


# Embodiment in Virtual Reality: The Body, Thought, Present, and Felt in the Space of Virtuality

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## ABSTRACT

Virtual reality (VR) has been a prominent idea for exploring new worlds beyond the physical, and in recent decades, it has evolved in many aspects. The notion of immersion and the sense of presence in VR gained new definitions as technological advances took place. However, even today, we can question whether the degrees of immersion achieved through this technology are profound and felt. A fundamental aspect is the sense of embodiment in the virtual space. To what extent do we feel embodied in virtual environments? In this publication, the authors present works that challenge and question the embodiment sensation in VR, specifically in the artistic aspect. They present initial reflections about embodiment in virtuality and analyze the technologies adopted in creating interactive artworks prepared for galleries and theater stage, questioning the sensations caused by the visual embodiment in virtual reality under the perspective of both the audience and the performer.

## KEYWORDS

Embodiment, Media Art, Performance, Virtual Reality

## INTRODUCTION

Presence concept is relevant as a mediating variable between experience and induced emotions, and Virtual Reality (VR) is an effective mood induction medium, opening its possible use in different applicative areas ranging from the well-being industry to clinical psychology (Riva et al. 2007). Both affective and immersion content affect the sense of presence, and this sense in the non-emotional environment depends mainly on immersion (Baños et al. 2004). Even if the sense of presence is a central but widely contested concept in VR and has been the subject of significant debate (McRoberts 2018), new advances in technology, combined with human factors research, represent new possibilities to test new explorations. It is often assumed that greater immersive quality levels elicit higher levels of presence, in turn enhancing the effectiveness of a mediated experiences (Cummings and Bailenson 2016). Embodied awareness is physical or emotional and a fusion of experiences that culminate into

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something larger than its parts (Tantia 2020). The sense of agency is provided in virtual reality when the participant's motion is mapped to the virtual body in real-time or near real-time (Kilteni, Groten, and Slater 2012a). Precisely, what distinguishes VR from other mediums and gives it this status as such is a sense of presence: the feeling of "being there" within the virtual experience produced by the artifact (Steuer 1992). In this sense, this "new" medium can be considered quite distinct from other mediums, such as video. Thus, these devices allow us to consider the hypothesis that mediated perception (with a tool) and non-mediated perception (with a sensory organ) follow similar mechanisms of appropriation (Auvray et al. 2005). Sense of embodiment in VR meaning has also matured with the evolution of interaction devices that transport users to new worlds beyond their physical space, in fields such as medicine (Riva, Wiederhold, and Mantovani 2019) (Alzayat, Hancock, and Nacenta 2019), psychology (Slater et al. 2010), ethics (Slater et al. 2020), science and art (Moura and Kolen'ko 2019), perception (Waterworth and Waterworth 2014), and artistic performance (Moura, Barros, and Ferreira-Lopes 2020a). Mel Salter states that VR is a technology that seems ideally suited to tackle research on induced embodiment, where the sense of agency depends on the synchronicity of visuomotor correlations (Kilteni, Groten, and Slater 2012b). When the stimulus is perceived as directed toward oneself, the brain network that encodes the bodily self and its surrounding space is more strongly synchronized across participants (de Borst et al. 2020). Because VR is able to immerse a user so fully in an experience, providing a range of sensory stimuli, it is an ideal platform for recreating embodied situations, empowering empathy (Wiederhold 2020). For the philosopher Don Ihde, the relations of embodiment occur in a context of use, in which it is possible to perceive the world through the instrument. This technology's effects are revealed in the alteration of human perception; it must be technically (physically) transparent, integrating with the bodily sensorium (Alves 2009). According to Ihde (2002:xi), the body may have three meanings, which we will try to consider: *Body First* – in phenomenology, Ihde sensitive body, of a perceived, emotional and moving being-in-the-world; *Body Second* – is also necessary to consider the experience of the body in the social and cultural sense; and *Body Third* – technology is a third dimension that crosses the *body first* and *second*. Expressing it differently, the first body is the living existential body, the here-now bodily experience, the sense of the body deduced by Husserl as *Leib*, but much better descriptively developed by Merleau-Ponty as the *corps vécu* (Pires et al. 2021). The *body first* is the oriented, active, perceptive being-body, through which we experience the world around us. Experience-as-a-body is a constant of all our experiences (Ihde 2002:69). As important as perceiving, from the body, the surrounding universe, is to notice that this same experience produces self-perception of ourselves as a zero point, coincident with our body perception. As Ihde explains, phenomenologically speaking, the invariant perspective on the world is reflexively pointing out the ways in which this same world 'points back' to the null point of each person's body position. It is relevant to note that Ihde points out the importance of old devices, such as glasses, a hammer (Heidegger), or even long-feathered hats (Merleau-Ponty), productive of the extension of the senses of the body and self-perception. In a way the questions currently posed by virtual reality and intelligent machines will not be very different (Pires et al. 2021).

In a virtual embodiment, at the unconscious level, memories and mental representations may be extended out from the physical body onto technology, blurring the physical and the mediated (Bailey, Bailenson, and Casasanto 2016). VR is more radical by exchanging the normal perceptual environment with a completely virtual one (de Gelder, Kättsyri, and de Borst 2018). Of the definitions found in the last decades, VR, generally, can consist of three types of sub-systems: a) virtual environments presented on the screen, b) environments based on multi-projection rooms (CAVE systems), and c) visualization devices placed on the heads of people designated as Head Mounted Displays (HMDs) (Steuer 1992)(Gigante 1993)(Cruz-Neira, Sandin, and DeFanti 1993)(Swanson 2007)(Mazuryk and Gervautz 1999)(Grau 2016). In the 1960s, Morton Heilig (1962) created the Sensorama device, a machine that is one of the earliest known VR technology examples. In the last twenty years, immersive vision devices with sufficient resolution have emerged to visualize generated worlds. We will probably witness a revolution in human interaction with VR technology and the environment in the next decade

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