Editorial: Information & Communication Technologies in Special Needs Education

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Information & Communication Technologies (ICT), in all their forms, are extensively utilized in most human activities. All people, regardless of being digital emigrants or digital natives, benefit from the digital technology. People use personal computers, mobile devices, other interactive systems, the internet, and any relevant technologies and applications in their education, work, communication and amusement. Info-inclusion and access to ICT for all, is indisputable. Special needs and abilities, disabilities, cultural diversity, equity and intercultural issues must not exclude anybody. Instead, “the means of access to information which are required to meet special educational needs, including ICTs and assistive technologies, as well as the training of teachers in order to instruct them in modern pedagogical methods and ways to use new hardware and software required to enhance the effectiveness of education” (Alistair, Serenella & Tokareva, 2006) are some of the factors to be taken into account for a successful inclusive education.

The United Nations Convention on the Rights of Persons with Disabilities suggests that “technology design should take into account accessibility and usability features for the protection and promotion of the human rights of persons with disabilities, in all policies and programs” (Pérez Cota et al., 2014). The Convention also suggests to States Parties “to promote the design, development, production and distribution of accessible information and communication technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost; to undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communication technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost; to promote access for persons with disabilities to new information and communication technologies and systems, including the Internet” (http://www.un.org/disabilities/convention/conventionfull.shtml).

The main types of special needs can be compiled as physical impairments (neuromuscular and skeletal), sensory impairments (visual and hearing), cognitive impairments, speech and language and specific learning impairments (Alistair, Serenella & Tokareva, 2006). ICT through assistive technologies and their compensation and communication uses offer many solutions mainly to physical and sensory impairments (Chantry & Dunford, 2010). Assistive technologies contribute to a universal design, accessibility, and service delivery systems. The didactic uses of ICT contribute mainly to cognitive, speech, language and specific learning impairments (Alistair, Serenella & Tokareva, 2006). The European Agency for Development in Special Needs Education acknowledging the positive contribution of ICT, in the 2001 report suggests the promotion of specific training for teachers, the availability of hardware and software infrastructure for all students, as well as the promotion of research, innovation and the exchange of information and experiences (http://www.european-agency.org/sites/default/files/information-and-communication-technology-ict-in-special-
Similar guidelines are also proposed by the British Educational Communications and Technology Agency (BECTA) in 2003. BECTA lays emphasis on the research on ICT in special educational needs and inclusion and especially on the pedagogical approaches concerning the use of ICT in the educational process (http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.education.gov.uk/publications/eOrderingDownload/15009MIG2791.pdf). In 2009 Walker and Logan, in their handbook on digital technologies for inclusive practices in education, present some examples on how various technologies may support inclusive practice concepts (Figure 1). One can see that essentially all types of digital technologies find their place. Indeed, new technological advancements and pedagogical approaches are developed to ensure access and inclusion. Under that context, technology has to be considered as an accessible and inclusive concept, “not one that requires a qualifier based on who it is for”. In order for this to be fulfilled, “accessible and inclusive technology would build in accessibility from the start rather than try to retrofit after the fact or make accommodations” (Foley & Ferri, 2010).

Figure 1. Inclusive practice concepts and related digital technologies (from Walker & Logan, 2009)
In their recent review Istenic Starcic and Bagon (2014) note that “research and development of information and communication technology (ICT)-supported learning for people with disabilities has not received adequate attention”. As expected, the published papers reviewed are classified into technological and pedagogical contexts, with the latter being the minority. The types of papers that the authors have identified concern ICT access, teaching and learning methods, development and testing of ICT solutions, reviews, assessments, inclusion, behavioural and social development, use of information technology, and interaction issues. The conclusion of the review by Istenic Starcic and Bagon (2014) is that there is “a need for application of universal design principles in research and development of learning environments to provide equal accessibility and inclusive education”. Istenic Starcic and Bagon’s results are in accordance with those by Runswick-Cole who noted that “pedagogical practice is still not ready for inclusion” (2011). The main finding of Istenic Starcic and Bagon as far as it concerns the topics under study, is that most of the papers reviewed refer to learning disabilities.

The above brief literature review mainly concerns studies coming from both international bodies such as UNESCO and the European Union and research papers. The main conclusion is that there is a need for research towards the design and development of technologies, systems and applications for inclusion, together with the design of pedagogical approaches for their use. The International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion (DSAI) aims towards this direction. The proceedings of the conference are published at the “Procedia Computer Science” journal and a special issue compiled of selected papers are published at the “Universal Access in the Information Society” journal.

This special issue of the international peer reviewed journal “Themes in Science and Technology Education” on “Information & Communication Technologies in Special Needs Education” arose from the special track “Information & Communication Technologies (ICT) in Special Needs Education” of the DSAI 2013 conference. The corresponding call for papers targeted the presenters of the special track of the conference, as well as researchers and practitioners working in the field of ICT in Special Needs Education. As a result, five papers have been published. All of them concern technologies and their pedagogical use and evaluation that refer to cognitive impairments such as autism and learning difficulties such as dyslexia. This is in accordance with Istenic Starcic and Bagon’s (2014) finding that these types of disabilities are quite frequent and the research in this field is a necessity.

The first paper of this special issue, by Wald, Li and Draffan, presents mobile enhancements to Synote, the free and open source, web based application that can make any public web hosted recording easier to access, search, manage, and exploit for learners, teachers and other users. Synote provides very well received enhancements to web based teaching and learning from recordings. Syntalk, a second tool, provides a simple and free way to capture and accessibly display the rich student interactions that may occur in classrooms.

In the second paper Silva, Salgado, Suplino and Raposo study cultural viewpoint metaphors that guide the collaborative strategies design of a multitouch tabletop game for people with autism. The authors present the evaluation of the current intercultural situation of the game, the identification of new features, and the redefinition of collaboration patterns with collaborative intercultural features intended for users with severe autism.

The third paper by Angkananon, Wald and Gilbert focuses on the development and evaluation of a technology enhanced interaction framework and method that can help with designing accessible mobile learning interactions involving disabled people. The proposed
method has been developed and validated using technology designers and accessibility experts. The method was successfully evaluated by both samples.

In the fourth paper Skiada, Soroniati, Gardeli and Zissis describe EasyLexia 2.0, a new version of a mobile application for children with learning difficulties. The authors present the results of an empirical study on whether digital devices can offer an improved learning experience for children with learning difficulties and whether a tablet application in comparison to a mobile application, could foster learning on a greater scale.

The last paper by Kazakou and Soulis studies the impact of feedback on phonological awareness development, by applying the same set of digital activities through two different types of feedback, behaviorist and constructivist. Results show that constructivism is the theoretical model that feedback has to be based on, for activities to be fruitful for students with dyslexia.

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References


