



# Enhancing User Engagement with Game-Inspired Privacy Interfaces in Virtual Reality

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MOTIVATION

## Data Collection in VR\*

**HMD** connects to:

- Microphone**: Voice, Speech content → Age, gender, ethnicity,...
- Camera**: Facial features, Facial expressions → Attention, emotions, sleepiness,...
- Controllers**: Surroundings, Height → Health, visual impairments,...
- Observations**: Limb length, Behavior → Interests, knowledge, abilities,...

## Abstract

We conducted in-VR sketching sessions with novice game designers (n=12) to develop novel privacy interaction concepts for a VR escape room [1]. We highlight 4 designs on this poster that make creative use of game-mechanics and metaphors. Our findings suggest that integrating privacy interactions into the game environment can raise user awareness and interest, but also highlight risks – such as blurring the line between gameplay and real privacy choices. We discuss these tensions and propose directions for refining and evaluating gamified privacy interfaces in VR.

\*based on Gonzalo Munilla Garrido, Vivek Nair, and Dawn Song, Sok: Data privacy in virtual reality. arXiv preprint arXiv:2301.05940, 2023.

[1] Vivek Nair, Gonzalo Munilla Garrido, Dawn Song, and James O'Brien. Exploring the privacy risks of adversarial VR game design. Proceedings on Privacy Enhancing Technologies, 2023.

RESULTS

### Mannequins

- Mannequin with moveable limbs
- Used to strike body poses
- Alternative game mechanic
- Allows progress in the game with less data collection

Share less data

### Privacy Companion

- Small virtual robot that follows player around
- Offers information and guidance on privacy settings
- Interactive game character
- Increase user engagement

Source of Information

### Print & Mail

- Privacy decision made using printer and mailing tubes in VR
- Uses elements that are already present in the game setting
- Seamless integration of the privacy interface

Seamless integration

### Privacy Book

- Users document their privacy choices using stickers in a book
- Previous choices can be modified anytime
- Book is kept like an inventory
- Familiar game concept/metaphor

Apply familiar concepts

DISCUSSION

## Challenges

Blurring the line

Scalability

More sensors & data types  
⇒ repetitive, lengthy interactions

## Goals

- ↑ Increase user awareness
- ↑ Increase user interest
- ↓ Reduce amount of undesired data sharing
- ↓ Reduce annoyance with (secondary) privacy task

- ⇒ Refine designs
- ⇒ Evaluate designs with users
- ⇒ Explore how diverse users respond to gamified privacy interfaces

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