ASSESSMENT AND REHABILITATION TOOLS: THE USEFULNESS OF IMMERSIVE VIRTUAL REALITY

Frédéric Banville, Ph. D. associate professor
Global Forum – October 8 - 2019
TECHNOLOGY FOR HEALTH

• Virtual reality technology allows accessibility for specialized interventions.
• Moreover, a survey lead with 70 psychologists shown that VR intervention is needed and must increase in the next 10 years (Norcross and al., 2013).
• Several study shown that VR intervention are efficacy, often more than traditional interventions (Garcia-Palatios et al., 2002; Villani et al., 2007).

Landry et Banville, 2019
USEFULNESS OF VIRTUAL REALITY

• Since 1990, VR is more and more used in several health domains.
• On a psychometric perspective, VR provide several advantage such as:
  • Standardisation
  • Verisimilitude and instrumental activities of daily living
  • Generalisation
  • ...
ASSESSMENT AND REHABILITATION

Banville, Nolin, Verhulst, Rosinvil & Allain (2019)

• After a Traumatic Brain Injury, VR is efficacy for:
  • Assessment of cognitive functions
  • Rehabilitation
  • With:
    • Children
    • Teenager
    • Adult
    • Elderly
• Several VE exist for the psychologist

Nolin, Besnard, Allain & Banville (2019)

• After a Stroke, VR is efficacy for:
  • Cognitive rehabilitation (and assessment)
  • Speech therapy
  • Physical and occupational therapy

Overall, the studies support the value and relevance of virtual reality as an assessment and rehabilitation tool with people who have suffered a neurological disease.

• Studies shown that normal cognitive changes occur with aging.
• When exposed to a VE and compared to young people, Elderly:
  • Judged the VE more realistic
  • Took more time in the tasks realization
  • Sometime shown the same success rate to the tasks.

Verhulst, Banville, Richard et Allain (2017)

Fig. 1. Path of adults (a) and elderly (b) during familiarization step with mouse and keyboard and then with HMD.
VIRTUAL MULTITASKING TEST-3
USING THE VIRTUAL MULTITASKING TEST-3 TO ASSESS PROSPECTIVE MEMORY

Frédéric Banville (Ph.D. Psychology)
Professor - Department of nursing, UQAR

&

Marianne Provencher (D.Psy. Psychology)
Clinical Neuropsychologist
VMT : AN ASSESSMENT TOOL

VIRTUAL MULTITASKING TOOL
TO ASSESS MULTITASKING

- **Context**
  - Visiting a good friend
  - (Ongoing) Tasks
    1. Make the dinner (roasted chicken)
    2. Set the table for two
    3. Store the groceries

- **Assessment**
  - 6 prospective memory tasks
    - Time-based: (Fax (3 time each 5 minutes) & Let the marinade rest for 5 min)
    - Event-based: Remember to put of quoted the ingredients for marinade & Take the shirt out of the dryer (when it ring)
    - Activity-based: Programming the oven for 1h30 before putting the chicken in & Preheat the oven before beginning the marinade

- Interruptions planned in the task: Thunderstorm, Feed the fish, Tickets
VIRTUAL INTENSIVE CARE UNIT
USING THE VICU TO TEACH AND TO ASSESS CLINICAL MONITORING IN NURSING

Frédéric Banville (Ph.D. Psychology)
Professor - Department of nursing, UQAR
&
Daniel Milhomme (Ph.D. Nursing)
Professor – Department of nursing
&
Andrée-Anne Parent (Ph.D. kinesiology)
Professor – Department of nursing
VIRTUAL INTENSIVE CARE UNIT
VIRTUAL INTENSIVE CARE UNIT

Three different learning environments are in development

Clinical monitoring  Psychotherapy  Functional anatomy
We leaded a pre-experiment with post-graduate nursing students and experimented nurses (n=7) to know how realistic is clinical monitoring script.

What they were thinking about the tasks and the environment?

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Social interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation (+)</td>
<td>Facial expressions (+)</td>
</tr>
<tr>
<td>Realism (+)</td>
<td>Representativeness of emotions (+)</td>
</tr>
<tr>
<td>Usability (+)</td>
<td>Human-Machin interaction (+)</td>
</tr>
<tr>
<td>Motivation (+)</td>
<td></td>
</tr>
<tr>
<td>Cybersickness (-)</td>
<td></td>
</tr>
</tbody>
</table>
VIRTUAL MINDFULNESS ENVIRONMENT
USING THE FULNESS ROOM TO IMPROVE
PSYCHOLOGICAL FLEXIBILITY

Frédéric Banville (Ph.D. Psychology)
Professor - Department of nursing, UQAR
&
Lysanne Landry
Doctoral student – Department of psychology, Montreal University
MINDFULNESS TO INCREASE ATTENTION AND WELL-BEING
THANK YOU
Frederic_Banville@uqar.ca

THE TEAM:
• Paul Richard, Ph. D. Polytech Angers
• Philippe Allain, Ph. D. Université d’Angers
• Eulalie Verhulst, Ph.D. Polytech Angers
• Jérémy Besnard, Ph. D. Université d’Angers
• Daniel Milhomme, Ph.D., UQAR
• Andrée-Anne Parent, Ph. D. UQAR