Modeling, Simulation and Training Procedural Skills: User experience and acceptability of a virtual reality simulator for scrub nurses in neurosurgery

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Assess acceptability and user experience of a VR simulation to train procedural skills for scrub nurses with dedicated models and validated tools.

Materials & Methods

- Scenario based on annotated video observations recorded in the OR
- 150 surgical instruments and 50 different interactions
- Acceptability assessed with the Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire
- User experience assessed with NASA TLX (workload), SUS questionnaire (presence) and SSQ (simulator sickness)
- Qualitative data from post test interviews and logs

### Results

<table>
<thead>
<tr>
<th>Participants</th>
<th>Non-expert users</th>
<th>Expert users</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD students / students / engineers</td>
<td>8 males 8 females mean age : 26.6 (SD = 7.54)</td>
<td>Scrub nurses in neurosurgery 13 females mean age : 42 (SD=7.7)</td>
</tr>
<tr>
<td>Presence</td>
<td>4.47/7 (SD = 1.14)</td>
<td>5.10/7 (SD = 0.96)</td>
</tr>
<tr>
<td>Simulator sickness</td>
<td>3.94/33 (SD =3.39)</td>
<td>3.15/33 (SD =2.97)</td>
</tr>
<tr>
<td>Time</td>
<td>13.44 min (SD = 3.65)</td>
<td>14.71 min (SD =19.25)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTAUT2</th>
<th>NASA TLX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance...</td>
<td>Effort expectancy</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Non-expert users</td>
<td>Green</td>
</tr>
<tr>
<td>Expert users</td>
<td></td>
</tr>
</tbody>
</table>

Discussion and Conclusion

- Acceptability the VR simulator was demonstrated for all participants
- No statistical significant differences regarding age, gender and expertise
- Most participants stressed its pedagogical interest, fun and realism
- VR simulator was validated for initial and vocational training

Limits

- Small sample size
- Experts from only one specialty and department

Following steps

- Measure transfer of skills to the OR
- Development of Non-Technical Skills (NTS) scenarios
- Intercultural studies