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RoboBraille as a UDL tool: Evaluation of the service converting printed materials into speech and Braille in Poland

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Abstract

RoboBraille is a free-of-charge online service used to convert black-printed texts into an audio or Braille format. After its creation in Denmark, it has since been implemented in many other countries. The aim of the research conducted in Poland was to clarify the performance of the service in a Polish context (a web-based questionnaire was created). The main group of examined users consisted of students and teachers of pedagogy. Results: RoboBraille proved to be a tool of high usability. The availability of the service free of charge was an important reason to test it. The service was used both by people with visual and reading impairment and by those without dysfunctions. Over 93% of the recipients wish to use it again, although only 9.5% were visually impaired. The utility of RoboBraille for different groups makes it not stigmatizing. In the cases of visual and reading impairments, RoboBraille is a necessity in converting text to alternate formats, while for people without disabilities, RoboBraille can serve as an assistive learning tool or be of entertainment purposes. Attracting the attention of teachers and students to RoboBraille may promote the use of the service among a larger user group of dyslexic, blind, low-vision and old-age people.

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1. Introduction

Universal Design for Learning (UDL) guides teachers and educators to increase students' access to learning by reducing physical, cognitive, intellectual and organizational barriers in learning such as different backgrounds,

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learning styles, abilities and disabilities (Rose & Meyer 2002). Persons with a reading disability are part of a group in need of support both in education and their everyday lives.

In the developed world, over 82 million people experience difficulties in reading printed materials: blindness, partial sightedness, learning disabilities such as dyslexia (Chan et.al., 2009). Taking into account all cognitive, sensory, physical and learning disabilities, individuals with print-related disabilities compose 52% of students in the postsecondary disability population (National Center for Educational Statistics, 2003). They are often forced to rely on others when accessing written information, which leads to a loss of independence and productivity or they appear to be slow readers, which in turn leads to frustration and discouragement. Reading constitutes a fundamental component of education, independent professional and personal life (Chan et. al., 2009). The use of assistive technologies provides these people with an access to information on an equal basis to others, while at the same time allows the full participation at school, work and in daily life (Edwards & Lewis, 1998).

However, research indicates a limited usage of assistive technologies by visually impaired people that constitute the majority in the population of reading-disabled persons. Nationwide calculations made by Kelly (2009) showed that 59% to 71% of students with visual impairments able to benefit from assistive technology did not have the opportunity to use it. What is the cause? The analysis of literature allows us to point to three fundamental reasons: financial, social and the lack of knowledge and skills of the teachers.

The Polish research on the use of new technology by visually impaired persons shows that the main barriers to use hardware and software are high prices, lack of support and technical complexity (Walter 2007).

There is also a problem of competence and knowledge of teachers working with people with special needs in the field of reading printed texts. American research shows that teachers did not feel confident when teaching the use of new technologies and they assessed a low skills level in this area. In the process of self- training and retraining they often do not have hands-on experience with many assistive devices to read print (Lee, Vega, 2005; Parker et al., 1990).

A survey of 165 teachers in Texas (Zhou et. al., 2011) showed that 57.5% of them did not feel confident to teach the usage of technologies to support their students. They had a significant deficit of knowledge in 55 of 74 (74.32%) competencies, such as: the knowledge of the Braille alphabet-related equipment and the ability to use it, the usage of screen-reading programs, the usage of Braille text conversion software, the usage of Braille displays and accompanying software, fundraising knowledge for the purchase of technological equipment. Similarly, the majority of teachers of students with visual impairments in Florida admitted they were not familiar with most of the various types of access technologies mentioned in the survey and had difficulty acquiring the training needed in this field (Edwards & Lewis, 1998). The lack of competence in teaching students with visual impairments using assistive technologies was reported by 51% of the teachers who participated in the study of Abner & Lahm (2002). Another survey by Kapperman, Sticken, & Heinze (2002) revealed that 72% of the teachers they interviewed were unable to answer the questions on assistive technologies because they lacked enough knowledge in this field. Brazilian research (Alves et al., 2009) showed that almost all (94.8%) teachers working at schools attended by visually impaired students did not use information technology in didactic work. The most common reason was the lack of competence in this area (70.4%). The lack of competence in computer use among students was indicated less often (20.4%).

The universality of using adaptive technologies by the disabled can also be influenced by social factors. Social contacts assume bilateral relationships between blind and sighted people. Visually impaired persons are not only recipients of services facilitating learning/reading of printed texts, but also need to prepare materials to be read by sighted teachers, colleagues, relatives. In addition, fully-abled people without adequate knowledge and skills who work or support persons with disabilities must have a simple tool they can use.

Creators of technologies supporting the development of self-reliance in the lives of the disabled stand before a choice in the designing process: a narrow design which may fail marketwise or a broad design that may fail usability-wise. Due to the narrow circle of users strongly specialized assistive devices may not ensure their creators economic success. On the other hand, widening the set of features risks not meeting various needs and capabilities of users (Chan et al., 2009). Creating a simple, universal tool allows to create the transparent social space in which the same rules define the functioning of all participants. Promoting support tools which are easy to use also by non-professionals is particularly important in the public area - in offices, customer service points and other such places. It would be desired if next to the specific equipment tailored to the capabilities and needs of its users, regarding

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