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Author(s): Lyytinen, Heikki; Richardson, Ulla

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Guest Editors' Introduction**SUPPORTING URGENT BASIC READING SKILLS IN CHILDREN
IN AFRICA AND AROUND THE WORLD**

Heikki Lyytinen
*The Agora Center
University of Jyväskylä
Finland*

Ulla Richardson
*The Agora Center
University of Jyväskylä
Finland*

Even in the 21st century, the need of support in literacy acquisition around the world remains huge. Data presented in a UNESCO-commissioned report (Education for All, 2014) estimates that 250 million children worldwide need reading support, with the largest number of countries in need located in Sub-Saharan Africa. Having poor reading skills is a huge problem for the individuals themselves as well as their societies. In today's information societies, the majority of learning materials are mediated via written text. Thus, literacy is vital for individuals' quality of life, their educations, career choices, and thus to the world economy and the development of democracy.

In all societies and in all age groups, the implications of poor reading skills are both personal and societal. Yet although the outcome (poor reading skills) is the same, the root causes are varied and complex. Research has shown convincingly that deficiencies in reading skills run in families (e.g., Wood & Grigorenko, 2001). This means that many, if not the majority, of individuals with serious difficulty in acquiring fluent reading skills (i.e., people with dyslexia) have genetic foundations to their vulnerability toward a deficit in reading and spelling skills. Around the world up to 15% of people suffer from this genetic reading difficulty (e.g., Shaywitz & Shaywitz, 2003). Furthermore, many individuals fail to learn to read as the result of environmental factors: no access to schools, inadequate instruction, and/or limited or no access to reading materials. These are specific problems facing developing countries. Yet no matter the root of reading difficulties, in most cases, targeted intervention, supported with learning technologies, can improve the level of reading skill over time.

The foundation for understanding the learning process for reading has its roots in Finnish research that began in the early 1990s at the University of Jyväskylä (JYU), in collaboration between the university's Department of Psychology and the Niilo Mäki Institute (NMI).¹ The initial research involved the study of children with familial risk for dyslexia. The JYU researchers followed 100 children with the familial risk from birth to puberty and compared their research findings against a similar number of children without such risk. The results of

the Jyväskylä Longitudinal Study of Dyslexia (see Lyytinen et al., 2008; Torppa, Lyytinen, Erskine, Eklund, & Lyytinen, 2010, for recent reviews of this research) showed that children who faced reading problems in first grade could be identified years earlier. The outcome of this conclusion was the initial and ongoing development of preventative support for these young readers. The goal of such support was that these at-risk children would be less likely to face learning difficulties in school—challenges that may affect not only their motivation to learn but also their perceptions of themselves as learners.

With financial support of Finland's Ministry of Education in 2007 and the expertise of researchers at NMI, the JYU researchers began to develop a technology to be provided to all Finnish children in need of support in acquiring literacy, no matter what the root cause. The output of this focus was a Finnish-language game-based learning environment called Ekapeli. Over time, as the JYU researchers began collaborating with researchers at other universities and in regard to other languages, the learning environment became known as GraphoGame.²

From the very beginning, we researchers fully understood that children with dyslexia faced quite severe difficulties to overcome, difficulties that required persistent training toward success. Therefore, a game-like format made the learning process an enjoyable experience for most students. A game environment is instrumental in keeping learners interested in remaining engaged in the needed training over a long period. In many cases, the young learners needed support to address any or all reading challenges: for example, decoding skills (i.e., skill to sound out letter sequences), word identification, and sufficient fluency to remember the beginning of a long sentence when reaching its end.

Although the initial intent of the language learning environment was to support and train children with specific reading/language issues, over time it became clear that the technology also could document and support all children in the process of developing reading skills. These very same basic steps of learning must be followed by anyone who wants to learn to read, that is, whether the reader is a typical or atypical learner. Only the time needed to reach the goal differs.

In following how children developed reading skills through this learning environment, we researchers came to realize that this Grapholearning environment, with its research-based acquisition regiment as currently formulated using phonics, provided teachers and others involved in a reading skills intervention with access to the optimal integration of reading/language training and assessment. The opportunity to observe dynamic assessments of struggling readers provided a window through which the trainers could identify whatever bottleneck might be challenging or frustrating the learner. From the research perspective, being able to observe and identify roadblocks to learning—such as the compromised perceptual differentiation of acoustically similar phonemes—allowed for the continued development of supportive tools or training for overcoming or bypassing the difficulties faced by the learner. Eventually, the effort to address these difficulties opened avenues for guiding learners to grasp the basic principles of reading skills even before problems surfaced.

As a result, the Grapholearning technology has expanded its application and assistance to any individual working toward reading competency. In developing countries, in particular, many typical learners need support to gain reading skills. Thus, research into new cultures, new languages, and new applications continues to expand and refine the Grapholearning technology. At this time, researchers in more than 20 countries are applying the technology and analyzing outcomes of focused research in almost as many languages. In this special issue of *Human Technology: An Interdisciplinary Journal on Humans in ICT Environments*,

the first of two, we focus on how the GraphoGame technology is supporting typical reading learners in Africa, where children are in urgent need of literacy support.

The original papers we have chosen for this first issue provide the context and background of the GraphoGame technology, with some focus on the Zambian educational and home environments. The authors of the first paper explore the family environment as a support for reading acquisition by first-grade Zambian students. **Tamara Chansa-Kabali and Jari Westerholm's** paper adds to the growing evidence that the family environment, particularly the parents' attitudes toward and encouragement for reading, significantly impacts a young reader's ability to grasp two key foundations for reading: orthographic awareness and decoding competence. **Robert Serpell**, who for many decades has worked with the historical and current challenges of language learning in Zambia, writes about the progress of the country in addressing literacy within a multilingual environment. In particular, he demonstrates how a collaboration between JYU and the University of Zambia, through the auspices of the Centre for the Promotion of Literacy in Sub-Saharan Africa (CAPOLSA), has enhanced the research efforts and educational interventions in reading acquisition by Zambian children. Finally, **Ulla Richardson and Heikki Lyytinen** provide an overview of the GraphoGame technology, the principles behind the GraphoGame method, and the impact of training with GraphoGame.

Because literacy is tied so closely to ongoing social and economic development, it is essential that quality research is conducted and disseminated in a systematic way. The research presented in this issue, and the upcoming special issue on a similar topic, demonstrates the importance of well-researched interventions for the benefit not only of the individual learners but also their extended families and communities. The next special issue on Grapholearning is planned for 2015. In that compendium, the focus will rest more specifically on the empirical validation studies of the GraphoGame-based training not only in Zambia but also in other African countries, such as Kenya and Tanzania.

ENDNOTES

1. The Niilo Mäki Institute is a third sector research unit funded by the Niilo Mäki Foundation, whose goal is to support children with learning difficulties. For more information, consult www.nmi.fi
2. Information on the GraphoGame is available at www.graphogame.com

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Author's Note

All correspondence should be addressed to:
Heikki Lyytinen or Ulla Richardson
The Agora Center, University of Jyväskylä
P.O. Box 35
40014 University of Jyväskylä, Finland
heikki.j.lyytinen@jyu.fi or ulla.a.richardson@jyu.fi

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