iPad update

What is the issue

There has been considerable media interest and discussion surrounding the benefits of personal tablet computers for individuals with autism spectrum disorder (ASD).

Whilst there are a wide variety of tablet computers on the market, using a range of different operating systems, the Apple iPad is perhaps the best known, and has received the most attention within ASD research. In particular, there has been a growing interest in the capacity of iPads to develop the communication and social skills of children and adults with ASD through the use of specially designed interactive applications (apps).

There are currently hundreds of apps available from the Apple iTunes store that facilitates augmentative and alternative communication (AAC). One of the most popular AAC apps available to iPad users is Proloquo2Go. This program offers a range of vocabulary and a comprehensive symbol set from which phrases and sentences can be constructed, visually modelled, and 'spoken aloud' by the computer. Proloquo2Go is considered to reflect good practice in AAC for its ease of use, versatility, scope, and quality of outputs (Farrall, 2011).

There is also a wide variety of apps that have been produced to teach or encourage other skills, including attention span, eye contact, social understanding, motor coordination, spelling, time management, self-care and dealing with negative feelings, to name just a few. The Learning App Guide is one website that provides information and reviews of ASD relevant apps: https://www.learningappguide.com/index.php

There are a number of reasons why iPads are considered beneficial communication aids for individuals with ASD:

- Computers are already known to play to the strengths and learning styles shown by many people with ASD; in particular, their preference for visually based learning.

- Apps can be easily customised to the needs of the user, as well as personalised around the individual's interests and circumstances. For example, they can be programmed to incorporate voice recordings of family members or photographs of familiar people and objects.

- Apps promote independent learning and offer immediate feedback and reinforcement.

- The iPad is portable and easy to use. In particular, the touch-screen design is well suited to those with poor fine-motor skills.

- The iPad is a socially acceptable and popular device that may help to remove some of the misunderstanding or stigma associated with more traditional communication aids.

Reviewers have also expressed a few cautions or concerns about the use of iPads for individuals with ASD. For example:

- High levels of technical support can be required, and staff may need extra training and support in the classroom (O'Malley, et al., 2013).

- Extra time and effort is needed to manage the use, storage and maintenance of the iPads (e.g. having the iPads fully charged each session). (O'Malley, et al., 2013).

- The iPad is relatively fragile, which may make it inappropriate for children prone to challenging behaviour.

- There is a risk that devices such as iPads may become a 'fixation' for individuals with autism that could have the effect of further isolating or separating them from others.

- Some apps, especially those centred on AAC, do not reflect good professional practice and may be overpriced relative to what they offer.

- Apps that seemingly cater to the same skill development areas may be programmed very differently from each other. This can mean that it is not easy for users to transfer or generalise skills from one app to another. This is a concern for students with ASD, for whom a key educational goal is the ability to apply skills consistently across settings.

What does the research say?

Despite the widespread publicity and anecdotal 'success stories' surrounding personal tablet computers and ASD, there has in fact been only a few systematic research projects carried out into the benefits of iPads and similar devices for individuals with ASD. Findings from a selection of these studies are summarised below.

- Autism Spectrum Australia (Aspect) (2013) recently undertook research to investigate the effectiveness of using iPads for developing core competencies in students with ASD. The researchers also reviewed the teachers' perspective on the usefulness of the technology. The results identified that teachers reported that the iPad is a useful pedagogical tool which is valuable as a motivational device for learning and increasing class inclusivity. The findings showed that student educational goal achievements can improve when compared to what the teachers would expect when using traditional teaching methods. The results showed that student achievement levels improved more than teachers expected in:
  - Behaviour goals – increased by 67% (30 students)
  - Communication goals – increased by 45% (58 students).

  For more information on this project, please see the media coverage about Autism Spectrum Australia (Aspect) (2012) Proloquo2Go app trial.
  http://www.smh.com.au/digital-life/smartphone-apps/speaking-of-useful-apps-this-ones-a-genuine-lifechanger-20120401-1w6n4.html

- Burton, C. et al. (2013) conducted a small scale study with four boys aged 13 -15 years who had ASD and intellectual disability. The researchers looked at using an iPad for teaching math skills. The study used the iPad to video the students while learning practical maths skills needed for shopping, such as identifying the cost of an item from a price tag, working out which monetary notes were needed and estimating the change they should get. The results from this study showed that when students are able to watch themselves accurately solving problems on an iPad, their mathematical skills significantly improved.

- O'Malley, et al. (2013) investigated the effects of using iPads in classrooms to increase a student's independence in task completion and basic maths skills. The findings suggested that independence in task completion slightly improved. Teachers reported that using the iPad allowed students to make progress toward learning goals that had not been mastered by traditional instructional methods.

- Milman, et al. (2012) investigated how teachers use iPads in classes with children with ASD in pre-kindergarten to 4th class students. The preliminary findings are very encouraging with teachers reporting a high student engagement for activities such as writing, drawing and maths. Teachers differed in their approach to using the iPad, and tailoring it to the individual's learning strengths and abilities.

- Price (2011) compared reading comprehension ability in relation to traditional printed books versus interactive e-books in 30 students aged 12 to 22. The interactive e-books included full colour pictures and simultaneous audio and text. Most students gained significantly higher comprehension scores when using the iPad and interactive e-book. Teachers reported that students found the iPads motivating and that the use of iPads reduced off-task behaviour.

- Rogers & Rogers (2013) review speech, reading and maths apps for the iPad. They conclude that the apps are a useful tool, but state that more research is needed to determine the optimal conditions for learning.

In summary

Recent advances in personal computer technology have revolutionised the options available to support children with ASD for developing their social, communication and daily living skills. With relatively affordable devices and cheap (or free) software applications now widely available, parents and special educators alike have welcomed developments such as iPads. To date, however, the impact of personal tablet computers on short- and long-term outcomes for students with ASD has not been comprehensively researched. Researchers are advising parents to seek professional advice before acquiring a tablet computer or applications in order to ensure the child's individual needs are being met.

References

Autism Spectrum Australia (Aspect) (2013) iPad research. Preliminary findings. Full results will be published. Details to be confirmed.

Burton, C., Anderson, D., et al., (2013) Video self-monitoring on an iPad to teach functional math skills to adolescents with autism and intellectual disability. Focus on Autism and Other Developmental Disabilities. Vol. No. 2. pp. 67-77.

Farrall, J. (2011) 'AAC apps – speaking APPropriately…' The Children's Hospital at Westmead School-Link Newsletter, Issue 2, p. 12.
http://www.schoollink.chw.edu.au/newsletter/

Menard, L. (2011, March). A Review of Innovative Communication Apps for Students with Special Needs. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2011, No. 1, pp. 3292-3298).

Milman, N. B., Carlson-Bancroft, A., & Boogart, A. V. (2012) iPads in a Pre K-4th Independent School–Year 1–Enhancing Engagement, Collaboration, and Differentiation across Content Areas. Paper presented at The International Society for Technology in Education Conference, San Diego.

O'Malley, P., Lewis, M. & Donehower, C. (2013) Using tablet computers as instructional tools to increase task completion by students with autism. Paper presented at 2013 American Educational Research Association Annual Meeting in San Francisco.

Price, A. (2011) Making a difference with smart tablets: Are iPads really beneficial for students with autism? Teacher Librarian, Vol. 39, No. 1, pp. 31-34.

Rogers, C. & Rogers, B. (2013) Using iPads to assist students with special needs: A preliminary overview. Proceedings of the Southern Association for Information Systems Conference. Savannah, GA. USA. March 8 - 9, 2013. pp. 176-178.
http://aisel.aisnet.org/sais2013/33/

Resources

Case study: Warringa Park School
This link provides details of a school for children with intellectual disabilities in Victoria that has resourced almost 300 iPads for use across all areas of the curriculum.
http://www.ipadsforeducation.vic.edu.au/ipad-education-case-studies/10-warringa-park-school

iPad assessment rubric *(see next page)*
This rubric provides an overview of factors that should be taken into account when considering the purchase of applications for iPads and similar devices. Each criterion can be assigned a score from 1 (lowest) to 4 (highest) to provide an overall assessment of the quality and usefulness of the app in question.

YouTube: Why mobile learning?
See how children from Towradgi and Lucas Gardens Public Schools in NSW communicate with an iPad and how a young adult demonstrates independence and the empowerment of communication through this technology.
http://www.youtube.com/watch?v=dECs3SRh8Xo

APP Name		Curriculum focus		Grade / Stage		Cost	

DOMAIN	4	3	2	1
Curriculum Connection	Skill(s) reinforced are strongly connected to the targeted skill or concept	Skill(s) reinforced are related to the targeted skill or concept	Skill(s) reinforced are prerequisite or foundation skills for the targeted skill or concept	Skill(s) reinforced in the app are not clearly connected to the targeted skill or concept
Authenticity	Targeted skills are practiced in an authentic format/ problem-based learning environment	Some aspects of the app are presented in an authentic learning environment	Skills are practiced in a contrived game/simulation format	Skills are practiced in a rote or isolated fashion (e.g. flashcards)
Feedback	Feedback is specific and results in improved student performance	Feedback is specific and results in improved student performance (may include tutorial aids)	Feedback is limited to the correctness of student responses and may allow students to try again	Feedback is limited to the correctness of student responses
Differentiation	App offers complete flexibility to alter settings to meet student needs	App offers more than one degree of flexibility to adjust settings to meet student needs	App offers limited flexibility to adjust settings to meet student needs (e.g., few levels such as easy, medium, hard)	App offers no flexibility to adjust settings to meet. student needs (settings cannot be altered)
User Friendliness	Students can launch and navigate within the app independently	Students can launch and navigate within the app independently *after* demonstration by teacher.	Students can launch and navigate within the app independently *after* demonstration by teacher. Students require intermittent support.	Students need constant teacher support in order to use the app
Student Motivation	Students are highly motivated to use the app and select it as their first choice from a selection of related choices of apps	Students use the app as directed by the teacher	Students view the app as "more schoolwork" and may be off-task when directed by the teacher to use the app	Students avoid the use of the app or complain when use of the app is assigned
Publishing	Students work can be published in multiple formats and/or social media sites	Students work can be published in multiple formats and/or social media sites after being transferred to a computer.	Students work can be only be published to a computer.	Students work cannot be published.
Reporting	Data is available electronically to the student and teacher as a part of the app.	Data is available electronically to student on a summary page and may be screenshot to share with teacher	Data is available electronically to the student, but is not presented on a single summary page.	The app does not contain a summary page.
Connectivity	App connects seamlessly to Wi-Fi network	App connects to Wi-Fi network with manual configuration	App requires port change to connect to Wi-Fi network	App unable to connect to Wi-Fi network

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