Mobile technologies and individuals with an autism spectrum disorder: A list of applications and reflections on their use

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Occupations can evolve over time, particularly as new technologies become available. Tablet computers, smart phones and other mobile devices enable people to engage in various occupations, kinds of learning, fine motor skill activities, movements involved in using a device, and cognitive or perceptual stimulation activities. Together with an Internet connection, a computer keyboard, a global positioning system (GPS), a gyroscope, a clock, a calendar, a microphone, a speaker, a camera and a video recorder, it is possible to imagine a whole host of uses that combine one or more of these possibilities. The purpose of this article is to share information on the applications (apps) available for use on these devices, particularly for individuals with an autism spectrum disorder (ASD).

Creating a list of applications that can be used in occupational therapy

As part of their work as research assistants, some occupational therapy students at the Université du Québec à Trois-Rivières explored various tablet and smart phone applications that might prove useful in occupational therapy. Key words entered into common Internet search engines, as well as the iTunes and Google Play libraries, were used to find promising applications from among the hundreds of thousands available. The applications identified were tested by the students and those that were selected were placed into various categories, including independent living (agenda, reminders, task assistants, etc.), motor skills (coordination, writing, colouring, etc.), cognitive and perceptive skills (association, memory, color, shapes, etc.), educational tools (letters, numbers, reading, mathematics, etc.), learning (time, music, etc.) and autism. A full list of applications was created with entries containing a hyperlink, a brief description and an evaluation by the students who tested them (Dumont, Bellemare, Durand, Leclerc, & Brûlé, 2013). The creation of this repertoire was made possible in part by funding from the Government of Quebec (Fonds de la recherche - société et culture). The list has been updated during the summer of 2013 and is available on the author’s website at the Université du Québec à Trois-Rivières (www.uqtr.ca/Claire.Dumont). The website also provides a description of criteria used in the selection of the applications included in the repertoire, other application repertoires, and a list of educational or professional application provider websites.

The use of information technologies for persons with an ASD

One of the innovative aspects of tablets and smart phones is that they offer opportunities to compensate for certain cognitive disorders through applications such as agendas, reminders, task assistants and schedule assistants, with hints or instructions in written, oral or picture form to assist the user in following rules or instructions, or keeping to a schedule (VanBergeijk, Klin, & Volkmar, 2008). One group that seems to derive the greatest benefit from this type of technology is people with an ASD. An Internet search helped identify lists of the best applications for persons with an ASD (e.g., iAutism (2011) and Jeremy Brown’s list (2011)), in addition to advice on the subject from parents and journalists. One website even calls the iPad a “miracle” for persons with an ASD (Des Roches, 2010). Certain scientific findings substantiate these comments and testimonials.

According to the central coherence theory, persons with an ASD have difficulty processing an overall situation or its meaning (Mottron, 2004). On the other hand, they are believed to have a heightened capacity for systematization (el Kaliouby, Picard, & Baron-Cohen, 2006). Individuals with an ASD often focus their attention on non-social stimuli and do not maintain eye contact with others, and are thus unaware of a great deal of social interaction. They can also have limited but intense interests (VanBergeijk, Klin, & Volkmar, 2008). These characteristics lend themselves well to the use of information technology in daily occupations, because these tools seem to mesh well with the interests and skills of a person with an ASD. The paragraphs below present the results of studies that explain how technologies can help enable individuals with an ASD.

Prior to 2004, studies generally concluded that people with an ASD had executive function deficits compared to typically developed people (Hill, 2004a; Hill, 2004b). However, subsequent research has shown different results. One reason for that is the altered format of some testing. For example, computer-based versions of tests such as the Tower of London and the Tower of Hanoi have been used in studies done since 2004. The results no longer show any deficit in the planning aspect of executive function evaluated by these tests (Kenworthy, Yerys, Anthony, & Wallace, 2008). Instead, better results are achieved when the examiner is replaced by a computer, suggesting that it is the relational aspect that presents difficulties for the people being tested. Moreover, one recent study illustrates the benefits of using a digital avatar to
communicate with persons with an ASD (Hopkins et al., 2011), while another shows that they can understand irony when the situation is presented on a computer (Glenwright & Agbayewa, 2012). These studies provide further evidence that information technologies may be useful tools for promoting learning and occupational performance when working with this client group.

A computer helps focus the attention of persons with an ASD, reduces stress during learning, and allows learners to set their own pace, repeat tasks as often as necessary, and receive hints (Hetzroni & Tannous, 2004). It is a predictable tool—one that the user can control, unlike an interaction with a person. Different computer applications have had positive effects on learning vocabulary, reading and other skills (Pennington, 2010; Travers et al., 2011; Whalen et al., 2010), on communication (Flores et al., 2012), and on certain social skills, particularly through video modeling (Ayres, Maguire, & McClimon, 2009; Ramdoss et al., 2012; Reichow & Volkmar, 2010). Several of the authors cited above also mention that children with an ASD particularly enjoy working with computers and that this enhances their learning. According to one study (Shane & Albert, 2008), children with an ASD are attracted to visual media displayed on a screen and demonstrate several skills in activating and watching content that interests them. Mobile technologies are also socially acceptable and can help boost self-esteem. Moreover, certain applications such as task assistants and schedule assistants can be configured for the specific needs of individuals and thus enable them to live more independent lives (Pigot, Lussier-Desrochers, Bauchet, Giroux, & Lachapelle, 2008).

Conclusion
Clinical experience, user opinion and scientific findings support the use of information technologies for persons with an ASD. Mobile technologies and their many applications offer unique opportunities and new developments can be expected in the coming years. Occupational therapists can consider including these tools in their work and they should be on the lookout for new technologies that can benefit their clients.

References


About the author
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