INTRODUCTION

Background
- Simulator Sickness (SS) occurs when the visuo-vestibular system and Head-Mounted Display (HMD) interact abnormally to inflict symptoms similar to motion sickness.
- The Simulator Sickness Questionnaire (SSQ) measures SS using three subscales: nausea, oculomotor, and disorientation (Kennedy, Lane, Berbaum, & Lilienthal, 1993) (see Figure 1).
- The quality of the virtual environment may impact SS more than the HMD system (HTC Vive and Oculus Rift).

Purpose & Research Questions
- This study examines the HTC Vive and Oculus Rift to assess SS in walking tasks:
  1. Is there a statistically significant difference between the HTC Vive and Oculus Rift for post-test SS?
  2. Is there a statistically significant difference from pre- to post-test SS for the HTC Vive?
  3. Is there a statistically significant difference from pre- to post-test SS for the Oculus Rift?

METHODOLOGY

Inclusion Criteria
- Normal or corrected-to-normal vision, not color blind, no previous history of seizures, U.S. citizenship, and 18 to 40 years old
- Thirty-nine participants, including 25 females and 14 males with an approximate mean age of 20 years, were chosen from the University of Central Florida and the surrounding area.

Participation Procedure
1. Randomly assigned participants to one of two conditions: the HTC Vive or Oculus Rift.
2. Completed informed consent procedure.
3. Administered Ishihara Test for Color Blindness.
4. Administered pre-scenario SSQ.
5. Provided interface training via PowerPoint Presentation.
6. Proctored three scenarios using assigned HMD (see Figures 4-6).
7. Administered post-scenario SSQ.
8. Debriefed and dismissed participants.

RESULTS

Between-groups: HTC Vive and Oculus Rift
A Mann-Whitney U Test* measured pre-test SS between the HTC Vive (Md = 22.4, n = 19) and the Oculus Rift (Md = 15, n = 20). U = 174 z = -.45, p = .67, r = .07.

Within-groups: HTC Vive
A Wilcoxon Signed-Rank Test* measured pre- to post-test SSQ scores within the HTC Vive group z = -3.23 p < .001 (r = .37), median SSQ score pre-test (Md = 4), median SSQ score post-test (Md = 22).

Within-groups: Oculus Rift
A Wilcoxon Signed-Rank Test* measured pre- to post-test SSQ scores within the Oculus Rift z = -3.41 p < .001 (r = .39), median SSQ score pre-test (Md = 0), median SSQ score post-test (Md = 15).

DISCUSSION

Between-groups: HTC Vive and Oculus Rift
- No significant difference in SS between the HTC Vive and Oculus Rift during a walking task.
- SS should not be a distinguishing factor when choosing between the HTC Vive and Oculus Rift.
- Healthcare patients in physical therapy may relearn motor skills using either HMD.

Within-groups: Statistically significant increase in SS after using HTC Vive and Oculus Rift.
- Virtual environment content and resolution impacts SS more than the HMD device (Singla, Fremeray, Robitza, & Raake, 2017) (see Table 2).

REFERENCES

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