Vera Real: Stroke Assessment Using a Physical-Virtual Patient (PVP)

Laura Gonzalez, PhD, APRN, CNE, CHSE-A
Salam Daher, PhD
Gregory Welch, PhD
Continuing Nursing Education

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DISCLOSURES

• **Conflict of Interest**
  • Laura Gonzalez (Presenter) VP of Programs for INACSL
  • Salam Daher (presenter) reports no conflict of interest
  • Greg Welch (presenter) reports no conflict of interest
  • Mindi Anderson (INACSL Conference Administrator) reports no conflict of interest
  • Erin Killingsworth (INACSL Lead Nurse Planner) reports no conflict of interest

• **Successful Completion**
  • Attend 100% of session
  • Complete session evaluation in app
LEARNING OBJECTIVES

Upon completion of this educational activity, participants will be able to:

1. Recognize current simulation technology.
2. Appreciate the value of realism in knowledge acquisition.
3. Apply findings to future work.
Overview

- Simulation has revolutionized teaching and learning.
- Traditional mannequins are limited in their ability to exhibit emotions, movements, and interactive eye gaze.
- Students often struggle with immersion and may be unable to authentically relate to the “patient.”
- Physical-Virtual Patients (PVP) combine the physicality of mannequins with the richness of dynamic computer-generated visuals.
Concepts Under Consideration

1. Urgency
2. Engagement
3. Learning
Technology Overview

Physical
- Mannequin [1]

Physical-Virtual
- Augmented Reality [2]
- Virtual Reality [3]

Virtual
- Computer Based [4]

Virtual objects coexist in the same space as the real word

[1] U.S. Navy Photo
[3] Photo courtesy of Simbionix
Technology Overview

Physical

- Front Projection [5]

Shader Lamps

Virtual Patient [6]

Virtual

- Head Mounted Display [7] [8]

[7] Images courtesy of Christoph Bichlmeier, Technical University if Munich. [8] Image © 2009 Aaron Kotranza
Technology used for “VERA Real”

Our Physical-Virtual Patient “VERA Real”

Response to Touch
Facial Expressions
Pupil Dilation
Eye following
Speech

Physical Shell
Projector
Speaker
Software

[7] Images courtesy of Christoph Bichlmeier, Technical University of Munich. [8] Image © 2009 Aaron Kotranza
Video: Capabilities of the Technology
Technology used for “VERA Real”

Healthy Neutral  Healthy Smile

Stroke Neutral  Stroke Smile

Graphical User Interface to Control the Patient
Video: “VERA Real” in a Stroke Scenario
Research Methodology

Nursing students (N = 59) in adult health class.

2-3 participants per simulation

Between-subject design

26 interact
10 observe

18 interact
5 observe
Research Methodology

Informed Consent

Pre-Questionnaire

- Neurological Pre-Test*
- Demographics

Familiarization Video

2 min

Case Report

3 min

Simulation

15 min

Post-Questionnaire

Post-test (final exam)

Head Tracking

- Realism
- Urgency
- Engagement

* When performing a neurological assessment what are all the potential findings you can remember.
Findings: Urgency

* Indicates significant results with \( p < 0.05 \)

<table>
<thead>
<tr>
<th></th>
<th>Mannequin</th>
<th>PVP Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgency</td>
<td>3.294</td>
<td>4.696</td>
</tr>
<tr>
<td>Close to Real</td>
<td>3.265</td>
<td>3.957</td>
</tr>
</tbody>
</table>
Findings: Engagement

Questionnaire from Huwediek et al, 2015

* Indicates significant results with $p < 0.05$
Findings: Learning Progress

Data From Written Pre-Test and Post-Test Question:
"When performing a neurological assessment what are all the potential findings you can remember"

* Indicates significant results with $p < 0.05$
Participants were more engaged, experienced higher sense of urgency, and learned more in the Physical-Virtual Patient condition compared to the mannequin.
Application to Current Practice

Realism does enhance **engagement** and **urgency** resulting in transfer of learning.

Realism may be particularly important with regards to high-impact visual simulations such as bruises, petechiae, jaundice.
Limitations and future work

This study used the PVP head and as such the assessment findings were limited.

We recognize a more thorough neurological assessment would have been performed in the clinical setting.

Future work includes extending the PVP to a full body simulator.
References


Contacts

Laura Gonzalez:  laura.gonzalez@ucf.edu

Salam Daher:  salam@kinghts.ucf.edu

Gregory Welch:  Greg.welch@ucf.edu
THANK YOU

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