

Teaching and Learning with Information and Communication Technologies for Intellectually Disabled Students: A Critical Review of the Empirical Literature

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Abstract

The objective of this study is to analyse student research into teaching experience and practice using information and communications technologies (ICT) for students with intellectual disabilities. To this end, an analytical grid was developed and applied to a corpus of 67 studies. Findings primarily indicate the intuitive character of these studies and their ineffectiveness in considering, in all of its complexity, the use of ICT in pedagogical interventions with such students.

1. Introduction

At this beginning of the 21st century, the time is more than ripe for individuals with intellectual disabilities to benefit from information and communications technologies (ICT) to the same extent as other members of society. In fact, the use of these technologies is an essential condition for success in terms of professional and social qualification and insertion. The Council of Ministers of Education, Canada (2000) maintains that students with little or no knowledge of ICT are at risk of experiencing problems in gaining smooth entry into the labour market. According to the Organisation for Economic Co-operation and Development (OECD), "society will suffer if some of its members do not know, or do not know enough, about using digital tools, more so as services, both public and private, are increasingly offered on-line" (OECD, 2001,

p. 10). This fact is more evident with the appearance of the phenomenon of e-citizenship and e-democracy. In 1996, Quebec's Ministère de l'Éducation concluded that knowing ICT is as fundamental as knowing how to read, write and count (Gouvernement de Québec, 1996).

As a consequence of the application of the obligation of accommodation, numerous gains in accessibility to ICT were made for disabled people (Ostroff, 2001; Vienneau, 2004). Nevertheless, these gains are nearly exclusive to physical impairments (Rocque and Desbiens, 2006). Cognitive disabilities are considered to be future problem areas with regard to ICT (Buhler, 1999). Derer, Polsgrove and Reith (1996), Weheymer (1999), and recently, Carey, Friedman and Bryen (2005) confirm that persons with intellectual disabilities underused technology. To address this problem, this investigation aims to conduct an analysis of previous research that proposed and studied teaching experiences and practices using ICT with students with intellectual disabilities in order to evaluate these studies' contributions to practice and research.

2. Method

2.1 Identification of studies

The corpus for this analysis was established from a consultation of the bases Eric, Francis, PsycINFO, CBCA Complete and Dissertation Theses (Proquest) from July 5 to 7, 2006¹. The final research corpus

¹ This investigation was carried out using the following descriptors: (cognitive disabilities or intellectual disabilities or mental

includes 67 studies dealing with pedagogical interventions using ICT among students with intellectual disabilities.

2.2 Description of the selected studies

The majority of the researches studied are scientific articles (57). More than the half of them (38) is published between 2000 and 2006. An investigation of the documents in the corpus in terms of the country in which the research was conducted revealed the dominance of the United States, the research site for fully 85 % of the documents used.

2.3 Coding procedure

The analysis procedure used was based on a closed thematic analytical grid. This grid was aimed to collect information about 1) the theoretical or conceptual frameworks used, 2) the pedagogical intervention with ICT studied (learners, teachers, the technology used, etc.), 3) the research methods used, and 4) the results found.

2.4 Limitations

The findings presented in this article must be viewed within the limitations presented by this study. First, it is reduced to studies available in a limited number of databases, and published in French and English. Second, the corpus is heterogeneous for it reflects different socio-educative realities (different types of disabilities, contexts of intervention, ICT used, etc.). This could constitute a limitation in terms of the possibility of identifying a general trend from the findings of this survey.

3. Main findings

3.1 The frameworks used in the reviewed researches

51 out of the 67 studies reviewed don't refer to a conceptual or theoretical framework. Woodward and Reith (1997) concluded that special education technology research is focused on systematic attempts to apply technology to traditional special education problems. In this setting, researchers pay little attention to frameworks. The result is data that is difficult to link and transpose to teacher training or conducting other studies in the absence of any indication on the interpretative system of the research (Bru, 2002).

retardation or developmental disabilities or mental deficiency) and (information technology or informatics or hypermedia or multimedia or hypertext or computer or multimedia or ICT or educational technology).

3.2 The technologies studied

Microswitches seem to be the technology the most investigated in the studies reviewed (13). The use of microswitches is considered a crucial strategy for disabled persons mainly those with multiple disabilities, to avoid a condition of passivity and attain control of environmental simulation (Lancioni and al., 2006). Video technology and simulation software were the object of 8 studies. Many school-based instruction programs face resource constraints which limit the opportunities for authentic community-based instruction (Falvey, 1989; Mechling, 2004). Simulated instruction has been recommended to face this situation (Haring, Kennedy, Adams, Pitts and Conway, 1987; Mechling, 2002, 2003, 2004). "Drill and practice" instructional software was also extensively investigated in the research (7). Goldman and Pelligrino (1987) emphasised the importance of automatization as a learning strategy of basic skills. They maintain that students with intellectual disabilities require more practice to achieve automatity. Computer-assisted instruction appears to be particularly promising to address this matter (Lin, Podell and Tournaki-Rein, 1994).

Many of the technologies studies in the researches reviewed are prototypic, i.e. they were specifically developed for the concerned study. They were not marketed commercially or they did not achieve sufficient visibility because of the narrowness of the special education technology market (Woodward and Neil, 1993; Woodward and Reith, 1997). This automatically restricts their accessibility and consequent applicability in practice and in research (Lancioni, O'Reilly and Basili, 2001).

3.3 The characteristics of the learners studied

It is evident that students with mild and moderate disabilities are the most in focus (30). Students with severe, profound and multiple disabilities attract less attention. It is important to point out this as this is an important field of research (Brodin, 2003). Another important result to point out is the that only 11 out of the 67 studies reviewed have taken into account the characteristics of learners with intellectual disabilities such as overselective attention and memory deficit. Wehmeyer, Smith, Palm and Davies (2004) insist on the importance of identifying and considering the characteristics of these learners mainly those that impact their technology use. In addition, many studies (40) did not consider the chronological age of their subjects. In considering only the mental age, there is a risk of infantilizing the subjects, which calls into question the effectiveness of the interventions.

3.4 The research methods used

The majorities of the studies used experimentation and were based on a very small sample of subjects whose types of disabilities varied considerably from one study to another. 37 studies were conducted with less than 5 subjects. Furthermore, the technologies studied were generally designed specifically for the study in question. The result is a problem in generalizing findings.

3.5. The results found

The majority of the studies analysed support that the use of ICT has positive effects, particularly on the acquisition of communication and money management skills (37). However 7 studies report inconclusive findings as to the positive effects of using ICT in teaching students with intellectual disabilities. The rest report mixed results. Eleven studies conclude that it is both important and desirable to combine the use of ICT with other instructor-directed teaching strategies.

Concluding remarks

These studies generate interesting findings but have a limited bearing on any conclusions that could be reached concerning the contribution of ICT in educating individuals with intellectual disabilities and understanding the conditions for successful interventions using ICT among these individuals. It will therefore be necessary to conduct systematic and in-depth studies in order to conceptualize and understand the interactional dynamic underlying pedagogical interventions using ICT among these types of students, in particular by basing them on an ecological approach to education.

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² For more detailed results including figures and tables and for the complete reference list, please contact the authors.