

# ASSESSMENT AND REHABILITATION TOOLS : THE USEFULNESS OF IMMERSIVE VIRTUAL REALITY

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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-Palacios 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.

# IS VR USEFUL FOR ELDERLY ?

Banville, Verhulst, Allain & Richard (2018)

- 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

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# 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**

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# VIRTUAL INTENSIVE CARE UNIT

**UNITÉ VIRTUELLE DE SOINS INTENSIFS**

UN LIEU DE FORMATION PRATIQUE

**UQAR**



# VIRTUAL INTENSIVE CARE UNIT

Three different learning environments are in development



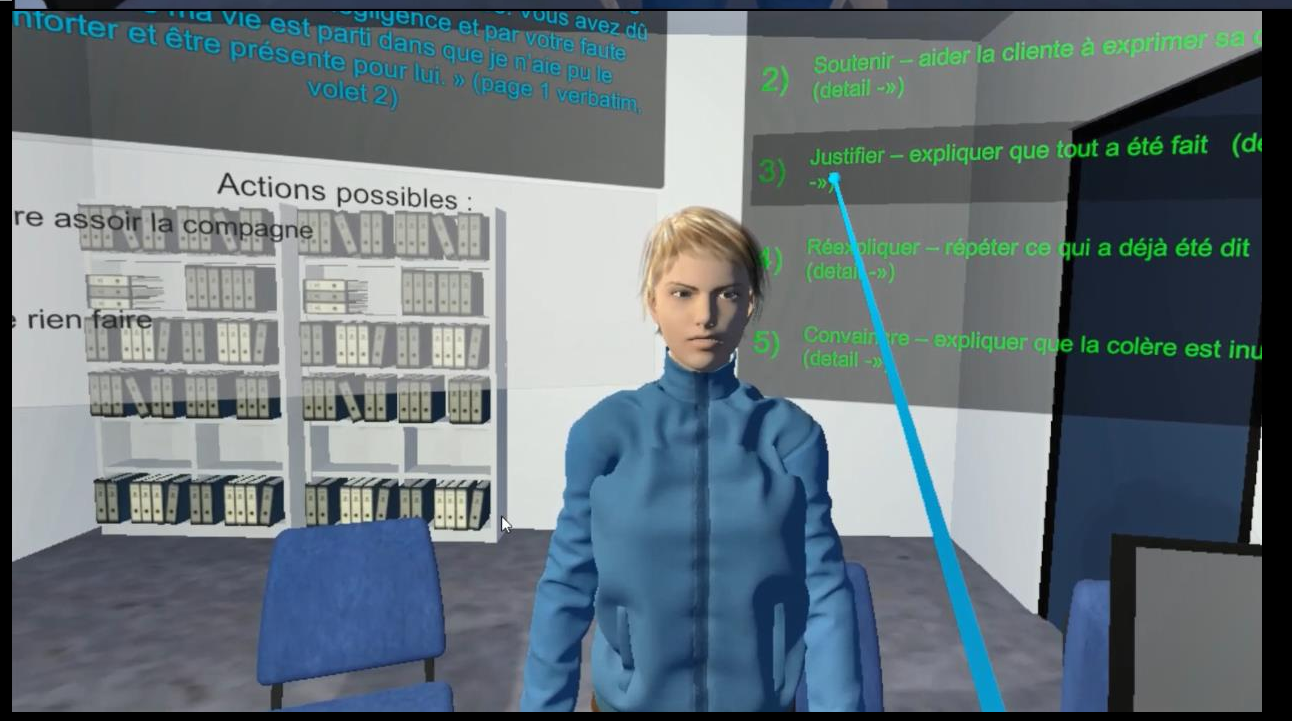
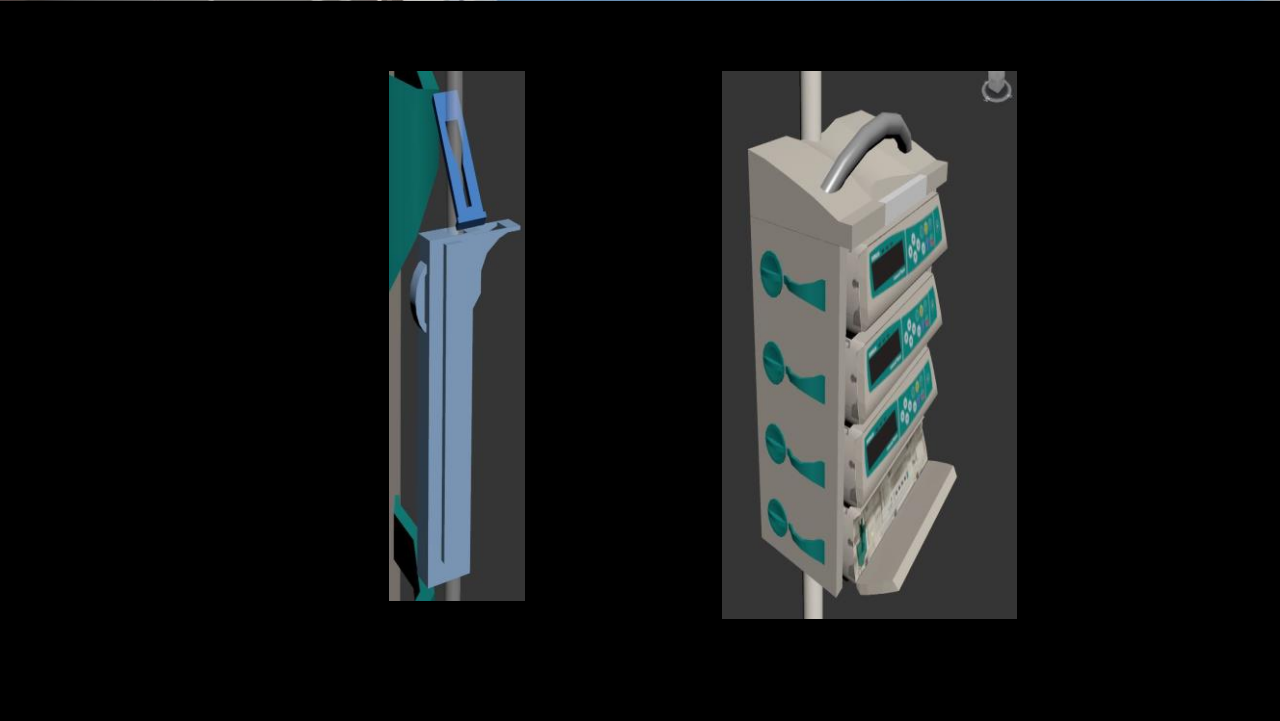
Clinical monitoring



Psychotherapy



Functional anatomy



## TRIAL VERSION

We led a pre-experiment with post-graduate nursing students and experienced nurses (n=7) to know how realistic is clinical monitoring script.

## What they were thinking about the tasks and the environment ?

### Tasks

- Navigation (+)
- Realism (+)
- Usability (+)
- Motivation (+)
- Cybersickness (-)

### Social interactions

- Facial expressions (+)
- Representativeness of emotions (+)
- Human-Machine interaction (+)



**VIRTUAL MINDFULNESS ENVIRONMENT  
USING THE FULNESS ROOM TO IMPROVE  
PSYCHOLOGICAL FLEXIBILITY**

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# MINDFULNESS TO INCREASE ATTENTION AND WELL-BEING



# THANK YOU

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The logo for UQAR (Université de Québec à Rimouski) features the letters 'UQAR' in a bold, blue, serif font. The 'Q' has a distinctive shape with a tail that curves under the 'A'.The logo for CORSeR (Collectif de recherche sur la santé en région) features the letters 'CORSeR' in a blue, serif font. The 'O' is replaced by a compass rose. Below the letters, the text 'Collectif de recherche sur la santé en région' is written in a smaller, blue, sans-serif font.The logo for Laboratoire ONIRIQUE features the word 'Laboratoire' in a small, grey, sans-serif font above the word 'ONIRIQUE' in a larger, bold, grey, sans-serif font. To the right of the text is a stylized graphic of a hand or a flower in shades of yellow and orange.

## THE TEAM:

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