

**The Experience of Nonmediation:  
Towards an Interdisciplinary Model of “Presence”**

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## **1. Introduction**

The rise of virtual reality technologies has not only advanced numerous applications in business, teaching, medicine and other practical fields, but has also led to new scientific challenges that demand interdisciplinary cooperation. Specifically, both the engineering and the social sciences are interested in the domain of VR, because it is a rapidly evolving technology that offers all-new and unique experiences to its users and, at the same time, allows for new scientific insights into the future of computing as well as the nature of human consciousness, thinking, emotion, and action. While the engineers and scientists involved with VR development seem to report further progress almost each day, communication researchers and psychologists are still trying to understand the way that individuals deal with the new media systems.

The internal state that is (or can be) elicited by using a VR system is usually described as “Telepresence” (Draper, Kaber & Usher, 1998) or simply “Presence” (Lombard & Ditton, 1997). Early Presence research was inspired by the question, if and how individuals would accept a virtual reality as the “real” reality, that is, under which conditions they would think, feel and act in a way that is appropriate to the VR system, but not necessarily appropriate to their real physical environment. In turn, the quality of a given VR system was defined by its capability to induce such Presence experiences. Advances in VR technology were therefore evaluated according to the quality and stability of “being-there”-experiences that were reported by their users, and Presence researchers tried to find out about the (technological and human) factors that caused these experiences as well as the effects of these experiences on other psychological processes, such as learning (e.g., Tammelin, 1998) or the overcoming of psychological problems (e.g., Binik, Cantor, Ochs & Meana, 1997). Such research promises to allow for innovative and more effective applications of VR systems in existing and new domains.

However, contemporary Presence research can be characterized by one major structural problem, as it lacks a common theoretical basis that is widely accepted and has proved to be useful in the different areas of fundamental and applied research on Presence. The absence of such a general theoretical framework is partly due to the highly diverse backgrounds and orientations of Presence researchers. The theorizing about Presence as a phenomenon of non-mediation has been conducted within very different communities that were more or less “unconnected” to each other, such like engineers and technology experts, neuro scientists as well as social scientists, such as psychologists and communication researchers. We believe that the structural problem should be solved through a stronger orientation towards interdisciplinarity. Social scientists can certainly gain new insights by debating with engineers and system developers, and in turn, the technology experts may benefit from social scientists’ experiences on how users would deal with their applications. Furthermore, neuro scientists should be able to find neurophysiological and neuropsychological correlates of the different concepts of nonmediation that have been generated by the community of social scientists. Our presentation tries to establish such new interdisciplinary connections between engineering, neuro psychology and social sciences related to VR and Presence. We suggest a model of Presence experiences that aims to unify the theoretical grounds of Presence research, thus supporting applied research both in technology development and VR usage.

The model is the product of an international collaboration in Europe and has been constructed upon experiences from psychology, communication research, neuropsychology, and VR systems development.

## **2. Towards an interdisciplinary conceptualization of “Presence”**

*Presence as an internal state.* The basic assumption of the model is that the mental state of Presence cannot be produced by high-tech VR media systems only. Individuals can feel a kind of Presence also while reading an “absorbing” book, watching a “nail-biting” movie or

playing a “fascinating” video game. Consequently, the factors that contribute to Presence experiences are not only situated within the media technology, but have to be searched for in the media users’ cognitions, motivations, emotions, and actions as well. However, non-systematic observations of sophisticated VR systems reveal that high-end virtual environments can obviously induce especially high levels of Presence. Of course, technology factors must not be underestimated within an integrating model of Presence. To deal with the partly independence of Presence experiences from technology, we suggest a multi-dimensional conceptualization. VR technology, such as 3D displays, spatial sound, and haptic feedback applications, are external stimulations that are perceived by the system user. These pieces of information are processed and integrated with a wide range of internal data, for example, *memories* of past relevant experiences, *mood*, *motivation* to deal with the content of the system, intellectual *capability* to solve the tasks presented by the system (e. g., following the story line of a novel or moving the functional elements of a robot in a VR teleoperating application), and perceptual-motor skills. Whether the experience of Presence arises during the exposure to a media setting therefore depends on the external stimulation provided by the system *and* the internal condition of the user. For example, a very disgusting or frightening VR environment may make a user want to escape the setting, thus motivating her/him to search for cues of virtuality within the VR setting, which in turn would destroy the Presence experience even if the VR system appears to be “convincing” in technical terms. The model to be presented will consider all these and various other aspects of Presence experiences and put them into a systematic order.

*The role of the media stimulus.* While a great variety of internal processes that contribute and/or belong to a Presence experience can be conceptualised and distinguished from each other, the specific role of VR media technology should be worked out in more detail. For example, it seems quite clear that “realistic” spatial representations in the visual and auditory modality promote the illusion of being present in a virtual environment. However, spatial

illusions may be produced by “absorbing” verbal descriptions as well (cf. Nell, 1988). Do spatial visual presentations make it easier for the individual to feel Presence? Or does the technology induce another quality of Presence experiences? To what extent are the underlying cognitive processes (imagining a room while reading versus “seeing” the room while walking through a VR environment) different from each other? To clarify the connection between external stimulation provided by VR technology and the facilitation of Presence as an internal state promises to lead to a deeper understanding of “how VR works”, thus allowing for a more goal-oriented approach in research and system design.

*The role of interactivity.* Another key question that has to be addressed by an interdisciplinary model is the role of interactivity. A major part of the technological progress in VR design is related to the activities that users are enabled to conduct and the feedback which is delivered by the system. The early video games demonstrated that states of absorption or Presence can be elicited by visually simple media environments that offered a basic task, such as Pong. A continuous stream of activity may therefore be a very powerful tool to induce Presence experiences that does not have to be accompanied by high-end sensory input systems to have the intended impact. Again, the model should be advanced by asking how specific input devices and feedback on user actions are related to the arising and persistence of Presence experiences.

### **3. Outlook**

Of course, the given description is a brief outline of the actual model we would like to present at the ICA2003. The actual model will include and/or differentiate various important phenomenons that are related to a sense of nonmediation, such as involvement, flow, immersion, absorption and spatial and social (tele)presence, as well as neurobiological correlates that underly the phenomenon of Presence.



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