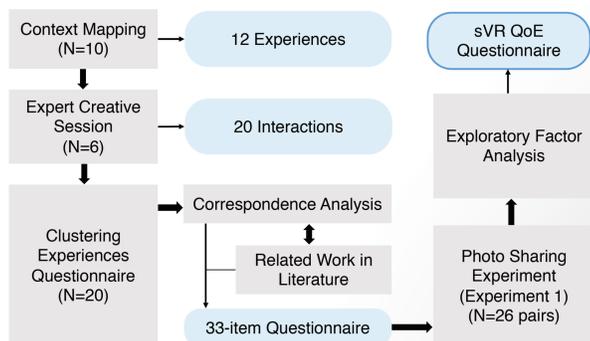


A FRAMEWORK TO MEASURE QUALITY OF EXPERIENCE IN SOCIAL VIRTUAL REALITY

Jie Li, Francesca De Simone, Abdallah El Ali, Pablo Cesar
Centrum Wiskunde & Informatica, Amsterdam, the Netherlands

2. Questionnaire Design



4. Experiments

Experiment 1: Photo sharing [1]

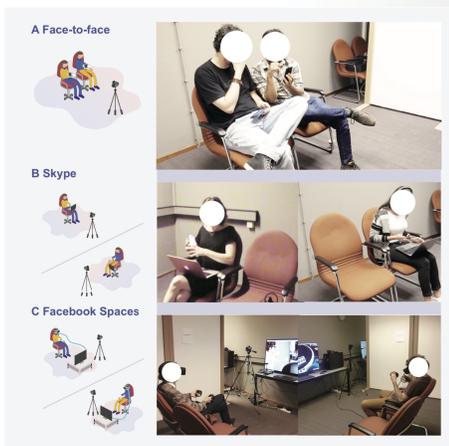


Figure 3: **Experiment 1 set up** for the (a) face-to-face (F2F), (b) Skype, and (c) Facebook Spaces conditions.

Experiment 2: Movie trailer watching [2]

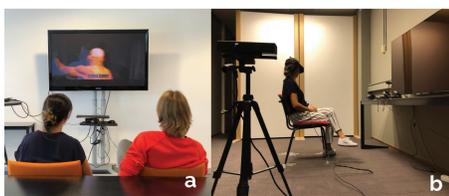


Figure 4: **Experiment 2 set up** for the (a) F2F and (b) sVR conditions. Users' HMD viewpoints and body movements are recorded.

Experiment 1 (N=26 pairs) and Experiment 2 (N=16 pairs) are both:

- A within-subjects design
- Using a sVR questionnaire to measure:
 - (1) Quality of interaction
 - (2) Social connectedness/social meaning
 - (3) Sense of presence/immersion

1. Introduction

A social Virtual Reality (sVR) system is a shared or collaborative VR system that allows multiple users to join a collaborative Virtual Environment and communicate with each other.

Our work was divided into two steps:

- (1) Design and validate a sVR questionnaire
- (2) Design an objective data collection framework

We evaluated the questionnaire and the framework using two controlled user experiments.

3. sVR Systems



Figure 1: Experiment 1 in Facebook Spaces with remote partners (a) and (b) looking at the same photo.



Figure 2: View by one user of Experiment 2 in (a) Facebook Spaces and (b) a video-based sVR system.

5. Results

Experiment 1

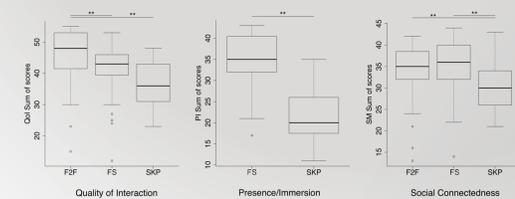


Figure 5: Box plots of the questionnaire subjective scores for F2F, Facebook Spaces (FS) and Skype (SKP) conditions.

Experiment 2

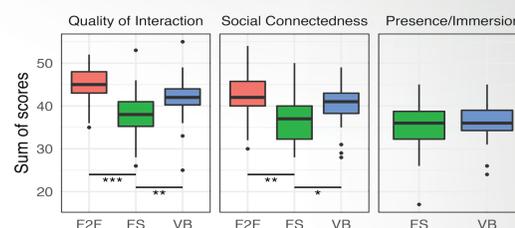


Figure 6: Box plots of the questionnaire subjective scores for F2F, Facebook Spaces (FS) and video-based sVR (VB) conditions.

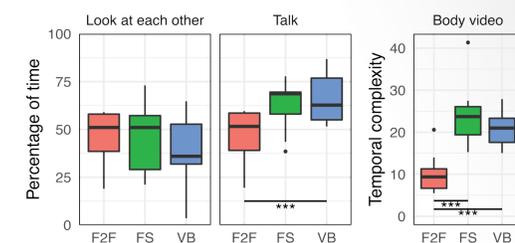


Figure 7: Box plot of the percentage of time spent talking to and looking at each other and the temporal complexity of the videos recording users' bodies.

6. Conclusion

- Our questionnaire and our empirical findings can provide researchers with a tool to measure reality-grounded activities in sVR systems.
- The video-based sVR system could provide experience comparable to the F2F one.
- The puppet-based avatars limited the perceived quality of interaction.
- The users talked and moved more in the sVR conditions than the face to face condition.
- Future work will focus on extending the analysis of the collected data.



Download our sVR QoE Questionnaire