Student Nursing Assessment of Discrete Neurology Symptoms using an Interactive Physical Virtual Head

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- INACSL is an accredited ANCC provider.

DISCLOSURES

- Conflict of Interest
  - Laura Gonzalez- VP of Programs, INACSL, reports no conflict of interest
  - Greg Welch- Supported in part by the Office of Naval Research, ONR Award# N00014-14-1-0248 (Dr. Peter Squire, PM).
  - Salam Daher- reports no conflict of interest
  - Jason Hochreiter- Reports no conflict of interest

DISCLOSURES

—Julia Greenawalt (INACSL Conference Administrator & Nurse Planner) reports no conflict of interest

—Leann Horsley (INACSL Lead Nurse Planner) reports no conflict of interest

- Successful Completion

—Attend 90% of session

—Complete online evaluation

OBJECTIVES

- Upon completion of this presentation, participants will be able to:

1. Understand Physical- Virtual simulation

2. Appreciate instances where PVS is useful for detecting subtle physical changes

3. Explore potential strategies and implications for this technology

Background

- Healthcare educators typically rely on role players and physical mannequins (e.g., Meti-Man, SimMan3G) for education and simulation.

Background

- Role players and mannequins can be very powerful, but **they cannot** display neurologic symptomatology such as facial asymmetry, muscle coordination and lid lag.

- Some options (* hybrids) include videos of real (stroke) patients next to a mannequin, and found this technique increased learner self-confidence.
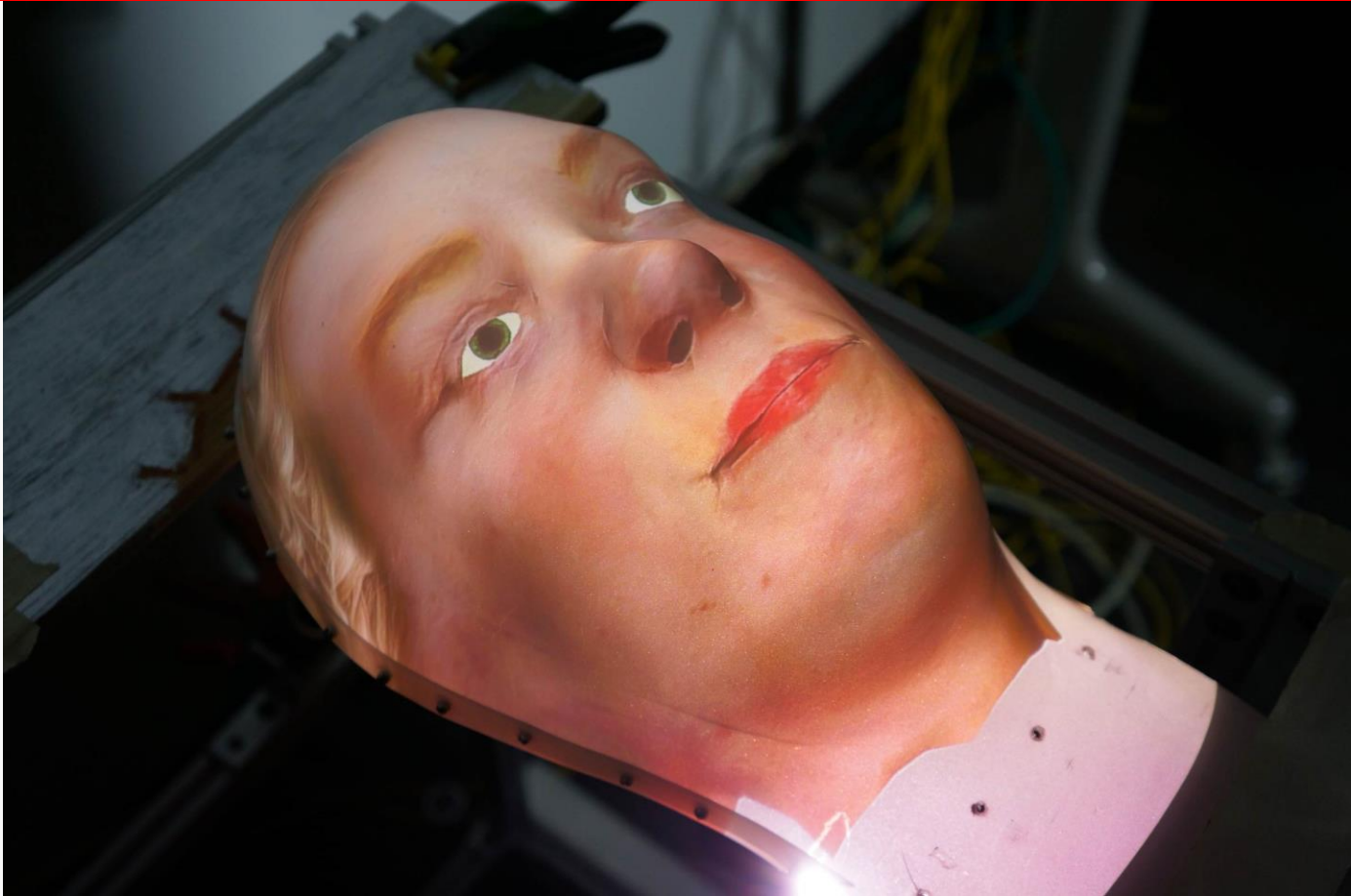
Background

- Researchers at IST/CS developed the *physical-virtual head*, a system that integrates interactive virtual (computer graphics) imagery and audio of patients into a **touch sensitive** head-shaped physical object

Physical Virtual Head aka Vera Real

Aim

- *Short term:* Elicit feedback from nursing students on the technology.

- *Long term*: Compare nurses' ability to assess neurologic symptomatology when interacting with a physical-virtual head with automatic touch sensing (PVHT) vs. a mannequin with nearby virtual imagery on a flat screen.

Presence

- One of the goals of the study is to explore the concept of "*presence* which is defined as a psychological state characterized by one self to be enveloped by, included in and interacting with an environment"

- Witmer & Singer

Student Engagement

- Touch points
  - 9 students from health assessment fall 2015 engaged with technology during neurology assessment class (sem 1)
  - 5 students from MS1 (sem 2)
  - 9 students from MS2 experienced both conditions (sem 3)

Physical Virtual Head

Normal Neutral   Normal Smile   Stroke Neutral   Stroke Smile
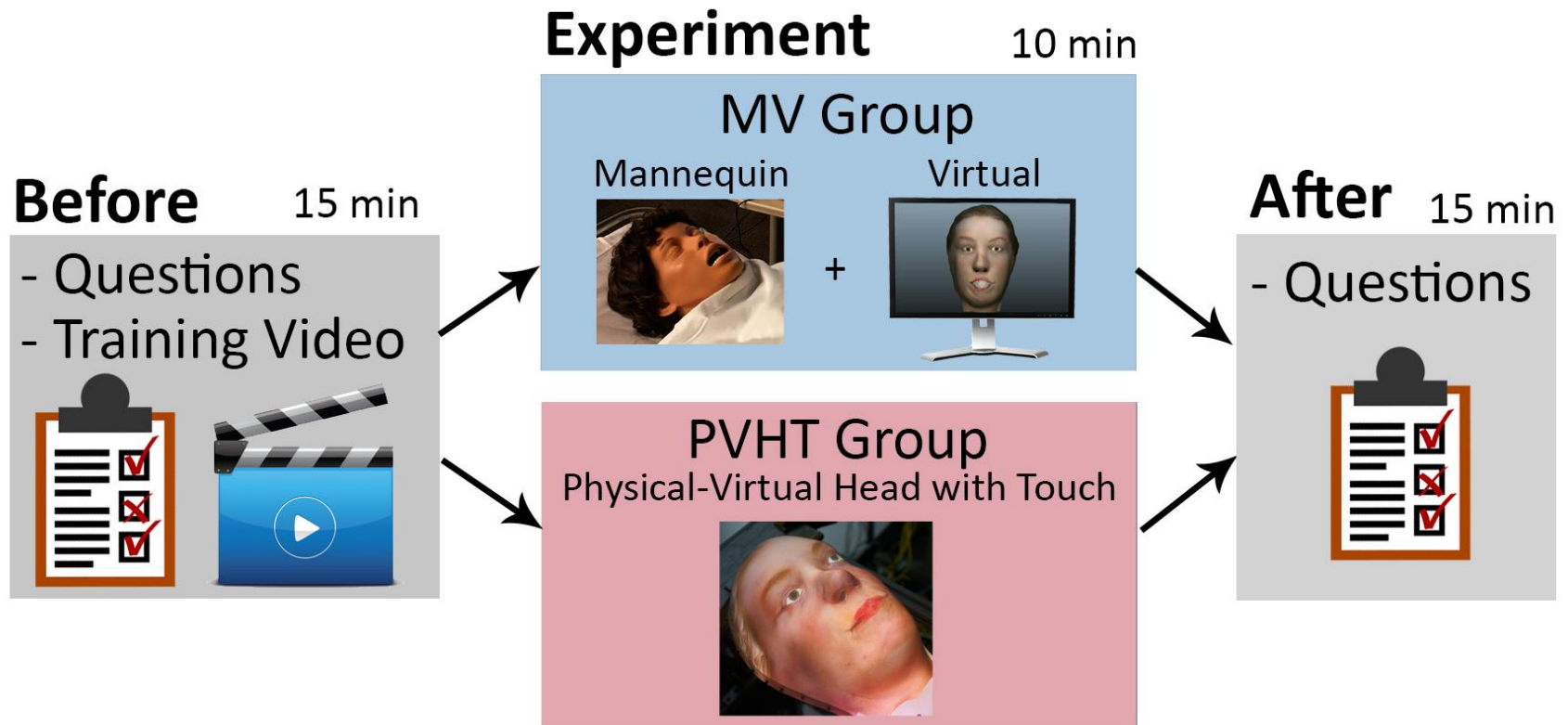
Methodology

- Second phase:
  - Between-subjects pilot experiment involving mid-level nursing students that were randomly assigned to the **mannequin with nearby virtual** imagery on a flat screen (MV) condition or the **physical-virtual head** with automatic touch sensing (PVHT) condition.

Methodology

Before Experiment

- Each subject was:

  Asked about their previous experience and expectations regarding virtual humans' realism

  Exposed to a brief introduction of the capabilities of MV/PVHT simulator

  Not told about the patients 'condition.

During Experiment

- Each subject was:

  – Presented with the same scenario presenting neurologic symptomatology and acted out by virtual imagery shown either on a nearby flat display (MV) or integrated into the head (PVHT)

  – Subjects were recorded and observed for recognition of facial asymmetry, response to touch, diagnostic questions asked, and speech evaluation.

After the Experiment

- Each subject was:
  - Asked Questions regarding their experience, interaction, perception of realism, and expectations.

Findings (PVHT)

- In general students liked the realism and interaction ability, "*as if she were a real person*"

- Agreement that this was useful for teaching sessions.

- Facial expressions were much more **realistic** than previous simulators and the voice matched the clinical presentation.

Findings (PVHT)

- "Facial expressions are so important when putting together the whole clinical picture" making sure **the verbal and non-verbal cues lined up** to provide accurate care.

- "It is **easier** to work with and much more realistic than any of the [other] mannequins".

Findings (PVHT)

- When asked what would you have done differently if that was a real patient, one subject said "nothing" while another said that she would have called the physician more quickly,

- other subjects said they would have done more tests on the rest of the body.

Findings (PVHT)

- Lastly, students expressed that it would be much more beneficial if the PVHead could be a **whole body system** since most conditions are rarely isolated to the head

Findings (MV)

- Nurses thought that the addition of the "TV" was a **"great bonus"** and that would be very helpful.

- The subjects indicated that the face on the monitor and its ability to express right-sided sagging, non-reactivity of the right pupil, the inability of the right eyebrow to raise, and the right side of the face to smile were all very realistic.

Findings (MV)

- The patient was perceived as responding in a timely manner, but **not communicating freely**

- When asked what would you have done differently if that was a real patient, most of the subjects mentioned they would have called a doctor or a charge nurse for a real patient.

- One subject reasoned that because it was a simulated patient she perceived the condition as *not* urgent.

Next steps

- To explore the concept of **presence** and **co-presence**. At this time there is not enough data to tease out whether one modality was better than the other

- Continue to work with CS/IST to modify and identify ways to bring into classroom

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