

Assistive technology to promote adaptive skills and academic performance in five children with cerebral palsy and developmental disabilities.

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ABSTRACT

Cerebral palsy (CP) identifies a group of permanent developmental disorders caused by peri, pre or post -natal- brain injuries. It is characterized by severe to profound motor impairments and may be associated with intellectual disabilities, sensorial abnormalities, communication difficulties and challenging behaviors, or ambulation incapacities. To overcome these issues, one may envisage the use of assistive technology-based programs (AT). AT includes any tool, piece, equipment or device ensuring children with developmental disabilities with self-determination and independent access to environmental stimulation.

This study involved five participants with CP, aged between 7 and 11 years, who were estimated within the normal level of intellectual functioning and presented extensive motor disabilities. Through the use of a combined AT-based intervention, the objectives of the study were: (a) to extend the use of microswitch-based program (MBP) for enabling the participants with the independent access to the literacy; (b) to extend the use of assistive technology-based intervention for motivating the recruited children to perform basic step

forward responses; (c) to assess its effects on positive participation (i.e., extended indices of happiness signs), as an outcome measure of their quality of life, active role, positive occupation, and constructive engagement; (d) to carry out a social validation procedure including 60 external raters.

The intervention sessions lasted 10 min. Typically, 3 sessions a day for 5 days a week were collected, along 3 months. Overall, 155 sessions were carried out for each participant. Dependent variables were: (a) completed words, (b) forward steps, (c) indices of positive participation, and (d) social validation scores.

For the literacy process, the technology included a laptop (the monitor presented on the upper side a word processor and in the lower side a keyboard emulator) equipped with Clicker five software package, a microswitch and an interface connecting the sensor to the laptop. For the ambulation responses, the technology included optic sensor (two photocells), a battery powered control-system unit, tactile vibrations, colored lights, and a portable CD player as positive stimulation.

The study was conducted according to a multiple probe design across behaviors, which includes: a first baseline on both behaviors, a first intervention on literacy process, a new baseline on ambulation responses, an intervention on ambulation responses and a final combined intervention on both behaviors. A generalization phase was implemented at participants' schools.

Results evidenced that all the participants improved their performance during intervention phases. Indices of positive participation increased as well. Social raters favorably scored the use of the technology. Data emphasized that an AT-based setup may be helpful to promote adaptive skills, enhance positive participation, generalize the learning process.