Editorial: Language Disorders and ICT

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Information and Communication Technology (ICT) is considered a powerful tool in supporting education and inclusion for persons with disabilities (Unesco Global Report, 2013). The successful application of ICT can make classrooms more inclusive, physical environments more accessible, teaching and learning content more in line with learners' needs. Assistive and instructional technology, are terms often used to denote educational technology for specific purposes.

Assistive technology refers to a variety of devices aiming to help persons with disabilities and special education/rehabilitation needs to function better within their daily context and achieve a higher quality of life. When issues of accessibility, availability and affordability are overcome, assistive technology may provide practical support reducing the negative impact of their disabilities and facilitate aspects of their life and learning (Bauer, Elsaesser & Arthanat, 2011). However, these technologies do not seem sufficient for providing full support to people with (language) disabilities.

Instructional technology includes applications and technology–based supports helpful for instruction and learning such as content enhancements or tools for explicit and online instruction. Technology–based applications can deliver instructional activities and provide practice in basic skills with which students often struggle (Kennedy & Deshler, 2010). Some of their advantages include increased academic learning time, feedback and review, systematic progress monitoring while a disadvantage may be difficulty to evaluate the extent to which acquired skills transfer to e.g. paper and pencil assessment procedures.

ICT effectively incorporated into practice, assists both teachers' instruction and students' learning. Instruction delivered through technology has attributes beneficial for at–risk children and those with language and learning problems, and advantages that make learning particularly attractive for vulnerable populations. The benefits of technology usage include active student response, ability to individualize and differentiate instruction, consistent delivery of instruction, increased student motivation, resources for classroom management (Musti-Rao, Cartledge, Bennett & Council, 2015). When applied skillfully and consistently in ways that build and strengthen skills, capitalizing upon treatment integrity, technology may assist teachers' efforts in designing inclusive learning environments in mainstream schools and classrooms.

However, technology remains severely underutilized. Reasons include inadequate teacher training, school culture, funding, lack of awareness among professionals, policy makers and family members (Smith & Okolo, 2010).

The advances in technologies, that have implications for the education of individuals for whom typical instruction is not effective, far exceed the development of research based resources that focus on learner attributes (Meyen, 2015). Conducting research to inform practice emphasizing on the interaction of *technology features x learner attributes x information processing theory,* incorporating *motivational* and *affective* aspects, is of prime importance. Thus, research and practice meet the educational challenge of serving the needs of all learners including those for whom typical instruction has not been effective.

Along this line, implementation of ICT provides a framework for a Universal Design for Learning (UDL) (Meyer, Rose & Gordon, 2014). UDL originates in the three principles of providing multiple means of representation, multiple means of action and expression, multiple means of engagement, and aims to guide educational practice develop learners who are knowledgeable, strategic, skillful and goal directed, motivated to learn more. It involves learning environments able to accommodate individual differences, assisted by instructional and assistive technology solutions. In the current special issue, it is highlighted how technology may serve assistive, instructional purposes and beyond.

Kevin Miller describes how technology is assisting deaf or hard of hearing individuals to minimize loss in language and listening skills and cater for their educational needs. He reviews technology with an impact on the level of services available for their needs. His paper presents the shortcomings in every approach used, triggering future research for an in-depth investigation of current and emerging technologies and the exploitation of their full potential.

Elena Babatsouli reviews technological advances used for investigating aspects of speech and language. Particularly the non-intrusive technologies she is focusing on and the case study data reported, set an example of how analysis of speech using CLAN and cross validation using PRAAT, may provide an insight into the strengths that language development research may get into aided by technology.

Along this line, Menelaos Sarris and Ioannis Dimakos explore speech analysis software and provide an example of how speech processing technology can be used to research less well investigated aspects of reading such as prosody. PRAAT has been used in a study of reading to obtain measures related to prosody such as pitch variation, pause duration and phonation time. The preliminary data shed light on prosodic features important for fluent reading processes.

An example of instructional technology work is provided by Styliani Tsesmeli and Theologia Tsirozi. Smart Notebook educational software has been used for an intervention designed to enhance spelling of compound words. Their work adds to the literature of literacy development and suggests an alternative technology-based approach to the intervention of spelling difficulties. Second significant feature in their study is the combination of training using technology with paper and pencil assessment procedures.

Chen Chwen Jen and her colleagues emphasize on the reading affordances particularly useful for struggling readers. They seek to derive guidelines for designing accessible on line learning environments. Their findings underline that an assistive technology tool (i.e. screen reader) for online reading is helpful for readers with low proficiency skills and should be available with adequate control (play/pause) options.

Many thanks are due to all authors who have offered important perspectives with respect to the contributions of Information and Communication Technologies in the area of language disorders. Their efforts seek to move the field forward with improvements in the approaches used to advance research, implementing technology and considering the next steps for the integration of technology into the lives of students with language and literacy problems.

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