

# Furniture CGI Presentation as 2D Renderings or Virtual Reality?

Anna-Lena Spleet, Dennis Kahya, Sören Eckardt  
Katrin Wolf



Figure 1: Presentation formats 2D (left) and 3D (2<sup>nd</sup> from left side). Examples of computer-generated ambient pictures used for the interactive Virtual Reality (3D) presentation (column right and 2<sup>nd</sup> from right side).

## 1. BACKGROUND

- Computer generated Imagery is increasingly replacing the traditional photo shooting process. In furniture sales product presentations are usually realized through 2D images.
- Developments in 3D content generation have great potential for immersive object or product representation, which have yet to be explored.

**Q. What are the respective benefits of product presentations through 2D images and using a 3D interactive environment?**

**Q. How do those two presentation formats influence the user's perception?**

## 2. METHOD

To investigate the influence of 2D rendered images and an interactive Virtual Reality experience on the perception of CGI we used a 2 x 3 within subject design.

### Independent variables

- Presentation format* (PowerPoint with 2D CGI, interactive VR experience)
- Presented Object* (wardrobe, couch, lamp)

### Dependent variable

- Perceived Usability*; measured using The System Usability Scale (SUS) questionnaire
- During the 2D PowerPoint presentation, rendered images of the *presented Objects* are shown to the participants on a Laptop in different states (e.g. the lamp switched on and off).
  - In the interactive Virtual Reality presentation, participants could look around freely with the Head-Mounted-Display (HMD), though remaining stationary. Interaction possibilities were given using the Oculus Touch controller (e.g. opening/closing the wardrobe).

- 24 participants necessary, divided in two presentation groups. One led by a female and one by a male person.
- Each participant had to complete 6 tasks. One for each of the three *presented objects* in both *presentation formats*.
- Within each group the order of the presented object was counterbalanced.
- Additional information was gathered by semi-structured questions about positive and negative experiences of the participants during the study.

## 3. RESULTS

- The 2D PowerPoint presentation scored higher in general with an average usability score of 76.42 compared to 68.40 for the Virtual Reality presentation.
- A Mann-Whitney U test shows that SUS scores for the 2D presentation are significantly higher than the scores of the Virtual Reality 3D presentation.
- The results of our study show that 2D presentations were rated more usable than 3D VR presentations.
- Aside from the usability scores the quality feedback by the participants gave good insight, which can explain the unexpected low ratings of the 3D presentation.
- The lack of image quality, the necessity to wear a HMD and the sometimes cumbersome usage of the controller were the main sources of negative feedback.

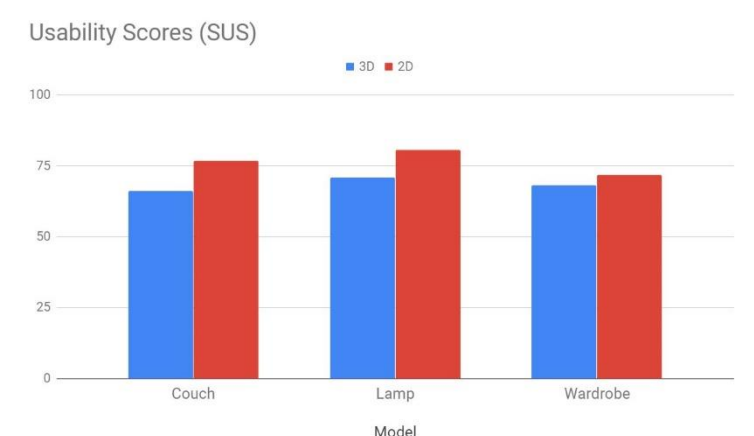


Figure 2: Usability Scores of the presented objects in both presentation formats.

## 4. CONCLUSION

### Benefits of 2D presentations:

- Image Quality meets the user's expectations.
- Can be held on any device being able to show pictures.

### Benefits of 3D presentations:

- Better suited to deliver the sense of size, relation and dimension of objects.
- Possibility of interactively exploring functionalities.

- Product presentations in VR will more likely outperform 2D presentations in terms of usability in the future, when:

- The unease of wearing a HMD decreases (HMDs getting smaller and lighter),
- The image quality improves (resolution and lightning in real-time),
- New Interaction concepts are designed to provide beneficial interaction possibilities with products.