

Study	Aim	Sample	Study Design	Conditions	Video Game	Video Game Category/Genre	Measures	Main outcomes
Brade et al., (2017)	Comparing a virtual field environment with a real field environment concerning presence, and evaluate its impact on the usability and the user experience of a geocaching game	60 participants (36 female and 24 male), aged between 18 and 30 (M=25.5, SD = 5.67)	2 conditions between subjects	Display: - Virtual reality (CAVE) - Real field environment	Geocaching game	Non commercial	Post gameplay: - ITC-Sense of Presence Inventory (ITC-SOPI) - System Usability Score (SUS) - User Experience Questionnaire (UEQ)	Significant differences in usability were found between the two environments (higher in the real environment); all presence factors correlated significantly with usability in the CAVE, but did not correlate in the real-field environment; concerning user experience, the CAVE showed significantly higher hedonic quality values, whereas the real field environment had higher pragmatic quality values
Buttussi et al., 2018	Investigating the effects of different types of immersive versus non-immersive display on procedural training computer game related to aviation	96 participants (55 males, 41 females), aged between 18 and 36 (M = 23.81, SD = 3.58)	3 conditions between subjects	Display: - Virtual reality with HMD with medium fidelity (Sony HMD) - Virtual reality with HMD with high fidelity (Oculus Rift, Oculus) - Desktop (27-inch computer monitor, Asus)	Serious game simulating an emergency evacuation of an aircraft	Non commercial	Post gameplay: - Questions relative to the informational contents of the game - Custom questions about self-efficacy - Custom questions about self-reported engagement - Igroup Presence Questionnaire (IPQ)	Significant differences were found between the desktop monitor group and the high-fidelity group, in favor of the latter, in both engagement and presence. The training benefits (knowledge and self-efficacy) were not significantly different among display modalities and the effects were still visible after two weeks

Martel et al., 2015	Investigating how head tracking in control schemes for virtual reality games affects player performance and experience	11 participants (10 males and 1 female)	4 x 3 conditions within subjects	Display: - Coupled virtual reality* - Decoupled virtual reality* - Head-directed virtual reality* - Desktop (computer monitor) *Oculus Rift Developer Kit 1 (Oculus)	Team Fortress 2 (Valve Software)	Commercial First person shooter game	Post gameplay: - Game performance measures (time, errors and “kills”) - Custom version of the Immersive Experiences Questionnaire (IEQ), assessing control, cognitive involvement, emotional involvement, and real world dissociation	The desktop display resulted in the highest performance for all tasks except the travel task’s time measure; between virtual reality displays, the coupled one (in which both mouse and head mounted display act as controls) had the highest performance scores for both the jumping and travel tasks, and the head-directed had the best performance scores for the targeting task; virtual reality displays had in general higher immersion scores than desktop modality
Pallavicini et al., 2017	Exploring differences in players’ experience between a first person shooter (FPS) game played in virtual reality and in a non-immersive modality	10 participants (4 females and 6 males), aged between 18 and 35 (M = 26.1, SD = 3.72)	2 conditions within subjects	Display: - Virtual reality (Gear VR, Oculus) - Desktop (iPad2 monitor, Apple)	Smash Hit (Mediocre)	Commercial First person shooter game	Pre and post gameplay: - State-Trait Anxiety Inventory Form-Y2 (STAI-Y2) - Physiological data (skin conductance response and heart rate) Post gameplay: - System Usability Score (SUS) - Net Promoter Score (NPS) - Game performance (total time played and level reached)	As concerns performance and usability, no difference was found between the two conditions; participants showed an increased self-reported state of anxiety only after the virtual reality gameplay, and the virtual reality condition was perceived as more engaging

Pallavicini et al., 2018	To explore differences in usability and emotional activation between a game played in virtual reality and in a non-immersive modality	26 participants (7 females and 19 males) aged between 18 and 35 (M= 22.65, SD = 2.54)	2 conditions between subjects	Display: - Virtual reality (PlayStation VR, Sony) - Desktop (32-inch computer monitor, Samsung)	Resident Evil 7: Biohazard (Capcom)	Commercial Survival horror game	Pre and post gameplay: - State-Trait Anxiety Inventory Form-Y2 (STAI-Y2) - Visual Analogue Scale for Subjective Feelings of Anxiety (VAS-A), Happiness (VAS-HP), and Surprise - Physiological data (skin conductance response and heart rate) Post gameplay: - System Usability Score (SUS) - Slater-Usuh-Steed Presence Questionnaire (SUS-II) - Game performance (the total time played)	No differences in usability, performance or perceived anxiety were found between the virtual reality and the desktop conditions; participants showed an increased level of happiness and a higher sense of presence in the virtual reality condition
Santos et al., 2008	Assessing players' performance in a developed game based on a maze having similar corridors, in which users had to navigate in order to find objects	42 participants (12 women and 30 men), aged from 14 to 40	2 conditions within subjects	Display: - Virtual reality (HMD i-glasses SVGA Pro) - Desktop (17-inch computer monitor)	Game based on a maze	Developed ad hoc	Post gameplay: - Navigation task performance (travel and way-finding)	A global tendency of the players to perform better when using the desktop setup emerged; nonetheless, the group of subjects who stated to rarely play any video game had a better performance using the HMD; finally, subjects generally considered the virtual reality setup to be satisfying and enjoyable
Shelstad et al., 2017	To investigate how virtual reality technology impacts game user satisfaction	40 participants (16 males and 24 females), aged between 18 and 40 (M = 21.5, SD = 4.32)	2 conditions within subjects	Display: - Virtual reality (Oculus Rift, Oculus) - Desktop (24-inch computer monitor)	Defense Grid 2 (Hidden Path Entertainment)	Commercial Strategy game	Post gameplay: - Game User Experience Satisfaction Scale (GUESS), assessing usability, narrative, personal gratification, social connectivity, enjoyment etc.	Virtual reality resulted in a more satisfying player experience (more engrossing, enjoyable, open to creative freedom, and had better audio and visual aesthetics) compared to the desktop condition
Tan et al., 2015	Evaluating user experience of a first person shooter game played in Oculus Rift	10 participants (3 females), aged between 21 and 38	2 conditions within subjects	Display: - Virtual reality (Oculus Rift Developer Kit 1,	Half Life 2 (Valve Software)	Commercial First person shooter game	During gameplay: - Physiological data (skin conductance response and heart rate)	The virtual reality condition was perceived as more immersive and flow inducing, and participants

	head mounted display	(M = 27, SD = 5.9)		Oculus) - Desktop (18-inch computer monitor, Alienware)			<ul style="list-style-type: none"> - Observational data Post gameplay: <ul style="list-style-type: none"> - Semi-structured interviews - Think-aloud sessions - Scores for Flow (FSS-2) and Immersion (IEQ) 	felt heightened experiences and a richer engagement, despite the fact that large head movements were said to negatively affect the game experience; all participants reported to be more in control of the fame in the desktop condition than in virtual reality
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