

# Pass and Play in Mixed Reality: Unconventional use of a MR headset as a shareable display

**Chris Elvis Leisi**

Zurich University of the Arts, Immersive Arts Space, Department Game Design  
Pfingstweidstrasse 96  
CH-8005 Zurich  
[chris.leisi@zhdk.ch](mailto:chris.leisi@zhdk.ch)

**Hiloko Kato**

University of Zurich / Zurich University of the Arts  
Rämistrasse 71 / Pfingstweidstrasse 96  
CH-8006 Zürich / CH-8005 Zurich  
[hiloko.kato@ds.uzh.ch](mailto:hiloko.kato@ds.uzh.ch)

**Oliver Sahli**

Zurich University of the Arts, Immersive Arts Space  
Pfingstweidstrasse 96  
CH-8005 Zurich  
[oliver.sahli@zhdk.ch](mailto:oliver.sahli@zhdk.ch)

## Keywords

Social play, pass and play, mixed reality, virtual reality, sharable device

## ABSTRACT

Within the context of “Virtual Reality(VR)”, fluid social play among groups of people is still an unresolved domain. Compared to monitor displayed computer- and board-games, a VR experience offers a sensorily closed-off and socially isolated to strongly mediating experience. Promotional videos for VR headsets from the 2010s, for example, often show several people in the same living room. Only one person however wears the VR headset, while the others watch the video feed of the game on an external screen, only contributing to the game as spectators (Olbertz-Siitonen et al. 2021). The shared social experience is not of the game, but of observing it. To enable collective play, online setups, additional game controllers – for example, in games such as *Keep Talking and Nobody Explode* (Steel Crate Games 2015) and *Acron: Attack of the Squirrels* (Resolution Games 2019) – or multiple VR headsets that enable co-location (Born et al. 2019) are required. Currently, there is another generally underused possibility – that of video passthrough, which, thanks to built in cameras, allows VR headsets to function as “Mixed Reality (MR)” (Speicher et al. 2019) devices. These technologies are less isolating for the user by allowing them to see the real environment and the co-players while wearing them.

At its core, MR Headsets are displays in front of the player’s eyes with spatially tracked input devices. With this technology, game developers are challenged to think about how MR games can be created

Proceedings of DiGRA 2024

© 2024 Authors & Digital Games Research Association DiGRA. Personal and educational classroom use of this paper is allowed, commercial use requires specific permission from the author.

in real physical space, taking inspiration from social- and board games (Tekinbas, Zimmerman 2003, Begy et al. 2017) where only single game elements or controllers are passed around periodically between players to create a social shared experience for a group of people, further described as "Pass and Play (PAP)". Some VR games like *Beat Saber (Beat Games 2018)* and *ForeVR Bowl (ForeVR Games Inc 2021)* include a simple PAP game mode, in which multiple players pass only one headset physically around in order to obtain a higher score. These games, however, utilize PAP neither as a core game mechanic nor do they implement more advanced social and physical gameplay of PAP. This raises three central questions: 1) What game elements and mechanics are needed to support a PAP game where several players can play together with only one MR headset? 2) How can all players be equally informed and motivated about the course of the game, even if they do not always wear the headset themselves? 3) What kind of social realities enables a PAP MR game for a group of players?

In our contribution, we showcase the development and analyse the videorecorded playtestings of the game "Next Player Please"(NPP) that was created with these questions in mind. NPP is a MR game in which the players pass around a single headset over several rounds. While holding the display in front of their eyes, the player with the VR headset is able to see the virtual playground on a physical table that serves as a shared play space. The players take turns to compete in different mini-games built as a social game mechanic. While not wearing the headset, the other players can interfere and influence the active turn by using the second controller. NPP was tested with several user groups (n=590) at game fairs and closed user tests and consisted of surveys, observations, face-to-face interviews and video analyses, which led to the following initial results categorized into active player and opposing player mechanics as well as technical and social mechanics:

- A PAP game should be based on simple and quick-to-learn game mechanics to enable the active player to get into the game as quickly as possible and not overwhelm them.
- MR passthrough allows the activeplayer to continue seeing the other players, which reduces social isolation and increases joint play.
- Auditory sound effects and voice comments via the built in speakers can be used to convey the missing visual information of the game to the opposing players via their sense of hearing.
- Sharing the controllers between the players during the mini-games—one controller for the activeplayer and the second for the opponents—allows the opposing players to interact with the player in charge even without wearing the headset.
- The opposing players can read the movements of the active player and react to them by, for example, deflecting the player's projectiles with a virtual shield on their controller or throwing virtual tomatoes at the active player's head to restrict their virtual vision.
- In addition to the virtual, rule-bound game, there is a social, free game in which the opposing players interact with the active by auditorily or physically distracting them in order to prevent them from continuing to play.

MR games developed for PAP represent a novel, game-changing approach to utilising VR/MR headsets as collaborative, entertaining controllers that blur the border between the real and virtual worlds. Social interaction (Ensslin 2012/Hausendorf 2015) as the playful core of digital games is thus enhanced through this technical and game-mechanical setting, tackling the insightful aspects of "being there together" (Schroeder 2013). The developed mechanics provide a distinctive and collaborative gaming experience, and also emphasise the potential of head-mounted displays as a real and virtual playground and its interactive achievement of the space as such (Hausendorf 2013), rather than just

being an isolating gadget. Consequently, NPP introduces an innovative paradigm for social gaming by repurposing the VR/MR headset into a dynamic and socially situated display.

## REFERENCES

- Beat Games. 2018. Beat Saber. Meta Quest, Steam VR, PlayStation VR. Beat Games.
- Begy, J., Consalvo, M., Scully-Blaker, R. and Ganzon, S. C. 2017. Methodological considerations in the study of tandem play. *Loading...*, 10(16). 149-161.
- Born, F., Sykownik, P. and Masuch, M. 2019. Co-Located vs. Remote Gameplay: The Role of Physical Co-Presence in Multiplayer Room-Scale VR, IEEE Conference on Games (CoG), London, UK, 2019, 1-8, doi: 10.1109/CIG.2019.8848001.
- Ensslin, A. 2012. *The Language of Gaming*. Houndmills: Palgrave Macmillan.
- ForeVR Games Inc. 2021. ForeVR Bowl. Meta Quest. ForeVR Games.
- Hausendorf, H. 2015. Interaktionslinguistik. In: Eichinger, L. (eds.). *Sprachwissenschaft im Fokus. Positionsbestimmungen und Perspektiven*. Berlin: De Gruyter, 43–69.
- Hausendorf, H. 2013. On the interactive achievement of space—and its possible meanings. In: Auer, P., Hilpert, M., Stukenbrock, A. & Szmrecsanyi, B. (eds.) *Space in language and linguistics: geographical, interactional and cognitive perspectives*. Berlin: Walter de Gruyter GmbH Co. KG, 276-303.
- Olbertz-Siitonen, M., Piirainen-Marsh, A. and Siitonen, M. 2021. Constructing co-presence through shared VR gameplay. *Journal of Media Linguistics* 4 (2), 85–122.
- Resolution Games. 2019. Acron: Attack of the Squirrels. Meta Quest, Android. Resolution Games.
- Schroeder, R. 2011. *Being There Together: Social Interaction in Shared Virtual Environments*. Human Technology Interaction Series. Oxford, New York: Oxford University Press.
- Speicher, M. Hall, B. and Nebeling, M. 2019. What is Mixed Reality? In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19)*. Association for Computing Machinery, New York, NY, USA, Paper 537, 1–15.
- Steel Crate Games. 2015. Keep Talking and Nobody Explodes. Meta Quest, Steam VR. Steel Crate Games.
- Tekinbas, K. Zimmerman, E. 2003. *Rules of play: Game design fundamentals*. MIT press.