2013 First year student
2014 Spends a rainy season in Cambodia
2021 Earns doctorate in English literature
2022 Publishes first novel
For hipster Californians raised on a diet of skinny lattes and even skinnier jeans, the latest iHope iteration to be belched from the bowels of Apple's creative core is a moment to be apeely anticipated in that trying-hard-not-to-be-too-impressed way of theirs. For everyone else, it's a time to ride out the bombardment of aspirational adverts and wait for that first, satisfying price drop before enquiring what the fuss is all about.

But there's one group that keeps an eye on Apple's output as our cossetted Californian cousins - teachers and parents of children with Special Educational Needs (SEN).

Technology has always played a pivotal role in helping people with disabilities lead a fuller life. Today, the easy user interface so associated with Apple's iPads and iPhones has acted as a template for other companies to follow. Removing technological barriers by making hardware intuitively tactile has created a perfect storm of desirability for high-tech companies.

The question is, can these devices - and others like them - really help people with disabilities and SEN improve their lives, communication, and academic performance? And are we likely to reach a pivotal moment in education where assistive technology becomes an essential part of a disabled pupil's experience, rather than a rarity or luxury?

Ruth Garner, who is the Director of Learn Net - a research and advisory body that specialises in helping people with learning difficulties and disabilities realise their potential through technology - believes there are few easy 'yes' or 'no' answers.

"There is a lot of anecdotal evidence to suggest that tablets such as iPads are extremely useful, and I do think they are beneficial," says Ruth, who spent 24 years working as a qualified occupational therapist for the NHS. She then founded Learn Net, and boasts plenty of experience in the field of learning through technology, having been a member of Greenwich University's GeTT team (Certified Learning through Transformative Technologies). Ruth believes that the needs of each child are unique, and should be taken into consideration with every iPad issued.

"It's quite a complex scenario, with success often dependent on the child using the technology, dependent on the right technology, and often dependent on the person who's helping that child."

A bespoke rather than broadcast approach is required, argues Ruth, who as Chair of the Birmingham eLearning Foundation (BeLF) has recently helped fund the distribution of iPads to one of the city's special schools. The results have been interesting.

"The school is extremely pleased with them because the children who have a passion for something have been able to produce excellent, self-motivated work, often unsupervised, on these iPads. Some of them are really flying thanks to what the technology enables them to do."

In many cases they do not even require a teacher's guidance or demonstration - a keen sign that the technology's intuitive-ness removes traditional barriers to learning that many children with SEN are faced with. It is early days but BeLF is capturing the benefits of the iPad project through the partnership with Birmingham University.

LOTS TO LEARN

Yet often - either because of the severity or distinct manner of a child's disability - pupils with SEN require direct guidance on how to get the best out of the technology provided to them. This, in itself, can cause problems for both teachers and parents who might be ill-equipped themselves, Ruth believes.

"What we have found at BeLF is that teachers in the schools we focus on have embraced the iPads, but they don't necessarily know how to manage the projects and have often been learning at the same pace as the pupils about what apps they need, and how they might prove beneficial, for example."

So learning cuts both ways. If technology such as iPads, e-readers and other forms of tablets flatten some of the hurdles that traditionally hinder SEN pupils, then they can sometimes push up obstacles for teachers and parents unfamiliar with such devices. Schools, too, can find it difficult - and expensive - to create an environment that is conducive to getting the best out of these technologies.

"One of the issues that BeLF is finding is that while we can give out iPad devices to numerous schools, not all will have the necessary technology setup to make use of them sufficiently," says Ruth. "For example, if Wi-Fi connection isn't of the required breadth across the school - as well as depth in its capacity to deal with data - then it can become incredibly frustrating for teachers and pupils."

TOP OF THE CLASS

One school that has proved adept at creating an atmosphere of technological understanding is Corseford School in Renfrewshire, Scotland, in collaboration with Dundee University's School of Computing, the school has worked on a groundbreaking project called How Was School Today? In a nutshell, the project developed software that can collect data of a child's daily movements and interactions at school - turning their day into a narrative they can tell their parents when they get home. "The project is intended for children with complex communication needs (CCN). It helps them create stories about what they did during the day: a computer tool that..."
creates a draft story based on knowledge of the user's planned daily activities and by automatically acquired sensor data," says John Baird, who is Head of RCUC Digital Economy – the research council charged with investigating the transformational impact of digital technology on British life. Annalu Waller, Professor of Human Communication Technologies at the University of Dundee, has worked in the field of Augmentative and Alternative Communication (AAC) for more than 20 years and helped create the technology behind the project.

"Despite the amazing advancements in technology, we still find that children who need to use communication devices struggle to reach past one-word or two-word responses or interactions," she says. "So the people who need AAC tend to be quite passive in their communication." Annalu and her team identified a need for children with CCN to move beyond these needs-based phrases in order to help improve their school day experiences, aid learning, and nurture better relations with their teachers and parents.

"The thing that characterises conversations for most people is narratives," says Annalu. "We tell stories all the time; we tell people what we’ve been doing and chat about things that have excited or amused us." Such easy interactions prove difficult at special schools for children with CCN, where one-way conversations are the norm and the children are unable to express themselves, their frustrations, or their achievements.

**A HIGH-TECH APPROACH**

A few years prior, Aberdeen University had been working on a new text technology that was able to sense information from its environment and create language narratives out of the data it had captured. This technology was being used for medical practitioners and weather presenters – key data turned into a stream of narrative and page for more about the project). By designing tablet-style interfaces for the children’s wheelchairs, and fitting the school with QR codes and RFID (Radio Frequency Identification) tags at various points, data can be captured throughout the day and compared with a child’s daily timetable before being turned into a real-language story.

**MEASURE OF SUCCESS**

Empowering children with CCN to move beyond single-word answers and one-way interaction has immediate and obvious benefits, not least in relationships with their parents, and their own happiness. But what about academic success?

"We hope to learn more about this as we continue our studies," admits Annalu, sounding as understandably reluctant as Ruth in giving any definitive answers. "The evaluation we have done so far indicates that children can certainly initiate more, and no longer have to wait for others to raise topics – they can introduce topics and conversations themselves.

"Increased confidence in children, as many studies have shown, exponentially leads to better academic performance. But Annalu signs off with an anecdotal dot of warning: "Work on earlier text-based systems – where we created children’s stories with them – led to many children developing much more confidence. There was one particular child who, at the beginning of the year, wouldn’t say boo to a goose. But at the end of the year, she would say ‘I want to go to the toilet’ and make a complete class for being cheeky!" she laughs. "Now to me, this is a real indication of success – the child had become so much more open and self-confident that we just couldn’t keep them quiet!"

If SEN-focused technology creates even more examples of pupil wellbeing, then maybe we can even suffer – in rather a perverse way – that it has the desired positive effect on children’s academic performance and personal development.

**HOW WAS SCHOOL TODAY?** – Annalu explains how it works...

"The system captures Places, Objects, People, and Time.

**TIME**

Time is easy, because computers are very good at keeping time. For PLACE, we ideally wanted to track children using GPS, but the way it is done at the moment is by scanning in at a place with a place tag - there are QR codes or RFID tags on the walls, so the children’s location can be quickly scanned when they arrive at a place in the school.

For **PEOPLE**, the ideal aim is to know who is where, and when. Ethically, teachers told us they don’t necessarily want the system to know where people are all the time, so we use tagged staff cards with RFID tags, so if a person is interacting with the child they can very easily scan that into the sensor.

**OBJECTS** are labelled – we label as much as we can within the environment, with the QR codes and RFID tags. There will, however, be more convenient ways to collect this data in the future.

The children have communication devices based on tablet technology on their wheelchairs that let us know who the child is, who they are talking to and what they are working with. This information is then compared to the child’s timetable, so we can be even smarter – in rather a perverse way – that it has the desired positive effect on children’s academic performance and personal development.

The child will see a graphical interface with the top five stories the system has identified for that day. By going through the system sequentially, the child can speak a sentence at a time, so it does not come out as a monologue; it comes out bit by bit. So if a child says, ‘Instead of going to reading’, we went to the half, the listener will immediately say, ‘Oh, what happened?’ because that is the natural flow of conversation. And the following sentence might be, ‘A visitor was there’. Who was that? We are making the most of the natural redundancy in conversations. It provides the children with a real sense of what the conversation is like, and what it is like to participate in it.

The system also allows the child to evaluate what they have just said. There are two buttons on the interface – a smiley face and a frowning face. By clicking one of these, the system generates a suitable evaluation comment; if a child has said, ‘A visitor was there’ and then presses the smiley face, it will automatically say ‘I liked her’, or ‘She’s nice’, because the system will have recorded, earlier in the day, whether that person was, say male or female.

We’re embedding profiles or information into the machine that the natural language generator can use to adapt sentences to what has gone on before, so the system will become even more sophisticated.

"The project's technology is not currently commercially available, but some of the ideas are being taken up by AAC developers."

For more information, visit:

- www.belf.org.uk
- howwasschooltoday.computing.dundee.ac.uk
- www.chooses2.org
- www.learn-net.co.uk

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A forthcoming book – Using Storytelling to Support Children and Adults with Special Needs: Transforming Lives through Telling Tales by Nicole Grove – touches upon much of the research discussed here, and is available from Amazon.