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## Dyslexia and technology

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## ***Dyslexia and Technology***

*Can innovative technology use impact dyslexia, creating opportunities for diagnosis and support in early childhood?*

*This article considers the pros and cons of technology for dyslexia diagnosis and support. Investigating cutting-edge technology, we consider whether concepts of embodied cognition can help ECEC settings embrace technological innovation.*

Dyslexia causes difficulties at school and beyond, decreasing literacy engagement, lowering motivation to learn, increasing mental health issues and lowering self-esteem. The British Dyslexia Association (BDA) estimates 10%-15% of us have dyslexia, yet less than 2% of school pupils are diagnosed, leaving many children undiagnosed and unsupported.

So, what does this mean for Early Years professionals? At present, the UK follows a wait-to-fail policy where assessment comes only after a child shows significant difficulties. Indeed, the BDA advocates for assessment no sooner than mid-way through primary school, saying it is “inappropriate...before aged 7”. In contrast, recent studies found indicators of dyslexia in infants (ref) whilst red flags for dyslexia, such as difficulties in phonological processes and delayed language development, are apparent in pre-schoolers. Using these markers, dyslexia could be identified in very young children, especially if diagnostic processes are reimagined.

Technology offers innovative approaches to early dyslexia diagnosis and support. A tablet-based, universal dyslexia screener is in development which focuses on pre-literacy skills such as phonological awareness, knowledge and linking of letter sounds and names, and print awareness as predictors of future reading acquisition. Aimed at children from four years old, this claims to be cost-effective and accessible, identifying issues early by assessing all children.

However, concerns exist around the sheer volume and variable quality of so-called educational apps, marketisation of children's game play, the unregulated nature of edugame development and the commercialisation of parental anxieties. Technology use can be divisive in early years and whilst studies suggest learning with digital games offers more favourable outcomes than traditional instruction, anxieties around digital play persist. There are practical considerations too; the durability of delicate hardware in an early childhood setting is worrisome, whilst affordability may also be an issue.

Clearly, collaboration between digital designers, researchers, psychologists and educators is needed to offer optimal outcomes when integrating new technologies into early education. Technology seems innately and powerfully attractive to young children, appealing to their playful nature, promoting motivation and engagement. Harnessing this attraction is the trend towards 'gamification' of remedial technologies, where "instead of just a set of exercises, the whole therapy could be considered as one big adventure" (Saunier).

Action video games are considered the most effective intervention for dyslexia. Specifically, such games “improve attention and perception, resulting in better reading skills through the changes in the neurocognitive functions at the basis of learning to read” (Franceschini). At the cutting edge is High Immersion Virtual Reality (HIVR), using a vision-encompassing head-mounted display with a virtual 3-D environment adapting as the user moves. This offers a novel sense of presence and immersion promoting enhanced learning in every age and educational level (Villena-Taranilla et al). Experts expect a significant expansion of immersive virtual reality in primary schools soon; could this also be true for ECEC settings?

Perhaps so, if we consider gamified HIVR as learner-centred with an inherently active, constructivist nature, offering new opportunities to “reinforce motor and cognitive abilities in a multisensory environment” promoting “active and critical learning” (Checa & Bustillo) even in pre-schoolers (Hsaio & Chen).

Widely accepted in Early Years pedagogy, the theory of embodied cognition asserts that learning takes place “across the mind, body and environment” (Tay). It is clear to Early Years professionals that the connection between body and mind, and bodily experience of the environment, is fundamental for learning. HIVR technologies offer new possibilities for this type of engagement. The embracing of a multi-sensory, active approach through HIVR offers rich and varied potential for “sensory orchestration” (Mills et al.).

Increasingly, however, research indicates that dyslexia offers significant advantages, notably within areas of discovery, invention and creativity. In 2022, “dyslexic thinking”

was included as a 'skill' option on a LinkedIn profile and the term "dyslexic thinking" was added to dictionary.com as "an approach to problem solving, assessing information, and learning, often used by people with dyslexia, that involves pattern recognition, spatial reasoning, lateral thinking, and interpersonal communication".

We must therefore ask; is it wise to use technology to retrain those with neurodiversity? Or could cultural adaptations be made to integrate neurodiversity more comfortably within education, including through the use of innovative technologies? Contemporary literacy is described as "multiliteracies... multiple linguistic and cultural ways of knowing and communicating" (Yelland), echoing Reggio-Emilia's philosophy that children have "one hundred languages" which we must recognise and respect. Embracing the concept of multiliteracies and offering innovative learning environments could benefit all children, and reduce current dyslexic challenges to insignificance.