

Master Thesis

Designing and Measuring Immersion in User Studies: A Cross-Domain Framework for Simulating Real-World Situations

Background

Many user studies investigate situations that cannot be fully reproduced in the lab or online. In such studies, participants are often asked to imagine a situation, but this can reduce ecological validity because the real-world experience involves risk, urgency, bodily sensation, social pressure, or emotional involvement. Different research domains use different methods to improve immersion: written scenarios, images, videos, sound, VR, driving simulators, cognitive-load tasks, time pressure, or physical stimuli.

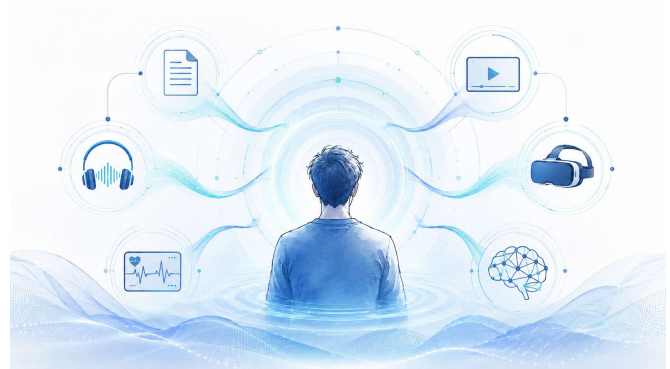


Image generated by ChatGPT, GPT 5.5

Objective

The goal of this thesis is to develop a cross-domain framework for immersion-induction methods in user studies. The thesis will analyze how different domains simulate real-world situations and propose a structured way to select, combine, and evaluate immersion stimuli.

Possible Research Questions

- Which methods are used across research domains to simulate real-world situations in user studies?
- Which types of target states are commonly simulated, for example emotional, cognitive, physiological, social, or risk-related states?
- How can stimulus modalities be categorized, for example text, visual, audio, audiovisual, VR, cognitive load, or physical stimulus?
- Which quantitative measures are suitable for assessing immersion and simulation effectiveness?
- How can researchers select an appropriate simulation method for a given user-study context?

Methodological Approach

The thesis may include:

- literature review on ecological validity, immersion, presence, simulation fidelity, and scenario validity;
- extraction of immersion methods from selected application domains;
- mapping of possible measurements;
- development of a decision framework for choosing simulation methods.

Required skills:

- interest in human–computer interaction, experimental methods, and research design;
- ability to conduct structured literature review;
- basic understanding of quantitative measurement;
- optional: experience with survey design, VR/video/audio stimuli, or statistical analysis.

Contact:
M. Sc. Yuchen Liu
yuchen.liu@tum.de
0173 5415535
MW3326

Start of the work: Immediately

M. Sc. Rutuja Joshi
rutuja.joshi@tum.de
0162 2062924
MW3329

Released on: 26.06.2026