

"MINI-GAMES" TO SUPPORT VISUOSPATIAL SKILLS IN CHILDREN WITH VISUAL IMPAIRMENT: A PILOT STUDY

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BACKGROUND

A set of novel mini-games explicitly aimed at children with visual impairment were created. These games are played within a large-scale interactive environment, a floor area under a motion capture system, linked to audio and graphic output which records players' movements. These games are the result of a cooperation between a multidisciplinary team from the Robert Hollman Foundation and computer engineers of the Department of Information Engineering, University of Padova, based on Design Thinking methodology and its five steps: empathise, define, ideate, prototype, and test.

AIM

The aim was to promote the use of children's visuospatial skills through a facilitating, interactive and entertaining virtual environment.

SAMPLE

These mini-games were used with 11 children, between 2 and 8 years of age with moderate to severe visual impairment and no other disabilities.

RESULTS

Preliminary data and observations in this group of children with visual impairment, suggest that these specifically designed mini-games created an enriched and customized environment which was enjoyable, motivating and facilitating them to better express their visuospatial skills.

METHODS

One game was given to children once a week during their visual rehabilitation. The professionals involved in this study were trained in how to use the device. The parametric analysis of videos was used to assess the visuospatial skills. A visuo-tactile VAS was used to register the children's level of satisfaction with this game.



The visuo-tactile VAS scale for satisfaction adapted for visual impairment



Video-recording's analysis of movements' directionality, accuracy and orientation

Session	Score 1 Min/Max	Score 2 Min/Max	Score 3 Min/Max
1 st	0	0	0
2 nd	0	0	0
3 rd	0	0	0
4 th	0	0	0
5 th	0	0	0

Children's satisfaction processed through the visuo-tactile VAS

Phase	Reaction time (sec)		Error (%)	
	1	2	1	2
1	2362	2317	2388	
2	2753	2862		
3	2385	2628		
4	2522	2488	2898	2782
5	2388	2333	2275	2223
6	2762	2588	2282	2223
7	3088	3427	2822	3488
8	2722	3444		
9	3088	3333		

Average time results for each child and session

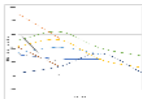


Chart of reaction times (between the appearance of the target (i.e. bubble) and its achievement) for all children

CONCLUSIONS

This virtual and interactive environment may be a useful rehabilitative tool to support the visuospatial skills in children with visual impairment.

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Digital mini-games played within a large scale interactive environment