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Assistive Technology for Supporting Communication, Occupation, and Leisure by Children With Severe to Profound Developmental Disabilities

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INTRODUCTION

Assistive technology (AT) includes a wide range of electronic devices finalized at supporting children with disabilities and special needs to have an active role in the social environment and to minimize their isolation and passivity. By providing practical help to persons with disabilities, AT produce beneficial effects enhancing constructive engagement and quality of life (Borg, Larson, & Ostegren, 2011; Felce & Perry, 1995). To design an effective AT intervention program is necessary creating a solution tailored for the targeted users, and considering the targeted behaviors, tasks and environments in which programs are implemented (Reichle, 2011; Shih, 2011). The growing availability of such technologies may be considered a crucial outcome of the effectiveness of AT-based rehabilitative programs (De Pace & Stasolla, 2014).

BACKGROUND

Two categories of users have been recruited for the aforementioned programs:

1. Participants with extensive motor disabilities and normal intellectual functioning, and
2. Individuals with severe to profound developmental and multiple disabilities (i.e. a combination of intellectual, motor and sensorial disabilities).

The AT for the first category, implemented for educational and/or rehabilitative purposes, may be useful to improve literacy process (Chiapparino, Stasolla, De Pace, & Lancioni, 2011), instead the interventions for the second category may be focused on the independent access to preferred stimuli or on constructive engagement (Stasolla & Caffò, 2013; Stasolla et al., 2015).

A basic form of AT are the microswitches, that is electronic devices planned to enabling persons with disabilities to control autonomously their environment through the exhibition of small and simple behavioral responses (Holburn, Nguyen, & Vietze, 2004; Mechling, 2006; Saunders et al., 2003). For example, through a pressure microswitch, a child may receive a short listen (e.g. 10 sec) of preferred song, rather than directly switching on the computer or the CD player, not accessible to him/her, considering his/her clinical conditions (Lancioni et al., 2008), or accessible only through the help of caregivers (Lancioni, Singh, et al., 2006). Consequently, they are considered as a great educational and rehabilitative resource (Stasolla & Perilli, 2015).

Some basic guidelines are needs for the effectiveness of a microswitch-based program. First, a plausible behavioral response, naturally present in the person's repertoire and exhibited without excessive effort, should be selected. Second, a microswitch for monitoring the aforementioned response should be adapted. Third, a positive stimulation for motivating the exhibition of such response should be retained. Thus, the response cost (i.e. the effort produced to perform the behavioral response) should be highly compensated by the preferred stimuli (Lancioni et al., 2008).

A second relevant goal of AT-based program is represented by the improving of quality of life (Felce & Perry, 1995). The main construct of quality of life is happiness, which encompasses well-being, pleasure, fulfillment and satisfaction, particularly difficult to detect among people with severe to profound developmental disabilities (Lancioni, Singh, O'Reilly, Oliva, & Basili, 2005). To overcome this issue, professionals refer to behavioral signs of happiness such as smiling, laughing and energized body movements, labeling them indices of happiness (Lancioni et al., 2005) which may represent an outcome measure of positive mood (Ripat & Woodgate, 2011). Thus, interacting independently with the environment, a person with developmental disabilities should increase positive mood with beneficial consequences on the quality of life (Lancioni et al., 2008).

This chapter includes a selective overview of microswitches, describes their use and provides some representative examples concerning their applications to persons with severe to profound developmental and/or multiple disabilities. Specifically, the chapter illustrates:

1. The independent access to positive stimulation (i.e. through the use of a simple behavioral response detected by one microswitch),
2. The independent access to preferred stimuli and/or the opportunity to ask for social contact with a caregiver (i.e. through a combination of microswitch and VOCA),
3. The increase of adaptive response and reduction of challenge behavior (i.e. Microswitch-cluster), and
4. The communication, occupation and leisure skills (i.e. microswitch and computer).

For each group the chapter outlines a selection of empirical evidences, emphasizing strengths and weaknesses. Furthermore, social validation assessments, aimed at formally endorse the interventions programs by practitioners and caregivers, is pointed out. Finally, the chapter will recommend some guidelines for the future research in this topic.

METHOD

Computerized and manual searches were combined within electronic database such as SCOPUS, PSYCHINFO, PUBMED, ERIC using AT, developmental/multiple/learning/intellectual disabilities, communication impairments, quality of life, indices of happiness, positive participation and social validation as keywords. Overall, twenty-seven studies were included, considering as including criteria at least:

1. One participant between 4 and 18 years,
2. One cognitive-behavioral intervention, and
3. Empirical data.

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