TUDelft

Reading in Space: Designing Literary Experiences in Virtual Reality

Tilman Dingler

14.01.26: "Future Directions in XR and User-Centred Design" Workshop, Utrecht.

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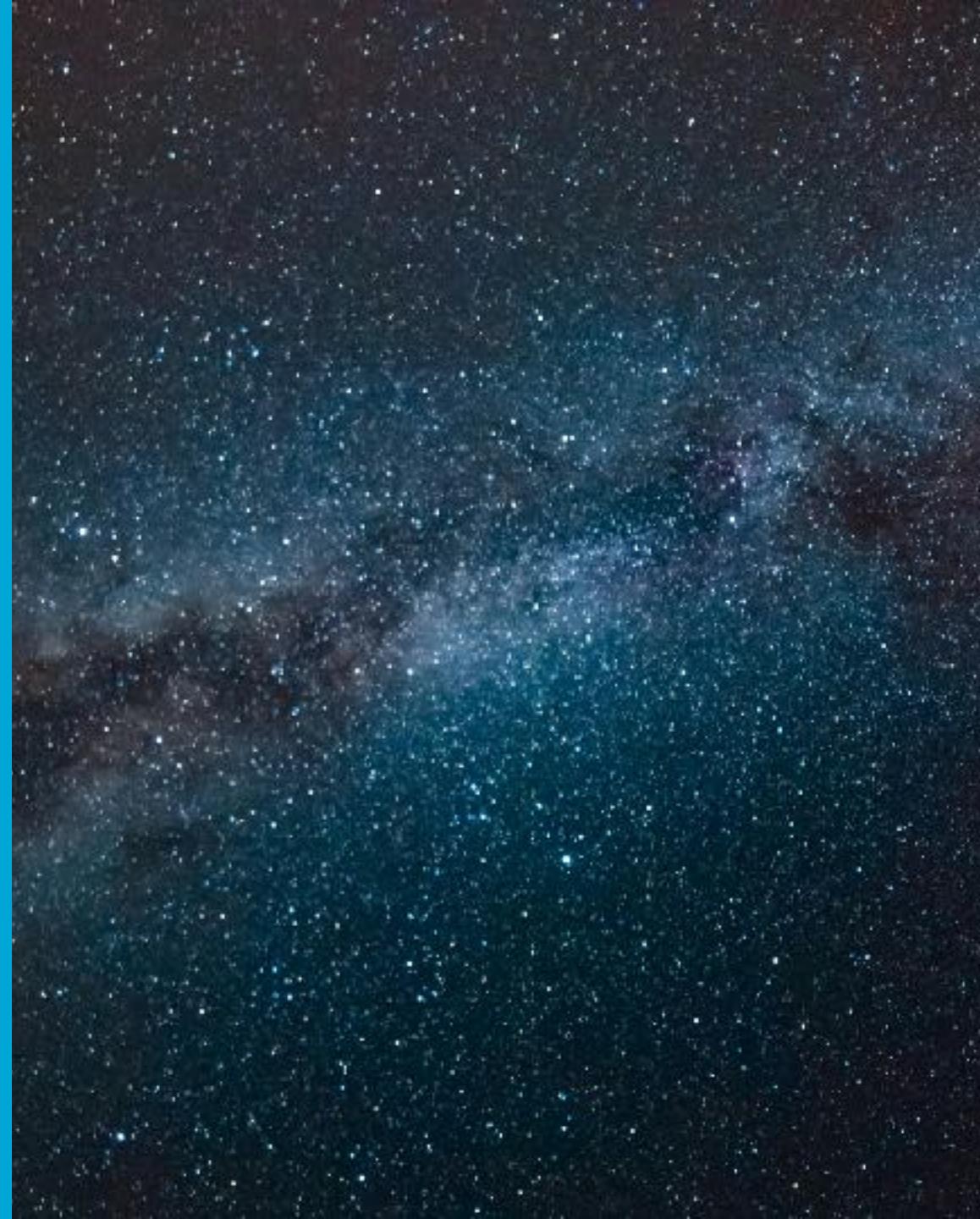
Matthew Effect: rich-get-richer

- Direct affect on
    - **Language skills**
    - Size of vocabulary

Boosted language skills

- **higher cognitive functions**

    - Reasoning
    - Judgement
    - General knowledge
    - Empathy engine

What reading does for the mind ...

Olson, David R. "Intelligence and literacy: The relationships between intelligence and the technologies of representation and communication." Practical intelligence (1986).

Intellectual & Neurological Structures

Learning a Complex Psychomotor Skill

- How we learn

  - **Phonemic awareness**: individual sounds make up words
  - **Alphabetic principle**: letters stand for sounds
  - **Phonics**: letter-sound pairing
  - **Fluency**: Switch from **phonological to visual** decoding
  - **Comprehension**: understanding the information communicated

Genetic Dispositions vs. Cultural Invention

A set of **interactive processes**, which **connects** the reader's background **knowledge** to the **new information**.

Empathy

Critical Analysis

Deep Reading

Deep Engagement through Transportation

"Narrative Transportation is a state of cognitive, emotional, and imagery involvement in a narrative."

- Focused attention on narrative events
- Vivid mental imagery & emotional engagement
- Reduced awareness of physical surroundings
- Active mental simulation & interpretation

Photo by Rahul Shah

Green, M. C., & Brock, T. C. (2000). The Role of Transportation in the Persuasiveness of Public Narratives. Journal of Personality and Social Psychology, 79(5), 701–721.

Into the Creator's Mind

Into Your Own Mind
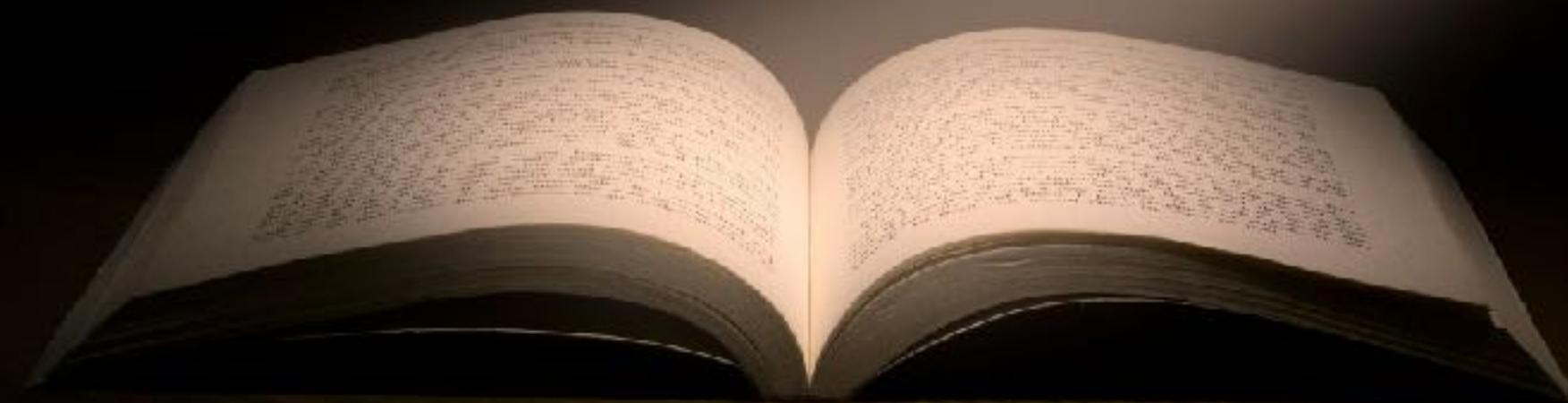
A Crisis of Passivity

*Screen Culture Threatens Our Imaginative Faculties*

The "Brain Rot" Phenomenon

Excessive passive screen time links to **reduced attention span**, executive difficulties, and a habit of seeking quick, low-effort rewards.

Suggate & Martz, 2023:

Viewers of film clips showed **impaired mental imagery** compared with readers. Passive viewing dulls imagination.

Suggate, S. P., & Martz, M. E. (2023). Does it kill the imagination dead? The effect of film versus reading on mental imagery. Psychology of Aesthetics, Creativity, and the Arts.

"We are in the transition from a literacy-based culture to a digital one. Our present cultural shift to a digital culture shows striking parallels to the shift of the Greek's oral culture to a written one."

~ Maryanne Wolf

The User-Centred Approach

Designing for our innate human computational power: the ability to imagine, interpret, and create worlds.

The Spatial Canvas

VR offers a multi-sensory canvas. By integrating text into a spatial environment, we can create embodied experiences that amplify immersion without dictating imagination.
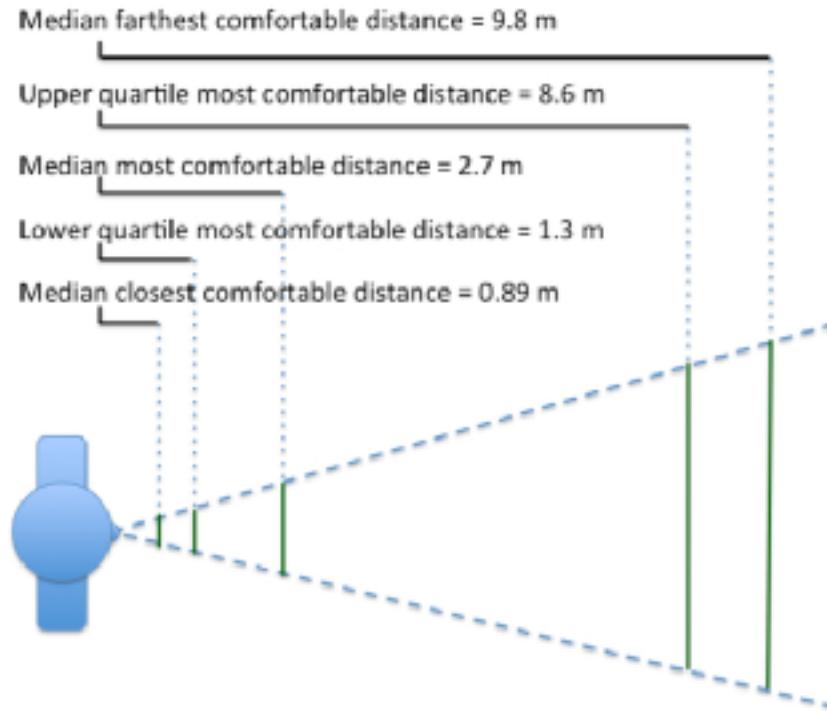
Designing for Reading Comfort

Text Angular Height

32 ± 11mm

Optimal size for readability without strain.

Vertical Position

-1.0° to 2.6°

Slight downward gaze is preferred over straight ahead.

Viewing Distance

0.6m - 2.6m

Optimal convergence distance for focus.

Visual Style

Dark Mode

72% prefer light text on dark background; Sans-serif fonts.

Dingler, T., Kunze, K., & Outram, B. (2018, April). Vr reading uis: Assessing text parameters for reading in vr. In Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems (pp. 1-6).

Spatiality Enhances Immersion

Reading on 3D Surfaces

Why confine text to flat planes?

Displaying Text on Curved Objects

Concave surfaces (curved toward the reader) enhance readability, particularly in the periphery, making the experience more immersive without sacrificing comfort.

Design Implications

- Text integrated into the environment deepens presence.

- Warp text around horizontal axes for natural scanning.

- Avoid convex surfaces which reduce reading comfort.

Dingler, T., Kunze, K., & Outram, B. (2018, April). Vr reading uis: Assessing text parameters for reading in vr. In Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems (pp. 1-6).

Embodied Interaction: Page-Turning in Virtual Space

The Tactile Void

Physical books offer simple, tactile feedback. In VR, we must replace this with a new language of interaction that feels equally grounded.

Natural Gestures

Developing techniques that use intuitive hand movements and gaze to navigate text, minimizing cognitive load.

Preserving Rhythm

The goal is to maintain the subconscious "flow" of reading. Interactions must be satisfying but invisible.

Dingler, T., Li, S., van Berkel, N., & Kostakos, V. (2020, December). Page-turning techniques for reading interfaces in virtual environments. In Proceedings of the 32nd Australian Conference on Human-Computer Interaction (pp. 454-461).

Multi-Sensory Narrative Immersion

Amplify narrative transportation in VR fiction reading by leveraging environmental and visual cues beyond the text itself.

Resonant Cues

Environmental cues (fog, sound, light) must resonate deeply with the narrative content.

Spatial Progression

The physical journey through the virtual space mirrors the narrative progression of the story.

Support, Not Dictate

Visual and auditory elements are there to support the imagination, not replace it.

Reader as Creator

The reader remains the primary creator of mental imagery; the VR world is merely the canvas.

Future Reading Experience

Exploring Narrative Transportation in VR Fiction Reading

Author: Po-Cheng Chen
Master Thesis

MSc. Design for Interaction
Delft University of Technology
July 2025
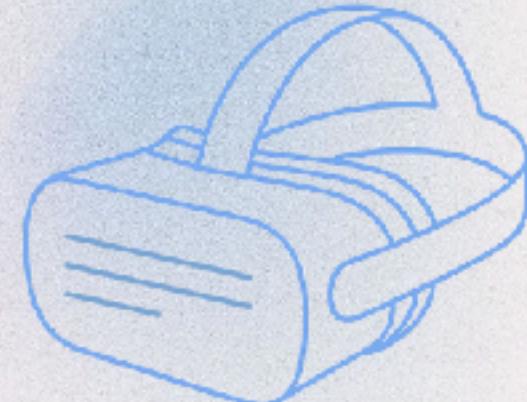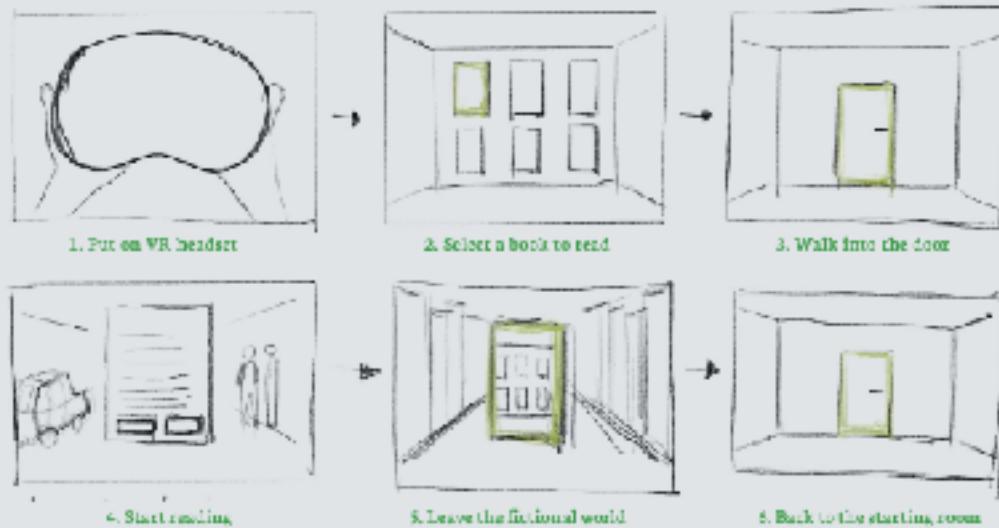
Figure 13. Storyboard Illustrating the Mechanism for Entering and Exiting the Fictional World in VR

Figure 21. Description of the Visual Styles in the Iterated VR Background

Preserving Imaginative Freedom

Too much visual specification: can constrain rather than expand the reader's imagination.

Environment should suggest, not define. Create an atmosphere that resonates with the text without dictating imagery.

The most powerful experiences honour the reader as the primary creative force, using sensory cues to support and amplify that act.

Po-Cheng Chen: Future Reading Experience. TU Delft, 2025.

The Ultimate Language Model

The Human Mind

Training Data

The Written Word

Reading hones its ability to simulate, empathise, and think critically.

Processing Engine

Active Imagination

The human mind creates and holds entire universes.

Goal

Amplification

We should build XR systems that give this innate faculty a more expansive space to play, rather than dictating it.

Spatial Reading Design Principles
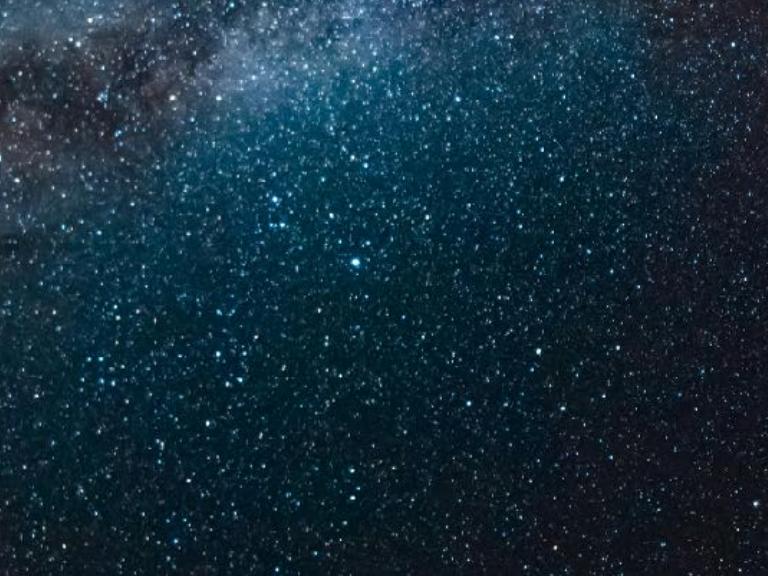
01

Comfort as Foundation

Physical comfort is the prerequisite for cognitive engagement.

02

Spatiality as Enhancement

Leverage VR's spatial nature to integrate text into the world.

03

Embodied Interaction

Natural interactions allow for an embodied reading experience.

04

Attentional Design

Guide focus without disorientation or overbearing.

05

Environmental Inkling

Cues support narrative transportation when in service of reader's imagination.

06

Imaginative Preservation

Maintain space for the reader's imagination to flourish.

Bedankt voor uw aandacht!

Tilman Dingler

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