Non-formal Therapy and Learning Potentials through Human Gesture Synchronized to Robotic Gesture [HRI] within a Virtual Environment [VE]

Eva Petersson & Anthony Brooks
Aalborg University Esbjerg
Denmark
Agenda

• Introduction
• Aim and objective
• Related work
• Method
• Results
• Discussion
• Conclusion
Introduction

Afferent (sensory)
- Vision
- Hearing
- Smell
- Touch

Efferent (motor)
- Voluntary
- Corticospinal
- Basal Ganglia
- Cerebellar
Aim and objective

• The aim of the study was:
  – to explore learning potentials through interactive play situations.

• The objective was:
  – to create a virtual coach as a supplement for the therapist.
Related work

• Robotic therapy

• Creative design
  – Inclusive participation

• Interactive play
  – Activity driven approach based on aesthetic resonance
Qualitative method

• Observation of interaction between child and robotic lights
  – Profound Multi Learning Disabled (PMLD)
  – 4 children between 4-6 years of age

• Questionnaire to facilitators
  – 4 facilitators
Moving head light
Method

a: Video camera 1
b: Video camera 2
c: Infrared volumetric sensors
d: Ultrasound system
e: MIDI interface
f: Computer
g: Light controller
h: Moving head lights

Moving patterns pan/tilt
Sensors

- Planar (e.g. camera)
- Linear (e.g. ultrasound)
- Volumetric (e.g. infrared)

Screen
Results - observations

- Self-achievement
- Re-inforced activity
- Exploration and play
Results - questionnaire

• The physical exercise energized the children’s available skills.
• Concentration
• Indications of awareness of social contact
• Indications of improved eye to hand coordination
Discussion

• Learning potentials through play
  – Autotelic quality of play
  – The interactive environment evoked the child’s interest in practicing otherwise limited skills
  – The interest influenced the child’s development of competencies

• Virtual coach as a supplement for the therapist
  – Inclusive participation empowered the child’s play experiences
  – Inclusive participation had the potential to support emergence of new and improved forms of actions and interactions
Conclusions

• Non-formal therapy has the opportunity to expand the child’s learning experiences, as learning is so closely related to play and intrinsic motivation

• The character of the ’virtual coach’ is dependent on the ’physical coach’

• The virtual coach should be motivating the user of the robotic system to:
  • be non-invasive
  • have a silent space available
  • be intuitive
Thank you for your attention!