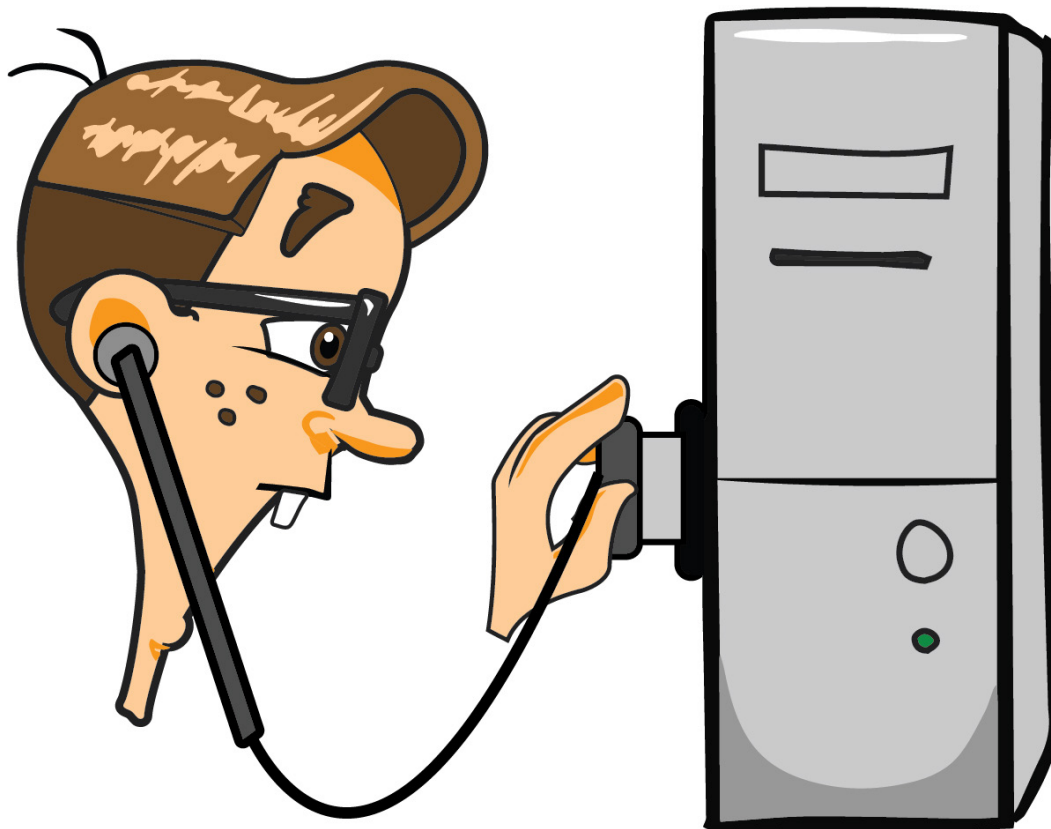
reduced intellectual capacity it is very hard to process multiple pieces of information simultaneously.

- **Adapting the content of the computer game.** This adaptation is related to the sphere of interest of the child, as well as to the goals of their IEP. It is very important that positive emotions are being used when working with children with SEN. For example, if the goal of the IEP is for a child to master the colour yellow and it is a child that loves to eat bananas, the colour yellow will be learned not by showing yellow cubes but by showing bananas. Positive emotions lead to new knowledge, which leads to increased self-esteem, satisfaction, motivation, etc.

For a child with **a sensory impairment** the following types of adaptation should be considered:

- **Adapting the background colour, as well as the colour of the objects in the game.** It is important to use appropriate colours that the child recognises and that stimulate positive emotions in him/her.
- **Adapting the outgoing message.** Several adaptations can be made to outgoing messages, by which I mean the messages computer games use to communicate with the user. First, using a familiar voice will help attract the child's attention. Second, some children will benefit from the outgoing

messages being slowed down. Third, the audio messages of computer games are very important because they help stimulate the child's speech development. Audio messages in a non-native language hamper this and will result in the child not understanding what he/she is being asked to do. It will also lead to the child mastering knowledge that in most cases is of little or no future benefit to them. Creating computer games that include the option of adapting outgoing messages enables each user to record text and audio messages in their own language.

These simple and easy adaptations to computer games would solve many of the problems faced by teachers and therapists from non-English speaking countries working with children with SEN. If implemented they would make existing computer games that can be found either for sale or free online accessible to everyone. Computer games for children with special needs are often very simple and including these kinds of adaptations does not present a serious challenge for most designers/developers. If all games that can be found in the marketplace today were interactive and adaptable the number of games that could be used with children with SEN would increase significantly and the possibilities for using computers to stimulate and develop these children's skills and abilities would significantly improve. •

The best of BETT

BETT is unashamedly loud and proud and this year's event is no exception. Sal McKeown previews Europe's largest education and technology show

By Sal McKeown

Photo by Jack Terry

Each January around 35,000 visitors descend on a London exhibition hall for four days of product launches, seminars and show-stopping talks by big names such as former film producer Lord David Puttnam (now chair of **Atticus Education**) and legendary explorer Sir Ranulph Fiennes. Visitors also get plenty of time to examine the wares of over 700 exhibitors and sponsors as they fight their way through the crowds on those long carpeted aisles. A lucky few might even score an invitation to the BETT Awards dinner – a best-bib-and-tucker event with a comedian compere.

Overseas exhibitors have a strong presence at BETT. Scandinavia@Bett has long been of interest to special education practitioners since Dr Chris Abbott of Kings College London start-

ed organising tours of BETT for the Swedish Handicap Institute in the 90s. This year there are **Spanish** and **Norwegian** Pavilions and over 30 exhibitors from China.

BETT is a show built on hyperbole – the biggest, the latest, 'the entire education spectrum'. While colleagues in other countries may be accustomed to this kind of language in Britain we are a little bit snitty about all this chest puffing. We are used to companies that say, 'Well, this might work in your setting; it's worth a try.'

We like human interactions, quality solutions and nice people who know what we are talking about. Nowhere is this more true than in the Special Needs Village. This is at the heart of the somewhat fraught relationship that sometimes appears

ChooseIt! Maker 3

Created by **ii** Inclusive Technology Ltd

***ChooseIt! Maker 3* online enables teachers and parents to turn their photographs, symbols, text and sounds into engaging choice-making activities, games and quizzes for early years users and children with special educational needs, physical or learning difficulties.**

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between those who run BETT and that little band of exhibitors who make their living from small scale ventures – and sometimes one-off solutions – that really do change one person's life.

The Special Needs Village used to house many small startups, which would bring their goods to market and attract interest from visitors via radio, television and print coverage. These days it is more corporate and subdued as BETT now tries to process a large number of visitors in the most efficient way possible. This is why the show moved from the characterful but antiquated Olympia with its wealth of neighbourhood bars, restaurants and cheap hotels to Excel in London's Docklands. The new venue has all the charm of a shopping mall and the usual range of fast food franchises but it does benefit from a very simple layout.

With BETT, what you get is a whirlwind tour of all that is best and most current (apologies for the superlatives) in educational technology and a chance to listen to some grassroots speakers who are doing clever things in their classroom using an increasingly varied range of software, apps, gadgets and gizmos.

Where does that leave the special education professional? Is it worth a footsore day of collecting brochures and fliers and the huge carrier bags that strain shoulder sockets? I think it is, so long as you plan your day carefully.

Set yourself some objectives for the day:

- Decide what the key issue is for your school/college right now. It might be funding or recording and reporting achievement, exam results or raising standards. Look to see if there are any seminars that fit the bill. Of course it is wonderful to see some of the big names in the flesh but their agenda might not be yours and you can't afford to be distracted.

- Think about your hardware and infrastructure. Look at the **online list of exhibitors** before your visit and pick out those who might have resources you can use. If you have just invested in all school sets of tablets, find companies that are doing great things with apps. Write their stand number down and a brief description. When you get a floor plan mark them so you do not waste time criss-crossing the exhibition hall.

- Look at your learners, especially the most difficult ones. While BETT does not guarantee miracles, there are often very knowledgeable teachers who help out on stands and can help make the match between product and learner or talk you through new ways of doing things so you will see better progress.

- And remember: don't wait to register on the day. You can do it **online** and spend more time at seminars or with exhibitors.

So with all those caveats in mind, here are my picks for BETT 2015. Stand numbers are given in brackets. Have a browse. You never know, some of them might prove quite useful.

Let's begin with access and communication support. I want to see **Forbrain** (C470) in action. It has been shortlisted in the

Forbrain

Special Needs Solutions (SNS) category for the BETT Awards. It is a headset with an audio filter that transmits amplified sound through bone conduction. Research suggests that it can help children and adults who suffer from speech and language difficulties and improve attention and memory. It is also having an impact on children with autism.

Therapy Box (SN67) is showcasing Predictable 4.0, also on the BETT Award's SNS shortlist. A seemingly intuitive communication aid that works on the iPad, it learns a new word after three repetitions. One of its most striking features is ModelTalker, an engine which can sample recordings of a person's voice and create a synthesised version. This means that those who struggle with speech through multiple sclerosis or Motor Neurone Disease can now get their own voice back.
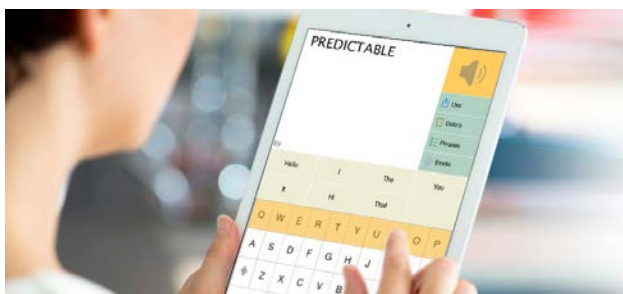
Therapy Box

I recently came across Augmented Reality provider **New Ways to Learn** (C116). They are promoting their Paper Portal for parents, a BETT Awards finalist last year. Schools send out a newsletter which parents stick on the fridge. Each week the family can point a smartphone at the printed page and pictures will appear as animations or videos. New applications for special needs mean that young people with poor memory can see instructions come to life.

Clicker Books (D210) have also been shortlisted on the SNS

Simple Switch Access
for iOS Devices

The Blue2™ Bluetooth switch provides single or dual switch access to your favorite iOS device. Use Blue2 with switch accessible apps or with Switch Control found in iOS 7 or later.

Features include:
› Two built-in switches
› Two external switch jacks
› Internal rechargeable battery
› Pre-programed with switch clicks using the keystrokes of Space, Enter, 1, 3, ~1, and ~3
› Program any keystroke to Blue2

Blue2 is also compatible with switch accessible software on Mac OS X, Windows, Google Chrome, and Android devices.

LEARN MORE

category of the BETT Awards but what I really want to see is **Crick's** new SuperKeys Assistive Keyboard app, which breaks up the QWERTY keyboard into manageable chunks for those who have problems with scanning or accurately hitting a very small target. Also worth a visit is **AssistiveWare** (SN52). They have Proloquo2Go, a symbol-supported communication app for iPads and iPhone that provides a voice to over 100,000 users around the world who are unable to speak.
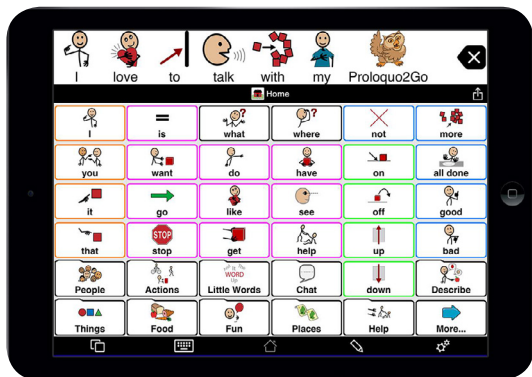
AssistiveWare Proloquo2Go

For maths, I am keen to see **DoodleMaths** (BFG4) for Apple, Android and Kindle which seems to go beyond assessment. It identifies the strengths and weaknesses of each child and creates an individual learning programme. The Teacher Dashboard lets teachers monitor, set tasks and send messages of encouragement.

Jelly James (SN65) Dynamo Profiler, another shortlisted product, is a dyscalculia assessment tool for ages six to nine that can be used for Education, Health and Care (EHC) assessments in the UK. **Flurrish** numeracy app (UK67) offers times table and number bond practice, while **NumberShark** (C310) is a highly structured program for pupils with dyscalculia and **Numbergym** (B555) is especially useful for EAL learners as well as those who need individual learning programmes.

On the literacy front there are phonics programs aplenty including **Monster Phonics** (BFS4) with its colour-coding system, flashcards, songs, PowerPoints and animations. It seems to be very popular in international schools. **ReadingWise** English (SN62) is a literacy program which started in 2006 in India and was developed by Victor Lyons, an entrepreneur with a background in e-learning and mental health therapy. He has a seminar on 21 January at 11.00 am in the **Learn Live: SEN Support for Everyone** area. At £5,000 per annum you need to make sure you have detailed discussions before you buy. It's another on the BETT Award's SNS shortlist.

I am definitely going to catch up with **Claro** (SN61) to see ClaroRead Cloud which has been used extensively in Sweden and is now heading to the UK. Take a picture on a mobile phone,

use Optical Character Recognition to decipher text and then have it read aloud. It has a starting cost of just £30 a month paid annually for schools and colleges so it seems to be an economical solution, helping learners to access text when they are out and about.

ReadingWise

Another useful product for learners out of the classroom is available from **Sonocent** (C501). Sonocent Recorder, a FREE app for iOS that will work on iPod Touch, iPhone and iPads, will run for five hours on most devices. Lisa Spence from Shapwick School in Somerset said: 'This new app lets students record vital conversations in lessons or whilst out and about, to review in their own time and pace. The ability to add images and notes on the fly whilst recording gives a new dimension to using audio.'
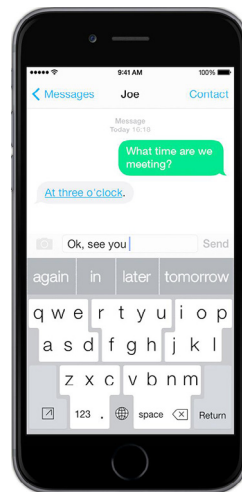
BETT also gives visitors the chance to see technology which lets

SuperKeys

users be creative. I recently wrote about music therapy for a magazine so I want to catch up on new developments. I am looking forward to seeing **Beamz** (SN4). Pupils move their hands through the Beamz lasers to trigger instrument clips, sound effects and songs. You might use it to teach cause and effect, sequencing, fine and gross motor skills, but it would also help learners compose, arrange and make MP3 recordings of their own original mixes.

I have seen some wonderful professional performances

using **Soundbeam** and it has now gone wireless so I am thinking open air performances might now be a possibility. I will find out at their stand (SN102). I will also catch up with one of my favourite products, **Skoog** (SN69). It is a tactile musical instrument which lets people with complex needs make music. It is a way into music, speech and language therapy, and occupational therapy and has now gone multilingual with versions available in several European languages.

The Skoog

There are 21 Learn Live seminars in the Special Needs Theatre. More than a third are about new SEN reforms and the National Curriculum in the UK so are not necessarily particularly relevant to overseas visitors. My top three seminar choices are:

- Wednesday 21 January, 15:30 – 16:00, Mobile Technology and the Sensory Learner This promises to be a fun session from Carol Allen, School Improvement Advisor (ICT and SEN), North Tyneside City Learning Centre.
- Wednesday 21 January, 16:50 – 17:20, Use of game design in SEN by two teachers from Denmark: Christian Nielsen and Morten Lindelof.
- Friday 23 January, 15:30 – 16:00, Gestures of Hope – James Winchester from Oak Grove College will be talking about how a group of schools in the UK are using emerging technology such as the Kinect, Leap Motion, Virtual Reality and Eyegaze with pupils with complex needs.

Most visitors to BETT try to do the whole show in a day; others stay for longer. The secret of a successful BETT is careful planning and a lot of stamina. Enjoy the show! •

BETT Awards 2015: ICT Special Educational Needs Solutions – The Finalists

- Crick Software – Clicker Books
- IdeasWise Ltd – ReadingWise English
- Inclusive Technology Ltd – Inclusive EyeGaze Foundations
- JellyJames Publishing Ltd – Dynamo Profiler
- Sound For Life – Forbrain
- Texthelp Ltd – Read&Write family of software products
- Therapy Box – Predictable
- WizCom Tech Ltd – Exam Pen

*Photo by Jack Terry*
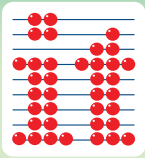
BIG BANG APPS

BIG BANG PATTERNS

Big Bang Patterns contains a variety of pattern styles including tracking, tunnelling, rotating and sliding as well as using flat, strong colours and sharp corners for maximum impact.

Download on the App Store

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BIG BANG PICTURES

Twenty one high contrast animated images and great sound effects designed to provide visual stimulation and develop hand eye skills for users with low vision and perceptual difficulties.

Download on the App Store

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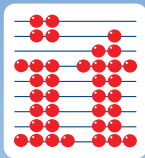
Counting Songs Apps

1

Counting Songs 1 offers ten fun and engaging counting songs with additional associated activities ideal for early years children and students.

2

Counting Songs 2 offers stimulating cause and effect learning activities that engage and encourage early listening and language skills.

Download on the App Store

Google play

Download on the App Store

Google play

Network, Learn, Share

While BETT 2015 visitors and exhibitors are vacating London's Docklands for another year their counterparts in the USA will be packing their suitcases and heading to Orlando, Florida

By Special World
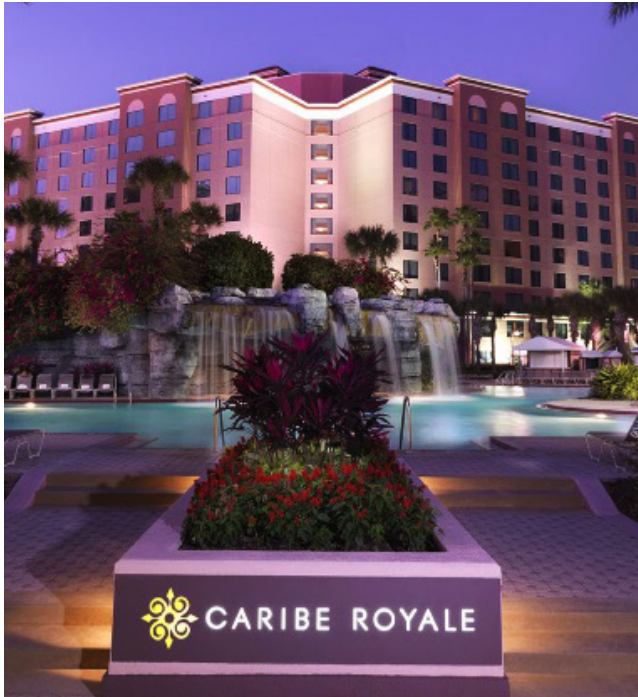
ATIA is a not-for-profit membership organisation of manufacturers, sellers and providers of technology-based assistive devices and/or services, and for many in the field of AT its **Orlando conference** is the most important event of the year.

The conference provides a meeting place for professionals, including teachers, occupational therapists, rehabilitation counsellors, physicians and psychologists, who work with people with disabilities. In 2014, it attracted 100+ exhibitors and nearly 2,600 participants.

At the time of writing 111 **exhibitors** have booked booths (stands) for this year's four-day event (27-31 January) held at the Caribe Royale All-Suites Hotel & Convention Centre. As well as viewing the exhibits, visitors can choose from over 300 educational sessions showcasing the ground-breaking work of manufacturers and users. In a recent interview with **WebAbleTV**

ATIA CEO David Dikter attributed the success of the conference to two components: the professional developments opportunities it offers and the chance to connect with 'like-minded folks who want to better their understanding of assistive technologies and access'. This is not about a single product, Dikter added, 'It's about how do you best use that product with students or with some of the clients you are working with'.

The names of several ATIA exhibitors are well known to attendees of BETT and readers of Special World. They include **AbleNet**, **AMDi**, **AssistiveWare**, **Claro Software**, **Crick Software**, **Don Johnston**, **InclusiveTLC**, **n2y**, **Sonocent**, **Texthelp**, **Tobii** and **Widgit**. As with BETT, ATIA is a popular event for companies like these to launch new products and services, especially into the North American marketplace, while for others the focus is on providing educational sessions for new and existing contacts.

So what should you look out for in Orlando this year? Well,

here are some of the booths *Special World* will be visiting.

While AbleNet (Booth 400) hasn't announced any new product launches as yet it recently acquired **Chester Creek**, including its full line of uniquely designed keyboards and iDevice accessories. Chester Creek has been providing unique solutions to the K12 market for more than 10 years but if you are unfamiliar with its products you can find out more from AbleNet's team.

AMDi (Booth 7008) has updated its iAdapter cases with better protection for your iPad and improved sound output thanks to better speakers. Optional Bluetooth switch access is available for the iPad Air and iPad Minis and convenient shoulder straps, handles and table stands complement the range.

If you don't get to see it at BETT it's worth dropping by AssistiveWare (Booth 703) to get a hands-on demonstration of Keeble, its new iOS 8 keyboard that can be used with any iPad app. Keeble offers self-learning word prediction and automatic capitalisation to reduce typing effort, Hold Duration to prevent accidental selections and Select on Release to compensate for motor-challenges. Its layout is also customisable for younger users or those with visual impairments.

And it's not just AssistiveWare who have taken advantage of the new features in iOS 8 to introduce their own keyboard. Crick Software (Booth 407), best known for Clicker and related products, launched SuperKeys at the back end of 2014. According to the company's blog SuperKeys is useful for people who have trouble tapping smaller-sized keys with precision. The standard keyboard layout is divided into groups of keys, named clusters. When a user taps a cluster, the keys within it expand to fill the keyboard area. This offers larger targets for users to tap. After tapping a key, the expanded cluster shrinks back, so the user can type their next character. Definitely worth checking out!

Among the products being shown by Inclusive TLC (Booth 417) will be the new EyeGaze Foundations, which we featured in Issue 1 of *Special World*. Specially designed to meet the needs of teachers, therapists and carers working with students with physical disabilities, cerebral palsy, visual impairment, intellectual disabilities, autistic spectrum disorder and communication difficulties, it offers a low-cost package that combines myGaze® Assistive Gaze Technology with Inclusive's own software.

Sonocent (Booth 518) will be showing the latest versions of its award-winning Audio Notetaker, which allows you to combine audio, text and images to produce comprehensive notes of lessons or lectures. It's a useful tool for anyone who struggles with note-taking while also trying to listen or who has trouble deciding what's important and what isn't at the time of a lesson or lecture. Away from the immediate pressure of events students can organise their recordings, colour code key points, discard anything that's not needed and supplement what they have with additional notes or images.

Finally, Tobii Dynavox (Booths 319 & 423) will be showing its

full range of communication and eye-gaze products, but having just declared 2015 the 'Year of Consumer Eye Tracking' at CES it is likely ATIA visitors will want to know what this means for education and the special needs community in particular. One of the products showcased at CES was Tobii Glasses 2, their latest combined glasses and software system built for advanced eye tracking analysis, which can capture user gaze data in HD at 1080p. It is hard to imagine that these wouldn't provide valuable feedback is designing and refining hardware and software destined for the educational marketplace.

Tobii Glasses 2

We will also be spending time at some of the **educational sessions** taking place over the four days. These include one- and two-day pre-conference workshops designed for people new to the field of Assistive Technology or first time conference attendees and one-hour sessions covering the full gamut of AT and special educational needs, including literacy, autism, sensory impairments and augmentative and alternative communication needs.

What's important to recognise is that for many in the AT community Orlando is one very important part of their professional development journey, with ATIA's pre- and post-conference webinars providing a seamless list of opportunities to stay ahead of the curve when it comes to the latest technological advances and their potential impact on teaching and learning.

The conference rallying cry of 'Network, Learn, Share' is at the heart of ATIA's year-on-year activities. As Dikter said after ATIA's 2014 conference, the association is always on the lookout for ways to share what it knows and build a more connected community. 'In Orlando we have attendees from around the world interested in recreating what we have - all the parts and pieces that make up a conference like ours - to benefit their home communities,' he said. 'For some nations the challenge isn't money, but a lack of AT professionals and practitioners. It's one reason we are pleased to offer conference recordings; they can serve more than just ATIA attendees and reach those who may never leave home. Still we need to find more ways to share, and not just presentations, but also our discussions. The technology, after all, is nothing without all of you.' •

50

BOOKMARKS

Useful links on the world wide web

In September 2014, **The Childrens and Families Act 2014** came into force. A pottage of policy changes covering everything from adoption to parental leave, its core clauses map out a new system of identification and provision for children with special educational needs and/or disabilities (SEND).

Four years in the making, it promises 'simpler, improved and consistent help' for those with SEND and their families, a greater role in decision-making and more choice about meeting needs. The Act is supported by a new **SEND Code of Practice** outlining the duties and responsibilities of all stakeholders, including professionals working in special and mainstream schools.

All mainstream schools in England and Wales are required to designate a teacher as their SEN Co-ordinator (SENCO). The SENCO must be a qualified teacher working at the school. If they are a newly appointed SENCO who has not previously held the post at that or any other relevant school for more than 12 months, they must achieve a **National Award in Special Educational Needs Co-ordination** within three years of their appointment.

While the role of SENCO is key, the responsibility of meeting the needs of children with SEND extends to all staff. As the Code states: 'The quality of teaching for pupils with SEN, and the progress made by pupils, should be a core part of the school's performance management arrangements and its approach to professional development for all teaching and support staff.'

Annex 2 of the Code suggests ways in which early years providers, schools and colleges can meet the professional development needs of their staff. This includes links to a number of organisations that have received funding through the Department for Education's (DfE) voluntary and community sector grants programme. One of these is the membership organisation **Nasen**, which provides access to a broad range of materials and support services through the **SEND Gateway**.

THE SEND Gateway

The SEND Gateway was launched by Children and Families Minister, Edward Timpson, at **Nasen Live** in May 2014. Jane Friswell, Nasen's Chief Executive, says the concept arose from a recognition that teachers actually 'don't know what they don't know'.

'We assume when we put the responsibilities and accountabilities that go with educating all children, including children with SEND, into the hands of teachers that they will know and understand the impact that having a special educational need has on a child's learning. Sadly, I believe in the 21st century, we still don't have a profession of teachers that are as well informed, well supported, well developed and well trained as we should, and there are a variety of reasons for that.' What was needed, she says, was a one-stop shop, where teachers could access information that was quality assured and up to date and where practitioners could share ideas.

Nasen received DfE funding for two years (2013-15), which it added to. It worked closely with other stakeholders, including an expert reference group, to refine its ideas and with **PIXL8** to design the site. 'Our requirement was that we wanted a facility where after three clicks online you would find what you were looking for,' Friswell says.

The resulting site provides a platform for other groups that received DfE funding linked to the introduction of the Childrens

Elin Franklin talks to Minister Edward Timpson about the reforms to special educational needs

and Families Act. These include a number of organisations that provide advice,information and training on specific impairments, such as the **Autism Education Trust**, **The Communication Trust**, **The Dyslexia-SpLD Trust** and the **National Sensory Impairment Partnership**. In all there are 50+ **contributing organisations**, all them from the voluntary and community sector. While the type of organisation that can publish on the Gateway is currently restricted under the DfE funding arrangements these restrictions will end in March 2015.

Whether further funding will be forthcoming is uncertain, but Friswell is hopeful given the commitment shown so far and the scale of the reforms being introduced. She says teachers' current workload is 'shockingly high' and cites the Education, Health and Care (EHC) review process as an example of the additional work schools are now being asked to undertake. While local authorities received substantial funding to support the introduction of the reforms this money wasn't ring-fenced and concerns exist that, in the context of swingeing cuts in local government grants, it may have been used elsewhere. 'We have got local authorities that are between a rock and a hard place in terms of funding and having to make very difficult decisions in very difficult circumstances,' Friswell says. 'Equally, they are being asked to increase the level of expectation on schools while not necessarily giving them the additional resources they need; that's an incredibly difficult situation for headteachers, SENCOs and teachers.'
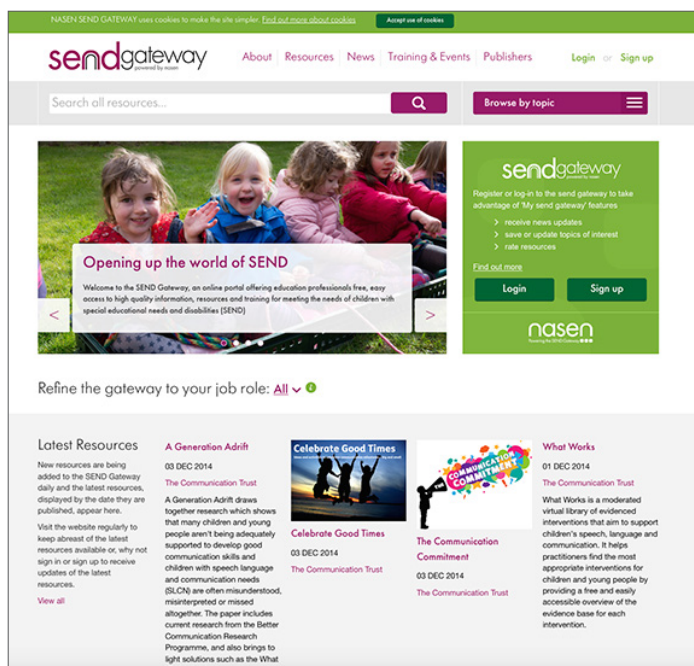
The future

Jane Friswell, Chief Executive of Nasen

Looking to the future, one of Friswell's biggest tasks is to protect the Nasen brand and its reputation for high quality training and resources. This extends to the SEND Gateway, with which the organisation is now inextricably linked. The expert reference group continues to play a role in quality assuring content posted on the site and clear screening processes are in place. After March 2015 the challenge will be to scale these up as Nasen seeks to expand the number of approved publishers while ensuring that standards don't slip.

But Friswell says the organisation has already gained valuable experience in helping others meet the quality control criteria through its work with smaller organisations. 'We've been able to support them to look at the resources, the information and training they have been funded to produce and also support them to get it onto the Gateway,' she says. 'There is an assumption that there is the level of technical application, knowledge and understanding within organisations to do that. But in some organisations there may be only two people and it doesn't necessarily work like that. So we have been very supportive and really attentive to those much smaller organisations that perhaps need a higher level of support.'

Thus far becoming a contributor has been by invitation only and Friswell says that will probably remain the case for some time to come. 'It sounds like it is a bit of an exclusive members club but what Nasen has to be particularly confident of is that any organisation and any resources or training events they provide doesn't conflict with the vision and values of the association, 'she adds. 'We are a national charity, we are a not-

for-profit organisation and our core purpose and function is to be the leading professional association for SEN.' Where widening the pool of publishers may prove especially challenging is when Nasen moves beyond the voluntary and community sector to include commercial organisations. Friswell is fully aware of the risks involved and foresees some tough decisions ahead.

In the meantime she says traffic to the Gateway has far, far exceeded the targets Nasen set. Every single item, whether it's an event, a resource or an information piece, has a built-in rating system and the 'Most Viewed Resources' and 'Most Viewed Publishers' are shown and updated on the home page. At the time of writing it is clear that guidance is the number one search topic as schools struggle to come to terms with the new procedures, but Nasen is also keen to see where gaps exist and how they can be filled.

As the DfE funding period comes to an end Friswell says Nasen is already taking stock. 'We will have a full and comprehensive evaluation report presented to our expert reference group by the end of March so there will be a series of recommendations made which I will then need to take to my Board of Trustees.' One thing she is clear about, however, is that access to the Gateway will remain free to all.
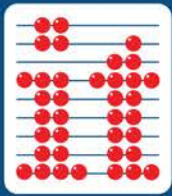
HelpKidzLearn

Fun, accessible games & activities for young children and those with learning difficulties to play online!
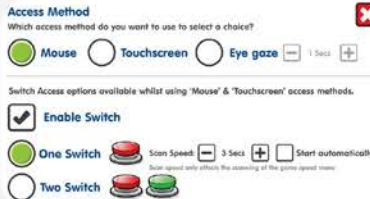
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WHAT'S ON

Your month-by-month guide to some of the key disability and special educational needs events

January 2015

20 January
Special Educational Needs: Early Intervention and a Person Centred Life Course, Holiday Inn Kensington, London, UK **VIEW**

21-24 January
BETT Show, Excel, London, UK **VIEW**

27-31 January
Assistive Technology Industry Association Conference, Caribe Royale All-Suite Hotel and Convention Center, Orlando, Florida, USA **VIEW**

30 January
NASEN Leadership Conference, Central Hall, Westminster, London, UK **VIEW**

30-31 January
26th Courage to Risk Conference, Broadmoor Hotel, Colorado Springs, Colorado, USA **VIEW**

February 2015

4-5 February
Engaging All Students in Inclusive Classrooms, Embassy Suites Hotel and Conference Center, San Marcos, Texas, USA **VIEW**

5 February
Dyslexia Friendly Good Practice, London, UK **VIEW**

6 February
SEND: Preparing for Independence – Working with Children, Young People and their Families, Epsom Downs Racecourse, Surrey, UK **VIEW**

18-21 February
2015 Learning Disabilities Association of America Annual Conference, Hilton Chicago, Chicago, Illinois **VIEW**

23 February
A new landscape for SEN and disability conference, Park Plaza Leeds, Leeds, Yorkshire, UK **VIEW**

26-27 February
EICE, Manchester Central, Manchester, UK **VIEW**

26-27 February
Mind Brain Education: Learning to Learn Conference 2015, Melbourne Convention Centre, Melbourne, Victoria, Australia **VIEW**

March 2015

3-4 March
The National Autistic Society's Professional Conference 2015: Innovative approaches to support and intervention, Harrogate International Centre, Harrogate, UK **VIEW**

4 March
A new landscape for SEN and disability conference, Friend's House, London, UK **VIEW**

11-12 March
Future Schools Conference, Australian Technology Park Sydney, Sydney, New South Wales, Australia **VIEW**

11-12 March
Special Education Technology Needs Conference, Australian Technology Park Sydney, Sydney, New South Wales, Australia **VIEW**

12-13 March
NAHT Special schools, specialist and alternative provision conference 2015 - leading the changes: engaging learners, Chesford Grange, Kenilworth, Warwickshire, UK **VIEW**

12-13 March
NUT Annual Special Educational Needs and Disabilities conference, Stoke Rochford Hall, Stoke Rochford, Grantham, Lincolnshire, UK **VIEW**

13 March
British Academy of Childhood Disability Annual Scientific Meeting 2015: Autism - Science to Service Delivery, Radisson-Blu Hotel Durham, Durham, UK **VIEW**

15-19 March
The Oxford Round Table 23rd Annual International Conference on Childhood Education, Harris Manchester College, University of Oxford, Oxford, UK **VIEW**

17-18 March
The Association of National Specialist Colleges Annual Conference 2015: Hard Times or Great Expectations – Dare we ask for more? Aston Business School, Birmingham, West Midlands, UK **VIEW**

19-21 March
Education Show, NEC, Birmingham, UK **VIEW**

20 March
World Down Syndrome Day Conference 2015: 'My Opportunities, My Choices' – Enjoying Full and Equal Rights and the Role of Families, United Nations Headquarters, New York, USA **VIEW**

25 March
Child Brain Injury Trust: Education for tomorrow – a positive experience?, Etihad Stadium, Manchester, UK **VIEW**

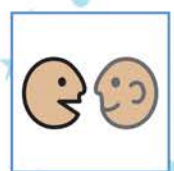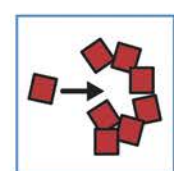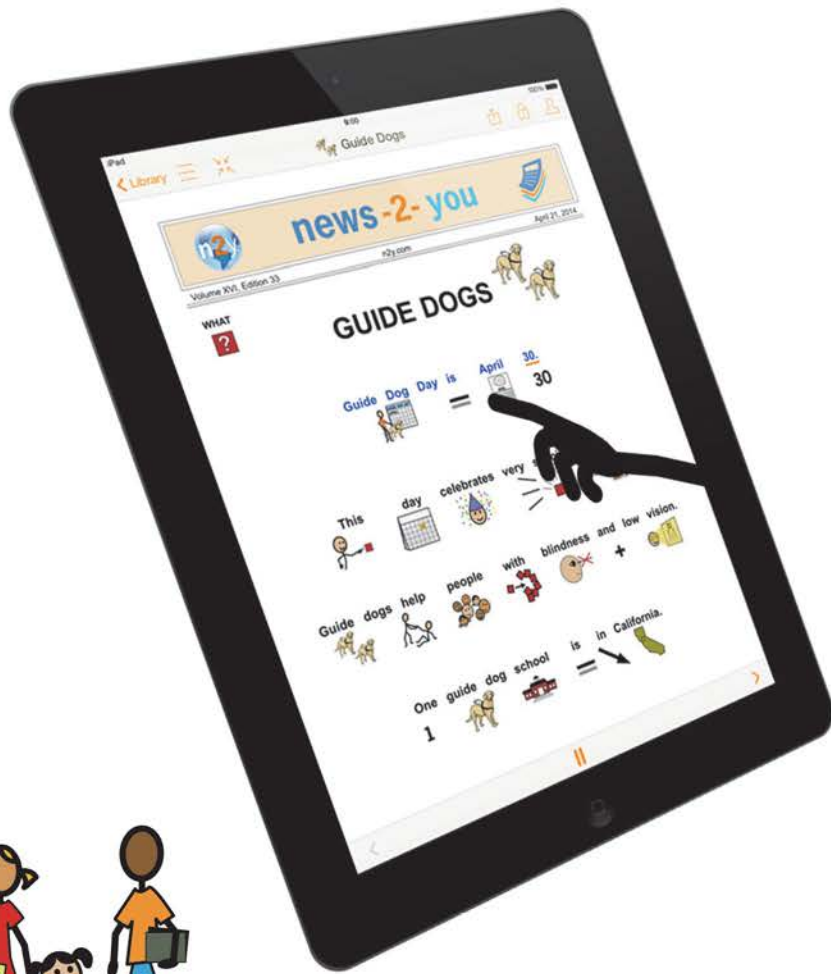**25-26 March**
Failing To Succeed: NAACE Strategic Conference 2015, East Midlands Conference Centre, Nottingham, UK **VIEW**

26 March
Special Educational Needs Law and Practice Conference 2015, Copthorne Tara Hotel, Kensington, London, UK **VIEW**

26-28 March
East Asia Regional Council of Schools (EARCOS) Teachers' Conference 2015, Sutera Harbour, Kota Kinabalu, Sabah, Malaysia **VIEW**

April 2015

2 April
World Autism Awareness Day **VIEW**

2 April
Ascent SEN Conference 2015, Ramside Hall Hotel, Durham, UK **VIEW**

8-11 April
Council for Exceptional Children Convention and Expo, San Diego, California, USA **VIEW**

16-18 April
European Teacher Educational Network Annual Conference 2015, UCC University College, Copenhagen, Denmark **VIEW**

21-24 April
2015 National Training Institute on Effective Practices: Addressing Challenging Behavior, The Vinoy Renaissance St Petersburg Resort & Golf Club, St Petersburg, Florida, USA **VIEW**

22-24 April
12th Annual Young Child Expo & Conference 2015, Wyndham New Yorker Hotel, New York City, USA **VIEW**

25 April
2015 Patoss Annual Conference & AGM, Imperial College, London, UK **VIEW**

28-30 April
Naidex, NEC, Birmingham, UK **VIEW**

30 April - 1 May
WESC Foundation Annual Visual Impairment International Conference, WESC Foundation, Exeter, Devon **VIEW**

May 2015

1 May
Dyslexia: Improving Outcomes, London, UK **VIEW**

11-17 May
Mental Health Awareness Week

15-16 May
Learning Works 18th National SEND Residential Conference, Swindon, UK **VIEW**

19 May
NASEN Leadership Conference, Macron Stadium, Bolton, UK **VIEW**

20-21 May
NASEN Live, Macron Stadium, Bolton, UK **VIEW**

June 2015

2-3 June
EduTECH National Conference and Expo, Brisbane Convention and Exhibition Centre, Brisbane, Queensland, Australia **VIEW**

15-16 June
The Digital Education Show Asia 2015, Kuala Lumpur Convention Centre, Kuala Lumpur (KL), Malaysia **VIEW**

18 June
Dyslexia Guild Annual Summer Conference 2015, School of Oriental and African Studies, London, UK **VIEW**

21-25 June
14th Biennial Conference of the International Association of Special Education: New Dimensions Toward Education, Advocacy and Collaboration for Individuals with Special Needs, University of Lower Silesia, Wroclaw, Poland **VIEW**

22-25 June
Canada International Conference on Education (CICE-2015), Toronto, Canada **VIEW**

25 June
7th National Dyscalculia and Maths Learning Difficulties Conference, The Cumberland Hotel, London, UK **VIEW**

World Autism Awareness Day

In December 2007, the United Nations General Assembly adopted **resolution 62/139**, tabled by the State of Qatar, which declares 2 April as World Autism Awareness Day (WAAD) in perpetuity.

The World Autism Awareness Day resolution encourages all Member States to take measures to raise awareness throughout society, including at the family level, regarding children with autism and to encourage early diagnosis and early intervention. It further expresses deep concern at the prevalence and high rate of autism in children in all regions of the world and the consequent developmental challenges.

World Down Syndrome Day
VIEW

21 March 2015 marks the 10th anniversary of World Down Syndrome Day (WDSD), when organisations throughout the world seek to raise awareness of Down syndrome (DS), how it affects those with it, and the positive contribution they nonetheless make to society.

While **Down Syndrome International** (DSI) encourages national organisations to organise and publicise their own events, it has also created a dedicated website through which they are able to register and share details of activities they have planned.

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REVIEWS

Freaked Out: The bewildered teacher's guide to digital learning

Simon Pridham
Independent Thinking Press
ISBN: 9781781351055
£20.00

There are an awful lot of iPads now being used in schools, with a few brave souls even opting for 1:1 deployment. One example is Casllwchwr Primary School in Swansea, Wales, which equips each of its pupils in Key Stage 2 (7–11 years of age) with their own iPad for the duration of their stay. Its headteacher is Simon Pridham, one of a small band of IT evangelists who are spearheading the effort to get our schools to embrace digital learning.

Aware of the yawning gap that exists between technological innovation and teacher confidence he has written this short book to help digital ditherers take their first steps. And his chosen vehicle, as for many others, is the iPad.

But this is a book with a difference. Structured like a hands-on workshop it starts with a brief introduction to the iPad itself, answers the muffled question 'What is an app?' and explains how to create an Apple ID

and iCloud account. Then, with the preliminaries covered, the real fun begins.

Readers are shown how to download three apps: Aurasma, Red Laser and Audioboo. These are, in turn, an augmented reality platform, a QR Code Reader and a social podcasting platform. Rather than abstractly describing these apps and their potential educational uses, however, Pridham skilfully integrates them into the design of the book using them to take us off the page to Apple's App Store (for further downloads) and to short video and audio clips replete with practical tips and first-hand accounts from Casllwchwr's digital team.

Enveloping all of this is a sound educational philosophy – 'inspire, engage and enthuse' – and a tried-and-tested framework for involving the whole school community, including parents and grand-parents in this digital journey. Importantly, this includes mapping out an internal structure that recognises and harnesses the different skills and expertise of pupils and staff.

While *Freaked Out* is not explicitly aimed at those working with children with special educational needs its central message of encouraging creativity, personalised learning and collaboration among pupils is relevant to all settings. As Pridham rightly states: 'You need to have a love of learning, be able to model effective learning systems, be brave enough to take risks, be innovative,and, most importantly, become a teacher of learning rather than a teacher of content, curriculum and facts.'

Reviewed by **Diane Crew**

Brilliant Ideas for Using ICT in the Inclusive Classroom (2nd edition)

Sally McKeown & Angela McGlashon
David Fulton/Nasen
ISBN: 9781138809024
£25.99

I can't pretend to be completely unbiased about this book as I was involved in its inception. Frustrated about the dearth of technology used in classrooms I visited, I complained long and hard to Sal over lunch one day. Sharing my disappointment, she

took up the gauntlet and put together a proposal for a publication that would begin to address the situation. The book that she and co-author Angela McGlashon produced was an inspired piece of work, subsequently shortlisted for the 2013 Educational Resources Awards.

In the tradition of all David Fulton-style books *Brilliant Ideas for Using ICT in the Inclusive Classroom* delivers just what it says on the cover. Written in an extremely user-friendly, straightforward, 'dip-into' style, it provides lots of

practical ideas for using ICT to boost the achievement of all pupils. I've used the first edition with trainee teachers (and their experienced colleagues) with really good effect and in several cases, implementing an idea from the book has led to the delivery of an 'outstanding' lesson.

Fifty illustrated case-studies, demonstrate how teachers can help pupils to develop the key skills of communication and problem-solving and access the wider curriculum. There is practical advice on how to use a

diverse range of technology from pod-casting to dance mats; from digital story telling to 'text home' systems. Twenty starter activities provide 'an idiot's guide' to improving your use of for example, the SMART Board, symbol software and cameras. The second edition has been updated to keep pace with new technologies. Readers can find out about apps, blogging, geocaching, art packages, Twitter: I especially like the 'extras' such as tips about getting the most out of iPads, and how blogging can be effective in getting

pupils to write. Sal and Angela have done the legwork so that teachers don't need to!

This book is an excellent resource. Used as a stimulus for staff development with teachers and assistants, it will enable them to inspire learners, engage the disenchanted, support the strugglers and generally liven up day-to-day lessons in ways that make a positive impact on achievement. It could make a very big difference in your school!
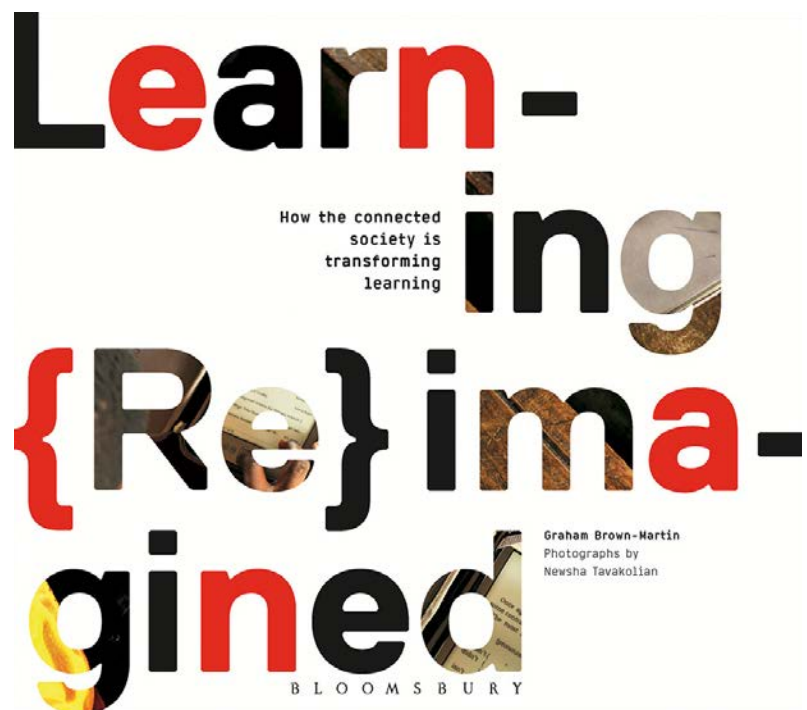
Reviewed by **Linda Evans**

Learning {Re}imagined
Graham Brown-Martin
(Photographs by Newsha Tavakolian)
Bloomsbury/WISE
ISBN: 9781474222730
£29.99

At the beginning of December 2014, Gartner, which describes itself as 'the world's leading information technology research and advisory company', set out its predictions for the next five years. Unsurprisingly, they include that by 2018 'more than 50 per cent of users will go to a tablet or smartphone first for all online activities' with the desktop PC reserved for meatier tasks. Certainly if you spend any time with young people this seems self-evident. What trends like this and the general ubiquity of information technology mean for our schools and education systems is what *Learning {Re}imagined* sets out to explore.

As an established blue-sky thinker author Graham Brown-Martin is well placed to lead us on this journey – and well supported by the **World Innovation Summit for Education** (WISE) and the **Qatar Foundation**. In a period of five months (July-November 2013) he crossed the globe with photographer Newsha Tavakolian visiting everything from village schools to prestigious universities in 11 countries, talking to key innovators struggling with how to harness this technology 'to make teaching, learning and education as engaging and relevant as they can for what is an uncertain future'.

The resulting book is, as the author says, part travelogue, part diary, part commentary consisting of 'essays, interviews, case studies and thought pieces, illustrated with beautiful photography and an evolving library

How the connected society is transforming learning

Graham Brown-Martin
Photographs by Newsha Tavakolian

BLOOMSBURY

of **digital resources**'. For those of us living in technologically advanced nations the fundamental issue seems straightforward: how do we reconcile this new technology with an education system fashioned in an earlier age and resistant to change. For others, the question is more basic: can this 'new' technology help overcome the obstacles that prevent universal access to education for some of the world's poorest people.

What's perhaps surprising is that so few of those interviewed highlighted the truly transformative role assistive technology has played and is playing in making schools more

inclusive for those with special educational needs. One notable exception is the Awsay Academy in Qatar where technology is helping educate children who may have otherwise missed out but is also encouraging 'a more informed dialogue' in the region about children with special needs.

Despite this shortcoming *Learning {Re} imagined* is a stimulating read for anyone interested in education in the 21st century, and a journey well worth joining Graham Brown-Martin on.

Reviewed by **Mick Archer**

Silent night?

Are more and more pre-school children being dosed with methylphenidates? A new survey suggests so

By Special World

It may have been a quieter Christmas for some UK families, but at what cost? According to research carried out by the **University College London Institute of Education** (IoE) and the **British Psychological Society** (BPS) more than a fifth of educational psychologists say they know of pre-school children being given methylphenidates such as Ritalin, contrary to **National Institute for Health and Clinical Excellence** (NICE) guidelines.

While the full details of the survey are yet to be released, pre-Christmas reports in the **Guardian**, the **Daily Mail** and The **Independent** will further alarm professionals concerned about the increasingly pervasive use of drugs as a first resort when treating children diagnosed with behavioural problems such as Attention Deficit Hyperactivity Disorder (ADHD).

Professionals say this flight to drugs is fuelled by the under-resourcing of alternative treatments recommended in NICE's guidelines. One educational psychologist who took part in the study is quoted as saying, 'Our biggest difficulty is that children's and adolescent mental health services and paediatric teams are so short-staffed they go straight to medication and completely ignore NICE guidance.'

NICE published guidelines on the identification and treatment of ADHD in 2008 and updated them in March 2013. The revised guidelines say that, 'Parent-training/education programmes are the first-line treatment for parents or carers of pre-school children' diagnosed with the condition, and that, 'Drug treatment is not recommended for pre-school children with ADHD.' It adds that if parent-training/education programmes prove ineffective healthcare professionals 'should consider referral to tertiary services for further care.'

The original guidelines also make clear that methylphenidate and atomoxetine do not have UK marketing authorisation for use in children younger than six years and that where drugs are used they should 'always form part of a comprehensive treatment plan that includes psychological, behavioural and educational advice and interventions.'

Vivian Hill, Director of Professional Educational Psychology Training at the IoE and one of the study's authors, told the *Guardian*: 'It is very alarming to discover that terribly young children who often have not had access to alternative treatments are being put on medication. It is almost certainly to do with the fact that the whole of children's mental health services is incredibly underfunded. It's quick and easy – one off the waiting list, one intervention in place. To work with a child or a young person and their family over time is much more costly, but much safer and likely to have much better results. Medication has a short-term impact. It will not make the difference long-term.'

The survey involved 136 educational psychologists from 70

local authorities. The findings will be presented at the BPS's Division of Educational and Child Psychology (DECP) Annual Conference in Durham in January 2015.

DECP Committee Member Dave Traxson told *Special World*, 'With the supportive data from such surveys I feel very optimistic that we can make progress in significantly decreasing, and hopefully stopping, the unacceptable use of potentially toxic psycho-active drugs with toddlers. The concern of professional bodies such as the **Association of Educational Psychologists** (AEP) and the DECP is that the brains of very young children have not yet finished developing and toxic pharmaceuticals may harm their normal growth.' •

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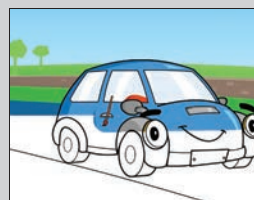
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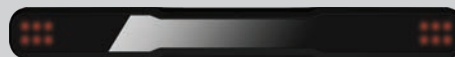
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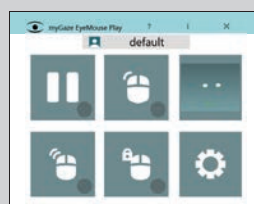
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