

Embodied Dialogue: Measuring Presence in XR

Context

Studies on Zoom fatigue highlight how the absence of embodied cues in traditional video conferencing can lead to cognitive overload and social disconnection (Bailenson, 2021). Despite extensive investment in XR solutions, telepresence as a response to this gap, evaluations of UX remain technocentric—focused on visual fidelity and system performance, while overlooking the embodied, affective dimensions of presence that underlie the potential trust, connection, and relational depth it could generate. New holographic platforms promise more immersive experiences; however, there is still no validated framework for measuring the felt sense of presence, and increased trust (Slater & Sanchez-Vives, 2016; Petitmengin, 2006; Gonzalez-Franco & Lanier, 2021).

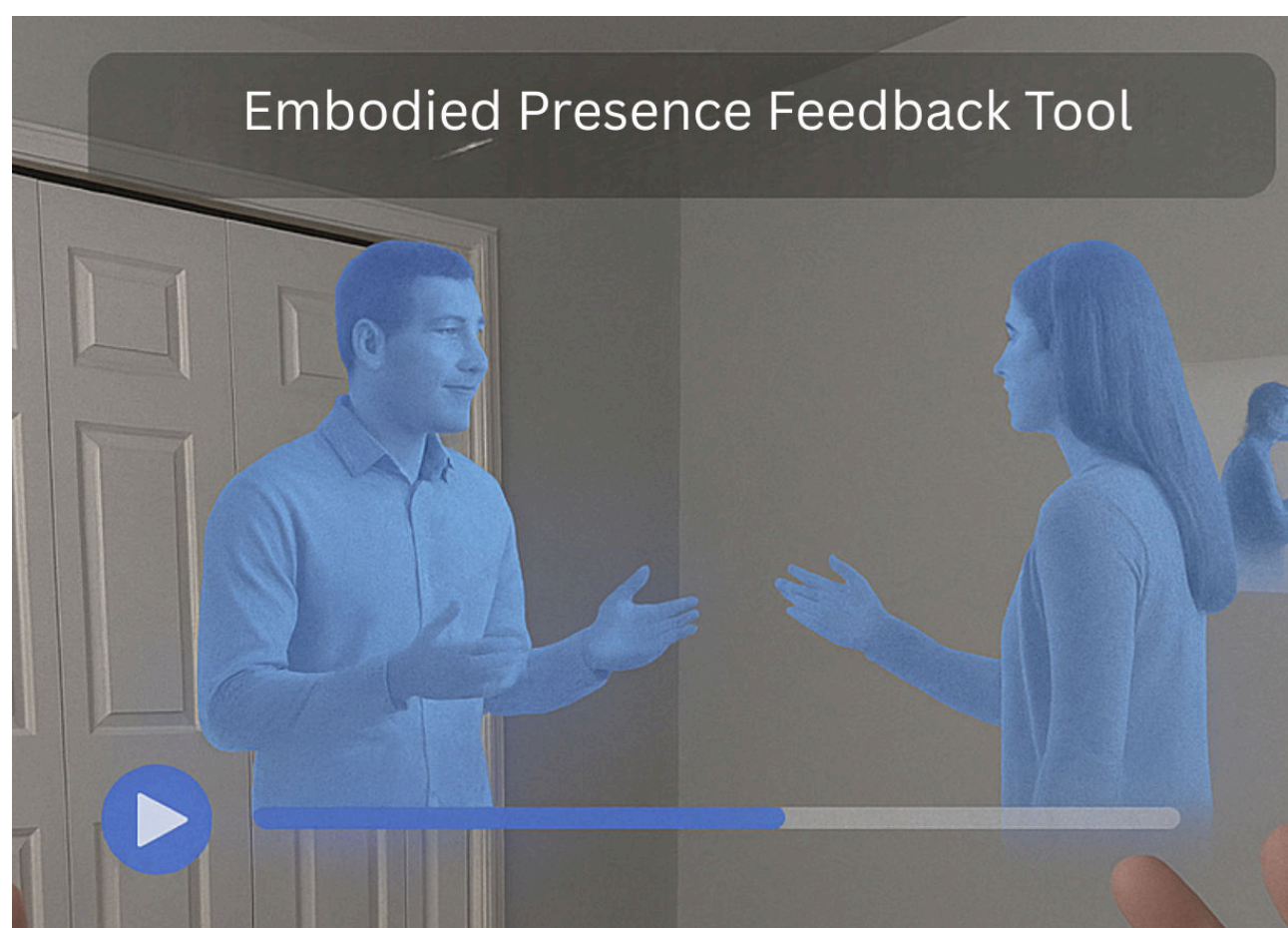


Fig 1: Embodied Presecne (OpenAI)

Embodied Presence

Merleau-Ponty's phenomenology of perception (1945/2012) views the body not as a passive receiver of information, but as an active participant in relational meaning-making. Rather than simply feeling immersed in a virtual space, embodied presence is a lived sense of being physically and emotionally "there" with others, grounded in bodily perception, gesture, rhythm, and shared attention. Similarly, Petitmengin's micro-phenomenological methods offer a structured way to surface pre-reflective dimensions of experience—those subtle but significant shifts in awareness that often go unnoticed in conventional tools.

References

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Approach

The Embodied Dialogue research addresses the aforementioned XR-design feedback gap by proposing a user-centered evaluation tool and framework to assess embodied social presence and its effects on relational trust (a subset of the latter) in XR-mediated human-to-human conversations and shared activities. **To achieve this, we combine qualitative and experiential methods to capture prereflective, moment-to-moment indicators of embodied presence, social presence, and relational trust.** By doing this, we aim to advance a more human-centered ethical design for XR, one that prioritizes the quality of connection in this emerging medium.



Fig 2: Social Presence (OpenAI)

Social Presence

Social presence is the felt sense of "being with" another person that occurs when people experience genuine connection through embodied cues, such as mutual awareness, emotional attunement, and shared intention. It supports relational trust, interpersonal understanding, and psychological safety (Kim et al., 2018). Unlike mere co-location, social presence operates at a pre-reflective level, creating an authentic encounter before participants are consciously aware of it (Merleau-Ponty, 1945). These findings resonate with Cummings & Bailenson's (2016) meta-analysis, which found that presence is not only a product of visual immersion but also of interpersonal dynamics. Our goal is to understand these dynamics as they are precursors to embodied dialogue and the development of trust in XR environments.

Tool

We propose a lightweight, scalable, open-source feedback tool to support embodied evaluation in XR. Grounded in phenomenolcal methods, we are suggesting and integrating the following indicators:

Indicator	Description	Measurement
Embodied Presence	Sense of being physically and emotionally "there" while maintaining connection to both virtual and real body	Self-reporting scale (5 items)
Social Presence	Felt alignment and empathy during XR interaction with sense of "being with" another person	Self-reporting scale (5 items)
Relational Trust	Sense of psychological safety, interpersonal trust, and confidence in XR technology to facilitate authentic interaction	Self-reporting scale (5 items)

Tab 1: Indicators (Embodied Dialogue)

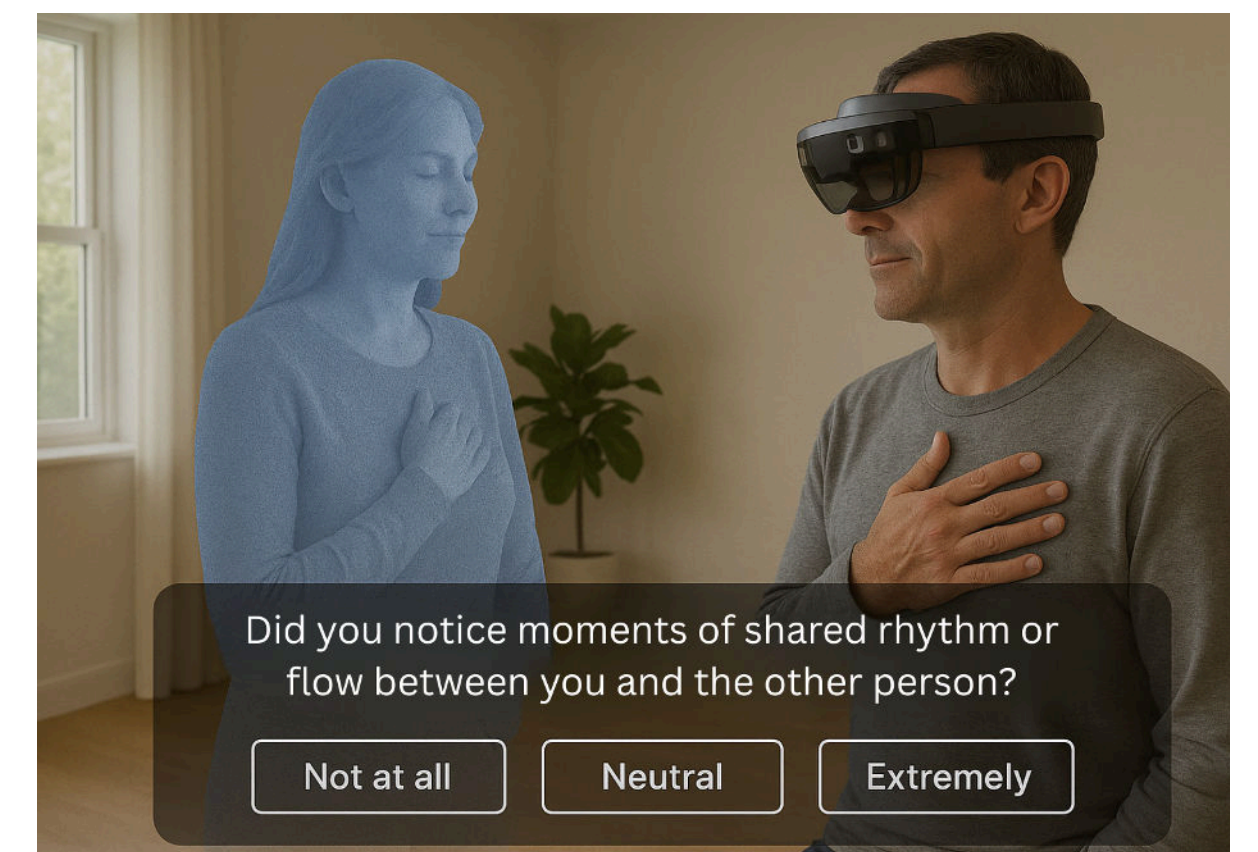


Fig 3: Relational Trust (OpenAI)

Relational Trust & Ethical Design

Our working hypothesis is that embodied presence and social presence give rise to relational trust—qualities that are felt and sensed in relation (McCarthy & Wright, 2004; Petitmengin, 2006). Framing and designing holographic communication as a medium to cultivate relational trust is to align future XR development to foster more humane, reconnective digital spaces (Fuchs, 2020; Slater, 2022).

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