INTERPLAY - Advanced video game console adapted for rehabilitation through play

Type of Project

Ongoing research project

Summary

The objective of this project is to develop a new video game console system that uses alternative channels of interaction, based primarily on bodily movement, eye and arm movements. It seeks to develop new activities early intervention in children with neuromotor disabilities to develop their physical and cognitive abilities as far as possible.

Low-tech, high-tech products, services and contexts for play

The aim of this project is to develop a new video game system that uses alternative channels of interaction mainly to alleviate the problems of children who have great difficulties in accessing computer by conventional hardware (mouse, keyboard, joystick). The interaction will be based on body and eye movement. It seeks to generate physical therapy activities for children with neuromotor disabilities in order to stimulate their full physical and cognitive abilities. Thus, the system being currently developed is composed of human-computer interfaces and adaptable to the specific condition of the game user. Rehabilitation through computer and video games have the advantage that the child can be more independent when performing the therapy with high motivation. This means that therapy can be more intensive and frequent due to the motivational aspect and can facilitate rehabilitation at home. Moreover, with the use of video games and an adequate system of capture, as provided in this case, it is possible to record much of the user's activity for later analysis. This will, for example, measure the range of joint motion, coordination to certain stimuli or estimating the degree of attention. The information provided by these systems is useful for measuring the evolution of user functions during therapy.
With the complete system is intended to provide an easily adaptable platform to the particular condition of the user, encouraging interaction between users with different types of neuromotor disabilities or non-disabled users, presenting a triple functionality: 1) rehabilitation of children with neuromotor disabilities; 2) the assessment of the performance of its activity and 3) improving quality of life through leisure activities.
This poster briefly presents the system developed to access the computer by head movements, along with additional guidance devices look and EMG with some results of exercises performed in children with video games with the limitations noted above.
With these technological solutions are expected to provide children with stimulating recreational and functional tasks that are in themselves and follow-up rehabilitation exercises, trying to become these common tools.

The context of use

Rehabilitation centers, home and schools

Type of play in this play system

Cognitive

Rule play (including videogames)

Social

Solitary

Objectives related to play according to ICF-CY

Play for the sake of play: Major life areas - d880 enagement in play

d8800 solitary play

Community social and civic life - d920 recreation and leisure time

d9200 play

Play-like activities: Therapeutic and educational objectives

b1 Mental functions
b7 Neuromusculoskeletal and movement related functions
d4 Mobility

Number of participants

>20

Chronological Age

6-12 years
12-18 years

Development Age

3-6 years
6-12 years

LUDI Categories of disabilities

Mental/intellectual impairments::
moderate
severe
Hearing impairments:
Partially hearing impaired
Visual impairments:
Partially sighted
Communication disorders (speech and language disorders):
Physical impairments:
Moderate
Severe
Autism Spectrum Disorders:
Multiple disabilities:

Explanation on the use of low-tech, high-tech devices, services or contexts

Explanation

Verbal instruction, language and communication is adapted
Visual instruction with written language
Visual instruction with pictures or drawings

Involvement

Adult: therapist/educator/researcher
Peer with disabilities

Role

Non-participatory observer
After the instruction, providing supervision during play

Evaluation of objectives and outcome measures

Description of outcome measure(s)

Observation by professional/researcher providing the play experience
(validated and reliable) outcome measures like tests, self-reports of client/system, questionnaires

References to the intervention or research project

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Keywords

Virtual adapted toys, rehabilitation, intervention, children videogames, interfaces, neuromotor disabilities