

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

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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

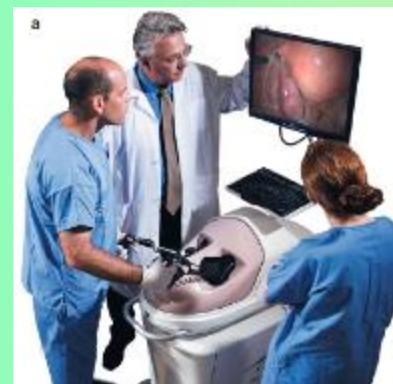


Mannequin [1]

Physical-Virtual



Augmented Reality [2]



Virtual Reality [3]

Virtual



Computer Based [4]

Virtual objects coexist in the same space as the real world

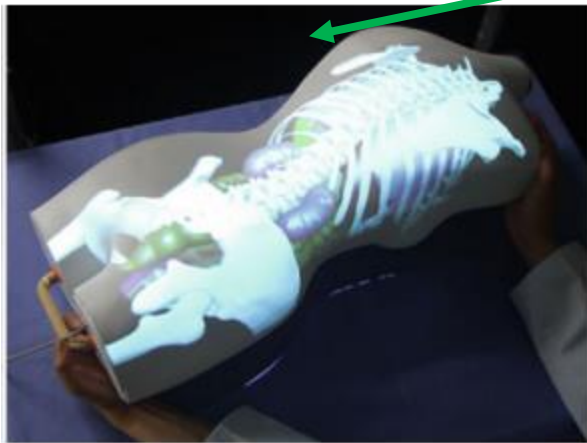
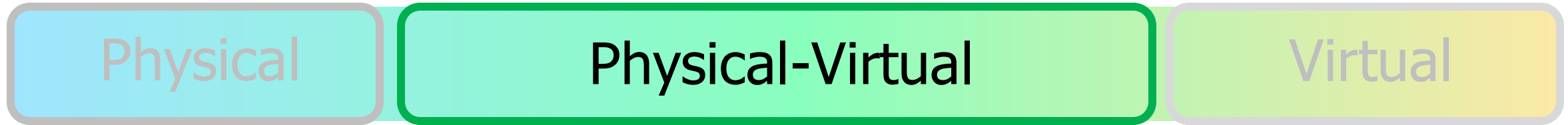
[1] U.S. Navy Photo

[2] <https://caehealthcare.com/ultrasound-simulation/vimedix/>

[3] Photo courtesy of Symbionix

[4] <http://www.i-human.com/>

Technology Overview



Front Projection [5]



Shader Lamps
Virtual Patient [6]



Head Mounted Display [7] [8]



[5] Sherstyuk et. al., 2011. [6] Rivera-Gutierrez et. al., 2015.

[7] Images courtesy of Christoph Bichlmeier, Technical University of Munich. [8] Image © 2009 Aaron Kotranza



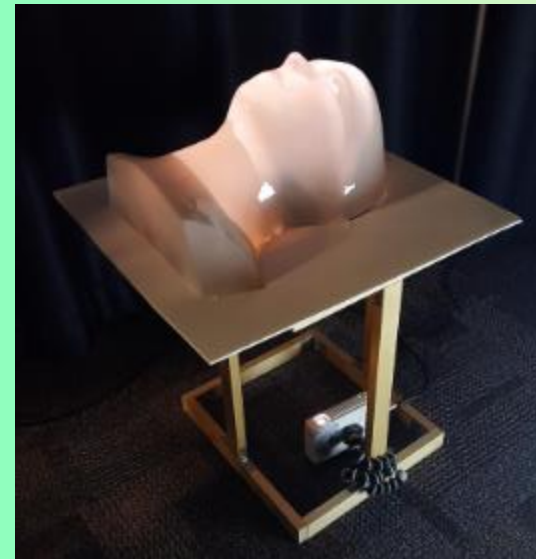
Technology used for "VERA Real"

Physical

Our Physical-Virtual Patient
"VERA Real"

Virtual

Response to Touch
Facial Expressions
Pupil Dilation
Eye following
Speech



Physical Shell
Projector
Speaker
Software

[5] Sherstyuk et. al., 2011. [6] Rivera-Gutierrez et. al., 2015.

[7] Images courtesy of Christoph Bichlmeier, Technical University of Munich. [8] Image © 2009 Aaron Kotranza

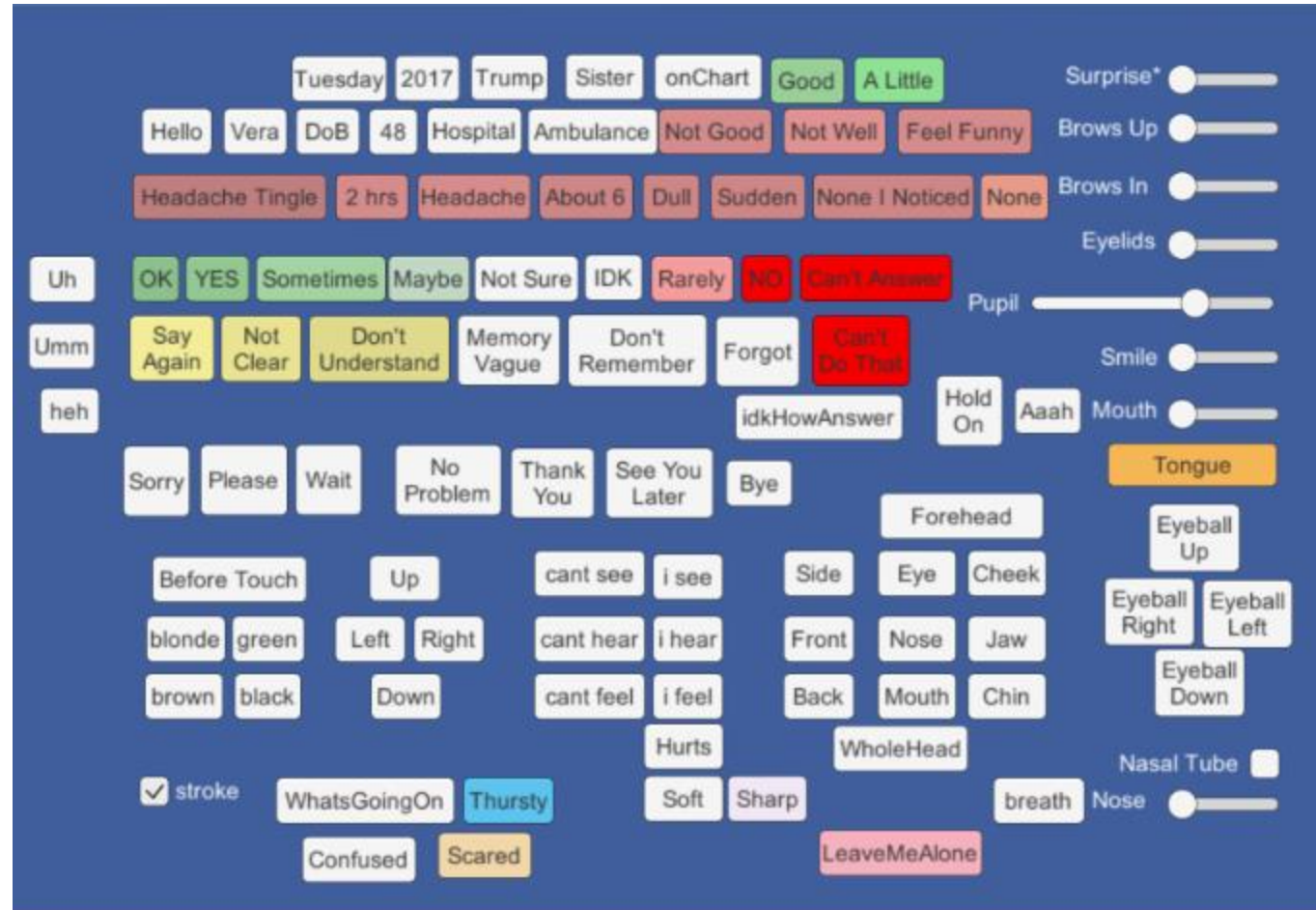
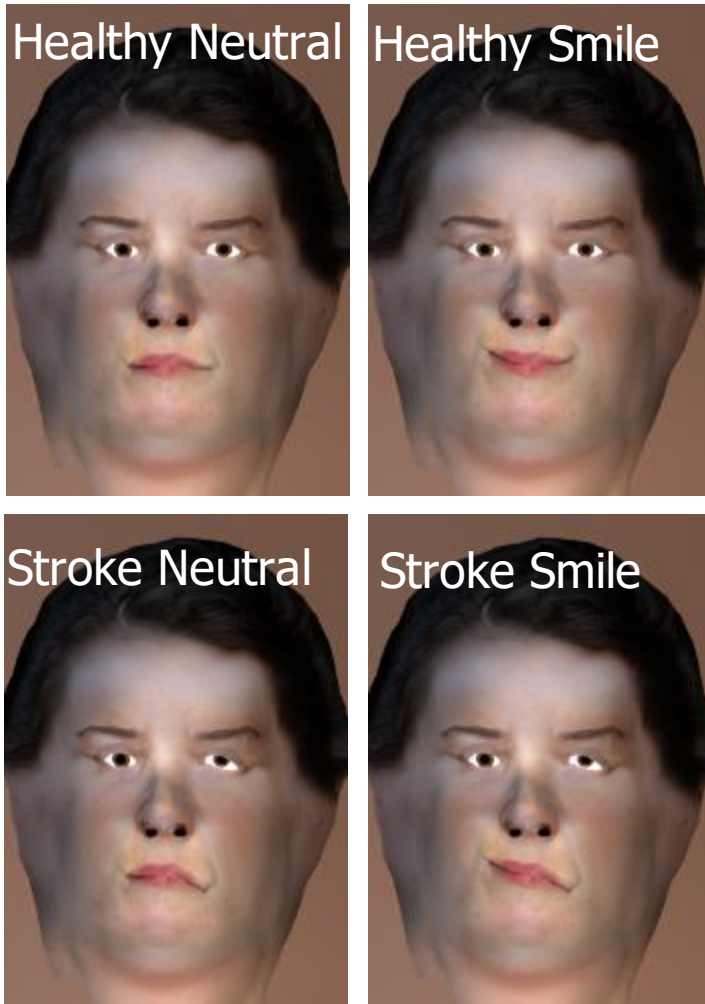


Video: Capabilities of the Technology



Video

Technology used for "VERA Real"



Graphical User Interface to Control the Patient

Video: “VERA Real” in a Stroke Scenario



Video

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





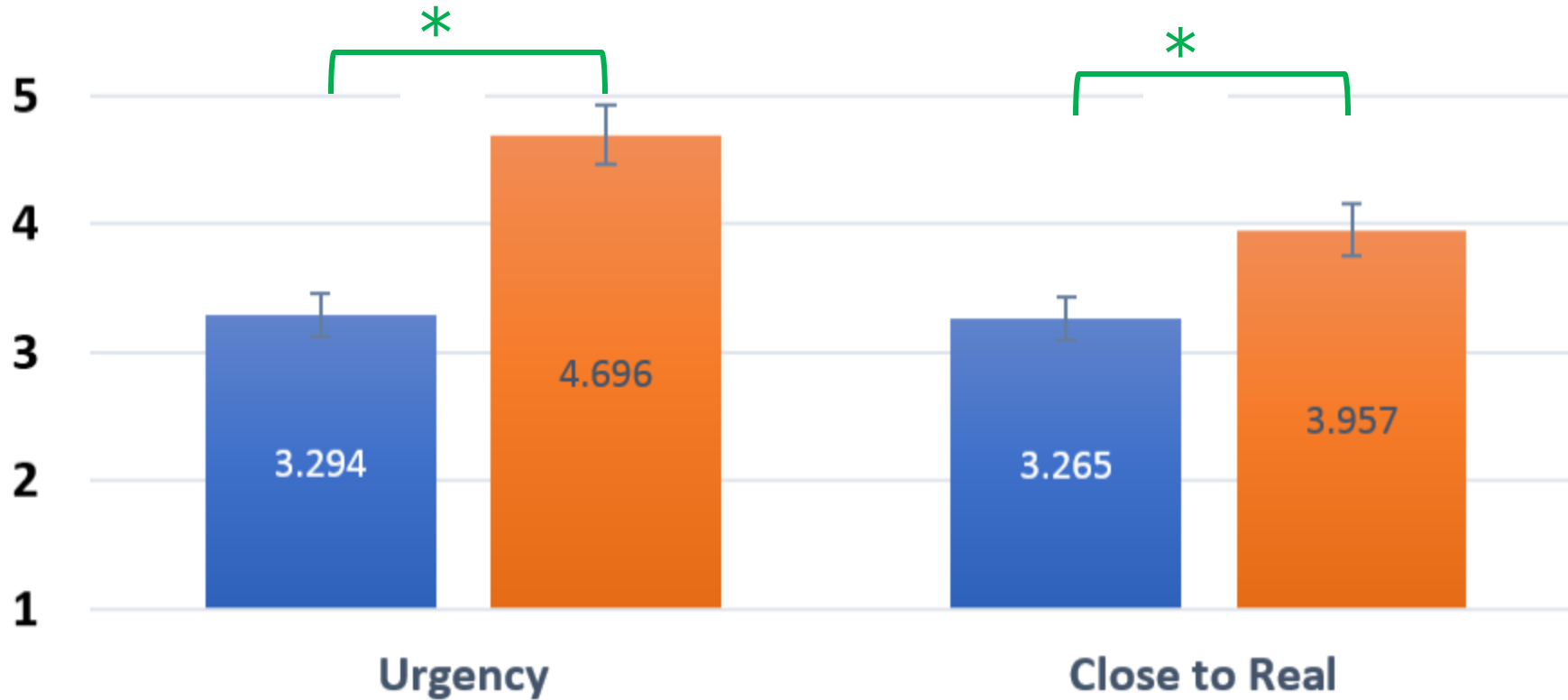
Research Methodology



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



Findings: Urgency



 **Mannequin**



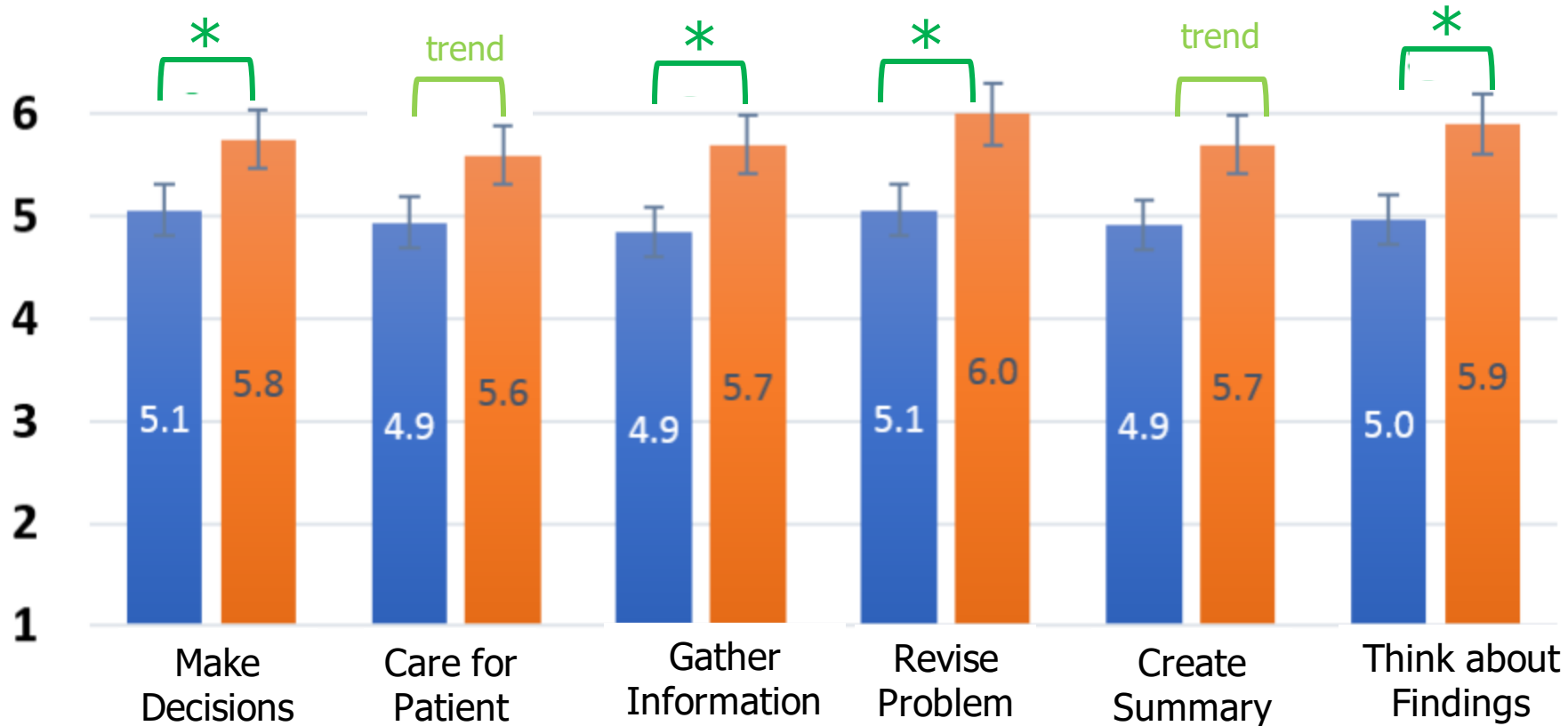
 **PVP Head**



* Indicates significant results with $p < 0.05$



Findings: Engagement



 **Mannequin**



 **PVP Head**

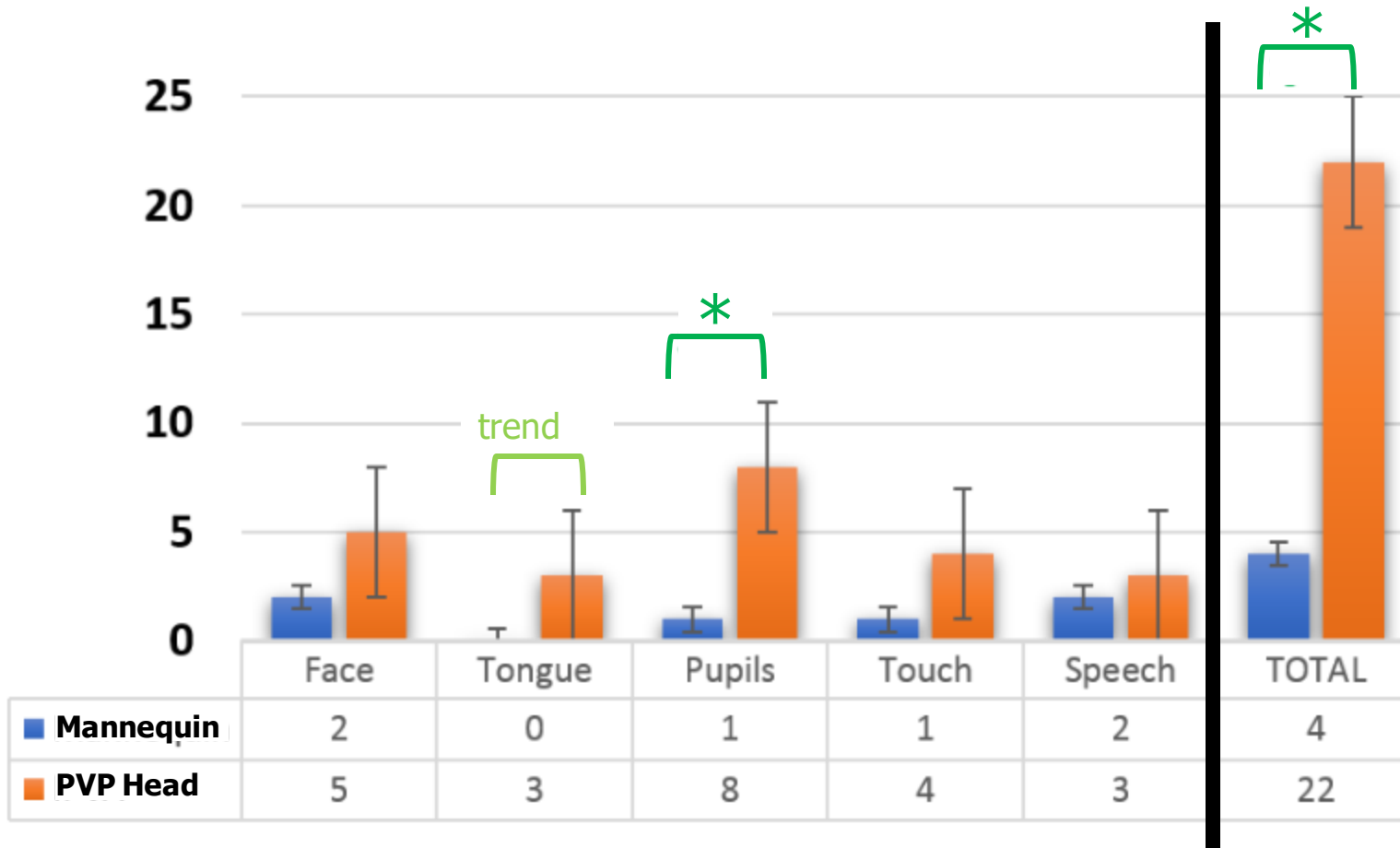


Questionnaire from Huwediek et. al, 2015

* Indicates significant results with $p < 0.05$



Findings: Learning Progress



Mannequin



PVP Head



* Indicates significant results with $p < 0.05$

Data From Written Pre-Test and Post-Test Question:

"When performing a neurological assessment what are all the potential findings you can remember"



Findings Summary

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

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