Furniture CGI Presentation as 2D Renderings or Virtual Reality?

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

Dependent variable
1. 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), tough 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.

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