International Journal of
Psychology and Psychoanalysis

Editorial: Open Access

Assistive Technology for Children with Multiple Disabilities

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Children with severe to profound developmental and/or multiple disabilities (i.e. combination of sensorial, intellectual and motor disabilities) are commonly described as quite passive and isolated, with few opportunities to interact positively with the surrounding world, dues to their general conditions hampering their social image, status and overall desirability. Thus, those children present a very limited behavioral repertoire, often exhibiting lack of speech, failing locomotion, stereotypic behaviors, unawareness of sphincter control, withdrawal. Moreover, they are often reported with breathing abnormalities, dystonic movements, medical complications, seizures, postural and learning difficulties, highly compromising their inclusion within home, school and/or medical/rehabilitative settings. That is, they pose serious problems to parents, teachers, staff and caregivers dealing with their clinical conditions. One way to ensure this population with basic forms of independence and self-determination is the use of assistive technology- (AT) [1], based on learning principles (i.e. causal association between a behavioral response and environmental consequences) [2].

AT includes any technological device (e.g. microswitch, vocal output communication aid, tablet, laptop) aimed at enabling children with multiple disabilities with crucial minimal responses allowing them to favorably cope with the outside contexts. Thus, by producing a minimal behavioral response (e.g. eye blinking, small hand closure, slight head turning on one side), a child with severe to profound developmental disabilities will be capable of constructive engagement towards the environment, through the use of the aforementioned technological devices. For instance, by activating a microswitch with arms and/or legs movements a child may autonomously access to preferred stimuli contingently to the microswitch activation, enhancing his/her active role [3]. Furthermore, by using a speech generating device (SGD) a person may ask for social contact with one or more caregivers, who could look for his/her needs [4]. Combining a microswitch with an SGD a participant is provided with choice opportunities such as those presented by a computer-based program (CBP) [5]. Else, by adopting a microswitch cluster, one may envisage to pursue the dual objective of improving an adaptive response (e.g. object manipulation) and reducing challenge behavior such as hand mouthing [6]. Otherwise, for children with consciousness disorders dues to post-coma conditions, who emerged from a minimally conscious state, one may design a CBP fostering the opportunity of choices between preferred items and/or eventually the access to literacy process [7]. Finally, for individuals with pervasive developmental disorders such as autism who have, however, a high functioning, self-monitoring programs finalized to increase on-task behavior could be adopted [8] and/or behavioral interventions with the goal of increasing constructive engagement [9].

Beside the importance emphasized on the independence and self-determination, a growing interest is assigned to the quality of life of those individuals [10]. The latter construct (i.e. quality of life) basically includes personal well-being, health and happiness [11]. Unfortunately, those behaviors are particularly difficult to detect among non verbal population. To overcome this methodological issue, researchers usually refer to indices of happiness such as smiling, laughing, energized body movements with or without vocalizations, as an outcome measure of quality of life concerning children with multiple disabilities [12,13]. Carrying out the effects on indices of happiness and quality of life for participants involved is the second rehabilitative purpose of an AT-based intervention, next to the option of assessing and corroborating its clinical validity through social validation procedures [14].

In light of above, new research in this area should undoubtedly deal with the following topics: (a) building new technological solutions, rigorously customer tailored, strictly responding to the constantly growing complexity of clinical conditions concerning the participants involved, (b) considering the economical coasts (i.e. by always pointing out cheap or less expensive solutions) allowing the availability of the technology to everyone, (c) promoting active and positive participation of the users, (d) integrating such programs with traditional interventions (e.g. physiotherapy, speech and/or stimulation sessions), and (e) eventually considering formal endorsements by experts such as psychologist, parents, teachers and caregivers as raters through social validation assessments [15].

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ClinMed International Library

Citation: Stasolla F (2015) Assistive Technology for Children with Multiple Disabilities. Int J Psychol Psychoanal 1:001e

Received: January 21, 2015: **Accepted:** January 22, 2015: **Published:** January 24, 2015

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