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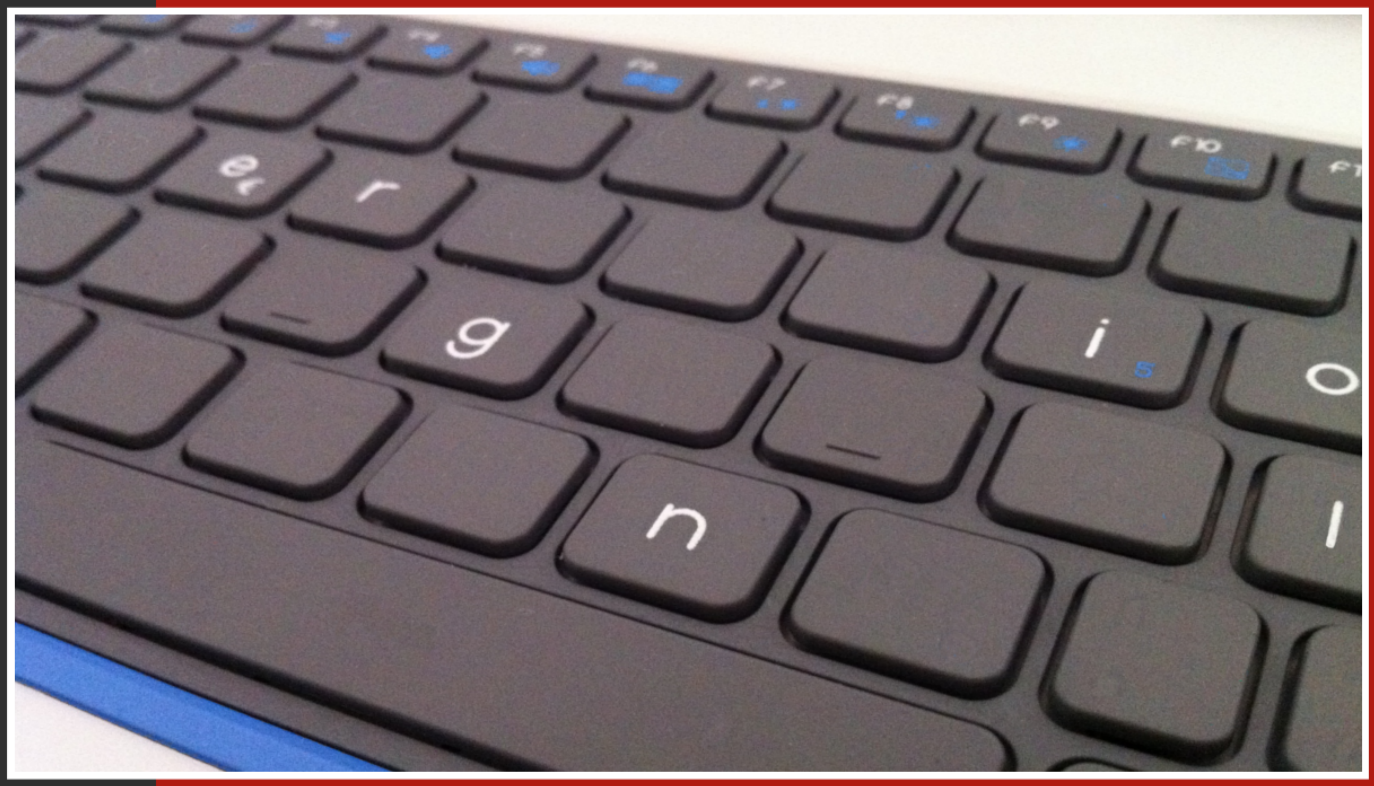

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# VR Mediated Content and Its Influence on Religious Beliefs

Stefan Piasecki


## Abstract

This article discusses technical features and perspectives of current "Virtual Reality" (VR) technologies and their potential impact on religious beliefs. The arising questions should be assessed in regard to the use of hard- and software devices in religious educational contexts. While touching the history of VR only marginally, this article focuses on observations and considerations regarding the players' and users' personality development in the context of their socialization and enculturation. In addition, an insight to VR applications in the fields of education, training and psychotherapy is provided.

Examples of research illustrate that today VR has become more than just a game or a tool for the visualization of objects and spaces. Can the technology, however, be used or applied in religious contexts? Would it give rise to new questions or can old questions be revised to facilitate a different approach?

After a definition of the term and basic functions of VR are provided, perceptional and emotional aspects as well as questions concerning transitions and boundaries that actually exist between *real* and *virtual* reality are discussed.

In individual practice, religiosity is mediated through objects, texts, rituals and community as well as certain expectations of believers, their duties and rights and, of course, through multipliers like clerics or teachers. However, are all of these necessary, existent or even realizable in VR?

Ultimately, a few questions are asked about the different implications of religion in virtuality: how do rules and rites communicate? What is the role of fellowship? How are believers and non-believers depicted in VR? Who is included or excluded?

Although the article cannot provide definitive answers in the face of a rapidly evolving technology, it would like to draw attention to important issues that can be harnessed in religious education and presumably also theology.



## Keywords

VR, virtual reality, religion, beliefs

## 1 Introduction

The real and the transcendental, spirituality and the technically endorsed imagination and also religious communities in comparison to gamer clans make both the contentual and technical possibilities and restrictions in Virtual Reality (VR) apparent. The physical consumerist globalized world of today implies that every new invention is an add-on to simplify life and to enhance experiences of any kind, often without reflecting on the consequences like whether an enjoyable or engaging experience really is a valuable outcome per se or if “fun” elements are truly desirable (Rapp 2017, 396).

VR expands and extends what people have been dealing with since primeval times - namely the visualization of the present, the past, the imagined and the future. VR takes what mankind has developed so far to narrate its beliefs and values to a new level. Campfire tales, ancient heroic epics, stage plays and films were mainly media for “reception” only; they allowed a very limited interaction. VR, however, as it will be shown, informs, entertains, visualizes and most of all binds the individual to the technical framework and its content and gives it an active role. For theology and religious education this leads to a multitude of possibilities to mediate and visualize beliefs. Network technologies cross national and cultural borders and pave the way for decentralized and international experiences through VR. Spencer-Hall compares movies (which are mainly a 20th century technology with roots in the very late 19th century) with medieval hagiography:

> "(...), cinematic spectatorship affords, at times, a (more or less) secular experience of visionary transcendence: an 'agape-ic encounter'. This transcendent experience is functionally identical to the episodes of ecstasy which are the mainstay of medieval hagiography. (...) I attest that our use, enjoyment, and conceptualization of cinema - and more recently, three-dimensional virtual environments online - reflect our enduring preoccupation with those topics which were previously the domain of religion, and thus hagiography. This includes: our fear and anxiety of mortality; our quest to understand the intersection of body and soul (...); the need to know what 'lies beyond' our present reality (...)" (Spencer-Hall 2018, 11).

VR is yet another leap further ahead in terms of the technical and cultural evolution. The author's result, in reference to media, is nothing entirely new. "Last questions" about death, eternity and so on have always been central to humanity's grand narratives. Still, VR is different: VR is a tool of the future for working and socialising and offers a multitude of economic promises. Then again, VR allows the use of such technology also for private social networking, recreation and even spiritual experiences and relief.

It is not only companies and individuals that want to participate in these new socially and economically evolving worlds, but religious communities too. One is reminded of church representations in "Second Life"[1] or attempts to bring churches into "the new media"[2] making corresponding strategy concepts necessary[3], which also led to legal gray areas on top of that (Cosson 2018). Attempts to set up online confession services made clear that new technologies often get used first for established contents and traditional forms of action, disregarding the additional possibilities a new medium provides.

The contradiction does not exist between faith and virtuality - the idea of a Kingdom of God, Paradise, or a better world is not a too different form of a prospected and to-be-experienced virtuality with the demand for realization. The virtual is a constant companion of human evolution and accessible to humans alone.

Therefore, it is not the "Clash of Realities", to modify a phrase coined by Samuel Huntington in the early 1990s referring to political and cultural hemispheres, that is new. What is “new” is that more and more technologies are becoming part of individual identities. Such enhancements for the perceptions of a subject have had no forerunners in human history. Each of these fresh technologies had to be functionally learned from the ground up, understood in terms of content, and accepted in everyday life. While the movie had the stage play as a predecessor, most of the usage of computer technologies seemingly appeared out of the blue, transported by marketing and pop-culture. They are subject to a technically justified "foreigness" which is transferred to the associated social and communicative processes.

An example would be the cave paintings of the Chauvet Cave in France which are in fact a diary, a guide for hunter training, a heroic epic and also a nature documentary all in one. Their mediated messages are future projection and transcendent appeal. Therefore, they are part of the same practice as antique floor mosaics, native American rituals, Islamic and far eastern calligraphy and church paintings as well as religious symbols in video games. Religious subjects and rites as part of oral narration were and are also taught through play, physical games and dances of indigenous people. Johan Huizinga and Roger Caillois reported extensively on the interaction of play, religion and virtuality in the 1930s and 1950s (see: Piasecki 2018, 141 - (German) - or a good English language source: Burrill 2008, pp. 37) before the term "virtual reality" was coined by Jaron Lanier (Stanovsky 2004, p. 175) in the very early 1990s.

After paintings which especially in the Renaissance attended to dying and death in a particularly drastic way, as in Pieter Brueghel, the Elder, ("The Renaissance and Baroque periods

1 https://secondlife.com/destinations/belief, 18.06.2018
2 https: //www.churchofengland.org/digital-labs, 18.06.2018
3 https://ministrytech.com/social-media/how-to-use-social-media-to -really-increase-your-ministry /, 18.06.2018

are in fact a time of increased preoccupation with death": Guthke 1999, 85) followed the technology of photography in the 19th century. Immediately this new visual medium was again used to portray life and death as comprehensively and multi-layeredly as possible in order to let the viewers participate virtually. A stereoscopy from 1863 shows a fallen soldier of the American Civil War in the trenches, almost presented as if on a stage. One does not know his name or his background or the circumstances of his death. He has no grave and no one mourns him anymore, but 150 years later stereoscopy still allows a virtualized notion of the environmental reality of his death (Böger 2010, 112).

Perception of transcendence and cognitive conditioning and processing are, therefore, genuinely work of man and not creations of an ominous "technology". It makes sense that religious contents manifest themselves in the virtual and visualized space: religion conveys itself at most in gestures and rituals, but can hardly be spiritually materialized. With modern digital media ways to transmit and share information of any kind spread. These were and will be commercialized since only the economization secures a technical development and perfection. Fantastic worlds, magic and magical beings and heroes enriched campfire stories and populated easy reads for centuries - today they are important subjects in movies and computer and video games. Their multiplayer option copies functions of social communication that books, comics, and movies could not provide. At the same time they freely use motifs and apocalyptic visions from mostly biblical sources and separate them from their original meaning (Wagner 2012, p. 187) turning them into factors merely for entertainment. Aupers analyzes game content:

> "More than 95 percent is based on the fantasy genre [Woodcock 2009] and virtual worlds display Tolkienesque environments brimming with spirituality, legends, mythical creatures, mysterious forces, and magical opportunities. Players, who play on average more than 23 hours a week [Yee 2006], are totally immersed in this otherworldly environment. (...) Religion, various academics comment, is not just a spiritual or otherworldly enterprise since it has always been embedded in and mediated by material culture – including commodities representing images of Jesus, Biblical scenes or vessels containing holy water [i.e., Meyer and Houtman 2012]. 1 f. (...) A basic assumption in the milieu is that the Self has been socialized in modern values, i.e., external perceptions of how to be, how to think, how to feel and how to act, which leads to feelings of alienation. Underneath these layers of socialization, however, one finds the “real,” “authentic,” “higher,” “spiritual,” or “divine” self that can and should be contacted by every individual. The self is, essentially, sacred and modern people are considered to be gods and goddesses in exile. “We are all gods!,” one of my respondents typically stated. 3 f." (Aupers 2014, p. 1)

The individual, who occasionally feels lost in a commercialized world, has, therefore, the opportunity of visiting alternative worlds in addition to existing real and spiritual worlds offered by established religions and confessions, where s/he can realize her/himself as s/he likes according to her/his individual self-conception. VR worlds are one option among many. Gamers can develop their own social environment within the world of the game(s) and are not completely bound to geographical conditions of the real world. Nevertheless, they are only experiencing transitions in space. They can never be fully present in virtuality. Acting in virtuality does not become a "colonization", one cannot really own (or inherit?) property (except by buying digital items and maybe estates by performing microtransactions resp. buying digital content). The VR always remains only a pseudo space. Online players can not use every single place in the game for themselves. As in reality, there are governed and locked spaces that can not be changed. A virtual lake can probably be used for diving but can not be filled with soil as one might wish, while boats can not be built unless this was intended by the developers. Man cannot change the virtual world with his own hands. The "reality" in the VR thus remains "virtual" and yet it is taken "really" seriously.

## 2 Virtual Reality - Terms and Definitions

The terms Virtual Reality, Augmented Reality and Cyberspace label forms of additions to reality that can be used for a variety of purposes - in education as well as for entertainment. They are used by architects, vehicle manufacturers, the military, medical practitioners, psychotherapists and many more:

> ”Virtual Reality is a complex user interface that includes simulations in real time through multiple sensorial channels. These sensorial modalities are visual, auditory, tactile, olfactory, etc.” (Burdea & Coiffet 2003, cited by Soares / Rebelo 2017, 360)

This shows that VR is both immersive and interactive requiring appropriate user behavior. Virtual Reality is immersive because users use technical accessories to enter an otherwise inaccessible artificial environment that presents itself to the individual senses as an extension of their own reality. VR is interactive because it is not just a series of automatically played animations. Users are actively engaged into the processes, changing them, and then reacting according to the returns of the system. They can pick up objects or knock them down, change layouts and much more - the VR responds in real time.

The central concept of "virtual reality" was first described in 1991 by Jaron Lanier. Lanier foresaw the benefits of VR, especially for private users, from the beginning. This explains why VR meanwhile has become an overall cultural concept (Biocca / Lanier 1992, pp. 152).

The technology has been evolving since the early 1990s and VR is already being used in a variety of fields although, according to the “Gartner Hype Cycle”, VR as a consumer product is still at the very beginning of market penetration. After the innovative start-up phase and the first grand "Peak of Inflated Expectations" AR and VR are currently still in the "Trough of disillusionment", VR being already moving into the "Slope of Enlightenment". Before a mass market can be installed, some time may pass (Gartner 2017), analogous to the big and heavy "Brickphones" in the early 1990s. They reached their peak in the mobile communications sector not earlier than 15 years later, with the introduction of smartphone technologies.

The goal of VR/AR technology is to make the user's experience exceed the actual space and by doing so dissolve the boundaries of perception.

It focuses on the aspect of interactivity which means the users’ ability of getting engaged in depicted environments and processes for the purpose of modification. This leads to an "eroding physical place" (Traxler 2010, 104). Heim in 1993 (pp. 109) already defined seven different virtuality concepts: Simulation, Interaction, Artificiality, Immersion, Telepresence, Full-Body Immersion and Network Communication. Today, visual and immersive VR and AR applications are roughly distinguished but in the face of technical developments the boundaries are getting blurred:

Immersive Systems: applications that want to or have to appeal to as many senses of their users as possible, in order to break down the barrier of a screen’s two-dimensionality, trying to completely seal them off from the potentially disruptive outside world. This includes classic applications where users wear VR glasses: "Dreams (...) may be one of the best, and most familiar, comparisons for virtual reality" (Stanovsky 2004, 171).

Window on the World: the three-dimensional environment is entered and viewed through a "magical window on other worlds" (Stanovsky 2004, 168), usually a PC monitor as in most 3D games.

Video mapping: using this technology, user movement is broadcasted to a screen. The motion games of Nintendo´s Wii console (released 2006) fall under this category, basically already envisaged in a conversation between Biocca and Lanier in as early as 1992: "So, you can almost picture a situation where you can learn a variety of new cognitive skills, where you're changing the sense of what you're doing, and the inferences you're getting from what you're getting back from the environment" (Biocca / Lanier 1992, 162).

Telepresence: connects signals from the real and virtual world, giving the impression of being in a different place. A videoconference in close-up, which gives the impression of a direct

conversation, is considered as such. Likewise, the help of a hotline employee who has remote access to functions of a faraway user's computer and then controls the mouse pointer almost like a "ghost hand" (Stanovsky 2004, 169). Burrill also discusses the split of corporality in more than one actual "presence": "In some ways, telepresence is the Cartesian mind / body split made real (and then made unreal), the mind reaching across vast spaces, becoming tangible in the form of robotics or prosthetics or, as Virilio points out, as signs. In essence, whenever we log on, we experience (through the spatial cues of the browser) telepresence, as if we are traveling to somewhere and performing some kind of work" (Burrill 2008, 96).

Augmented or Mixed Reality: Data from multiple sources can be simultaneously retrieved and presented to a user in order to perform actions in reality and real-time, while these actions alter the flow of data at the same time which then again influences the user's actions. The work of a surgeon who receives patient data and other visual representations via AR glasses during the operation falls in this category. Similarly, the work of an archaeologist who uses artifacts within a virtual environment to decode its function (Théophane, Nicolas / Gaugne , Ronan / Tavenrnier, Cédric et al., 2015, 273) could be another example.

*Figure: Use of VR in archeology (ibid., 273) (Picture: © R. Gaugne, IRISA)*

VR applications put users right into a new reality or rather new contexts. This can happen by means of a so-called "headset", meaning a pair of glasses which completely shuts off the visibility range and fills it with new images. In some cases the aural sense is sealed with headphones correlatively. This makes users vulnerable in real space, because the bulky headset is limiting their sight and movements but allows a more immersed access to the virtual space. Within this graphical environment, however, the user is utterly free and can perform functions using various input devices (similar to joypads, data gloves, etc.).

In a CAVE (Cave Automated Virtual Environment) setting, the user is inside a specially arranged room which is partially adjusted to the expected virtual reality. In order to treat phobias some areas might be equipped accordingly and for example be fitted with the replica of a bridge railing. In some caves, images or animations are projected onto the walls the user has to respond to, as when using a CAVE training system for firefighters (Backlund / Engström / Gustavsson / Johanneson / Lebram / Sjörs 2009).

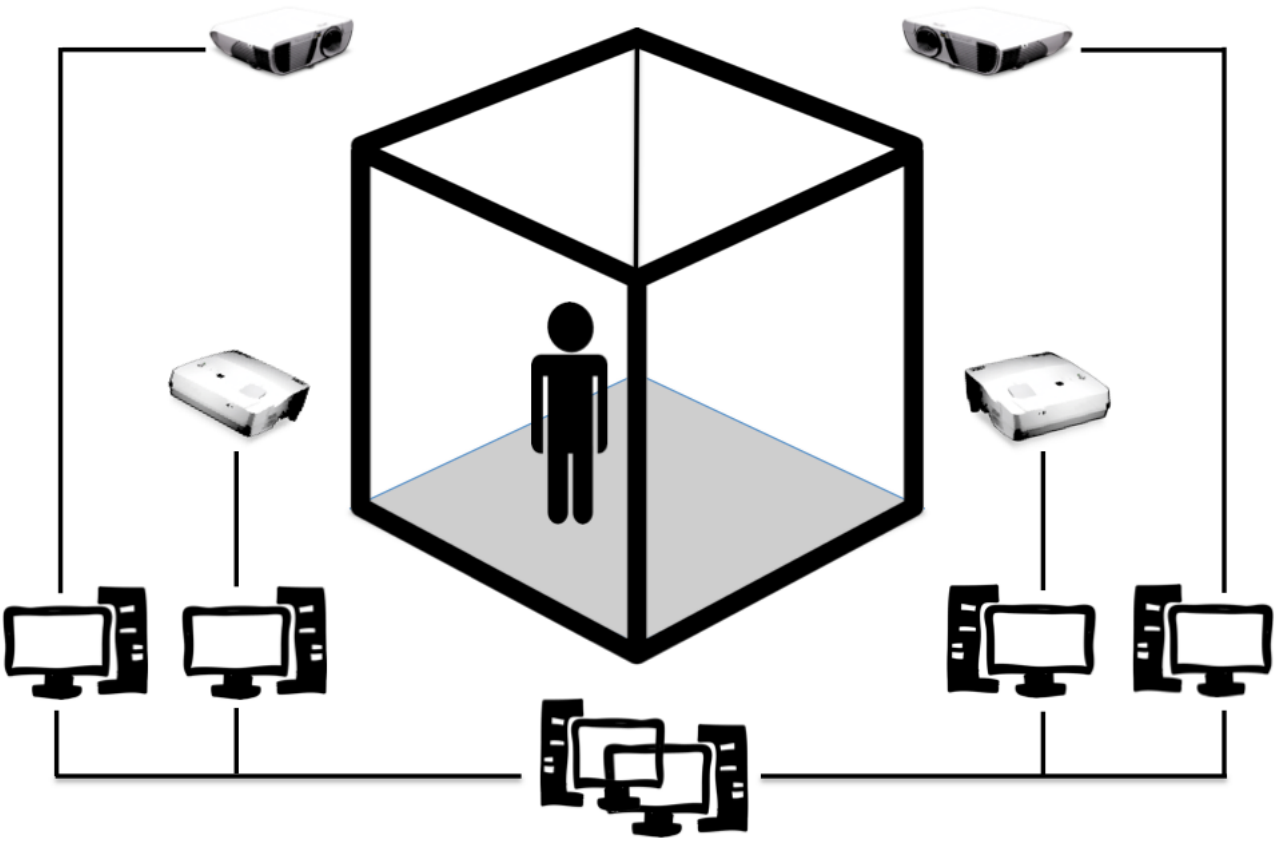


*Figure: CAVE setup (Illustration: Piasecki, inspired by Backlund et al.). The user is surrounded by image projectors, which depict the modified environment in a in a computerized manner based on the user's actions*

Augmented reality overlays perceivable reality with new experiences. In the case of AR glasses like "Google Glass", information is projected into the field of view. If a user passes a restaurant, images of the interior or menus and comments of previous customers can be displayed. A well-known example of AR methods is Pokemon Go. Here, players can use their smartphones to see objects that are tied to specific GPS data and only appear on the display of the mobile device.

*Figure: The non-real cartoon character is projected via the smartphone display into a real environment (Picture: Dimitar "Mix" Mihov / KeongDaGreat / Shutterstock, Inc.)*

The basic idea of a VR was first described in Stanley G. Weinbaum's short story "Pygmalion's Spectacles", a science fiction novella from 1935. Here, the author invented a method for experiencing artificial worlds, smells and touches through holographic aids. The fictional first impressions of putting on a VR headset described over 80 years ago are surprisingly close to the sensations that can be experienced today:

> "There was a moment of chaos. The liquid before Dan's eyes clouded suddenly white, and formless sounds buzzed. He moved to tear the device from his head, but emerging forms in the mistiness caught his interest. Giant things were writhing there.
>
> The scene steadied; the whiteness was dissipating like mist in summer. Unbelieving, still gripping the arms of that unseen chair, he was staring at a forest. But what a forest! Incredible, unearthly, beautiful! Smooth holes ascended inconceivably toward a brightening sky, trees bizarre as the forests of the Carboniferous age.
>
> Infinitely overhead swayed misty fronds, and the verdure showed brown and green in the heights. And there were birds—at least, curiously loving pipings and twitterings were all about him though he saw no creatures—thin elfin whistlings like fairy bugles sounded softly.

> He sat frozen, entranced. A louder fragment of melody drifted down to him, mounting in exquisite, ecstatic bursts, now clear as sounding metal, now soft as remembered music. For a moment he forgot the chair whose arms he gripped, the miserable hotel room invisibly about him, old Ludwig, his aching head. He imagined himself alone in the midst of that lovely glade. "Eden!" he muttered, and the swelling music of unseen voices answered.
>
> Some measure of reason returned. "Illusion!" he told himself.
>
> Clever optical devices, not reality. He groped for the chair's arm, found it, and clung to it; he scraped his feet and found again an inconsistency. To his eyes the ground was mossy verdure; to his touch it was merely a thin hotel carpet" (Weinbaum 1935, p. 6).

The very first word the fictional viewer in the novella uttered at the sight of the new world, sharing it with the readers as witnesses of the first emotions in the face of VR ever, is striking here: "Eden". The crossing into the new world is evidently involuntarily equated with a religious experience of transcendence— the glimpse either of paradise or maybe the afterlife— *before* it is understood as an extension of the individual and personal reality that it actually is.

Starting in the early 1960s, the first devices for public use within the leisure sector were tested, which, combined with auditory and visual stimuli, odors, and fans, supported the visual impressions of images. Unfortunately devices like Morton Heilig's "Sensorama" failed to have significant commercial success (Brookwell 2016).

Other systems focused on very specific effects only, such as Universal Pictures' "Sensurround" technology used for the films "Earthquake" (1974) and "Battlestar Galactica" (1978), which literally shook the movie theater (Konow 2013).

Other historical precursors included oversized and wall-filling images, which, as in the case of the newly created "Atlanta Cyclorama"[4], showed battle scenes in a giantic scale to appropriately display the military course of a fight. The intention was that the presentation would be absorbed as a truly "immersive" experience.

4 http://www.atlantahistorycenter.com/ explore / destinations / atlanta-cyclorama, 20.06.2018


*Figure: "Atlanta Cyclorama" on the Atlanta History Center´s webpage (Screenshot: Piasecki)*

Different methods and concepts to represent a virtual within a physically real reality can be distinguished. VR is an oxymoron since "Virtual Reality" also contains the contrasting "Real Reality" within itself.

## 2.1 VR in use

VR's cyberspace is a space consisting of artificial "narratives" (processes, methods) and "images" (objects, subjects, functions). However, unlike two-dimensional images or texts such as manuals, they need to be self-explaining to the user, make its functions immersively plausible and include social functions to connect multiple users (Sherman / Craig 2003, p. 17).

This description matches Heim's basic definition of a VR as a *Triple-I* realm of experience: Information *Intensity, Immersion and Interactivity* (Heim 1998, p. 7). This means that the user of a VR environment acts "embedded" and also "interactively" with the elements of the (virtual) environment. The user is an integrated part of the information system. Almost 20 years later Heim wrote:

> "(...) bodily sensations might also become data. If a sensation can be noticed, why not digitize it? Why not have it represented in the virtual world just as we represent musical tones in binary digits? As components of the ego's experience, why not add physical sensations to the map of virtual worlds?" (Heim 2017, 165).

In contrast, the Internet browser on the real world screen would also be an information set, but the user does not abandon "his" reality. For Straaten the four components *Purpose*, *Participant*, *Medium* and *Content* are keys to the content design of an effective VR (Straaten 2000, 2-1). The "participant" has a "purpose" to apply or change the "content" within the "medium". The number of contents (Range), the efficiency of the technical design and graphics performance (Speed) and the form of the interaction options (Mapping) decide on the overall credibility of the (thus) described space for the user who is at the same time physically and mentally present. The earlier mentioned state of "Telepresence" is underlined by Steuer to put emphasis on the factor of "Presence":

> "In unmediated perception, presence is taken for granted: What could one experience other than one's immediate physical surroundings? However, when perception is mediated by a communication technology, one is forced to perceive two separate environments simultaneously: the physical environment in which one is actually present and the environment presented via the medium. (...) Telepresence is defined as the experience of presence in an environment by means of a communication medium" (Steuer 1992, p. 75).

Especially the credibility of “telepresence” or of “immersive embedding” should be considered more closely depending on the application. A learning environment that is supposed to represent a complex environment as realistic as possible must place more importance to appealing to all senses than the virtually tangible representation of the function of an engine. In this case, additional information components that distract user’s attention from the pure object would be even counterproductive. An example would be what the game manufacturer UBISoft has done with its highly realistic action game “Assassins Creed Origins”. Based on the game, a "Discovery Tour" version was created, with the in-game missions being removed, allowing players to examine Ancient Egypt and learn about it in an environment that feels very much like a game (Hardawar 2018).

For video games, credibility is one of the most important factors. Large, almost unlimited three-dimensional worlds that human players can discover and submit to have always been the dream of gamers and game developers alike. Although the early systems were technically still very limited, the success of Nintendo's Wii console showed the willingness of players to use their bodies and to control its game functions with their movements (mapping).

Recent approaches also aim at evaluating the users' brain activity and adapt the flow of information accordingly[5]. A method that is also used to study the effects of religious states of consciousness.

AR and VR are flourishing in the industrial, educational and, of course, military fields. In the future, devices will be light and flexible enough for everyday use and can be connected to portable devices. The company ODG[6] has been offering such eyewear for professional and military use for years. AR can be connected via several levels of detail such as a pure additional information supply as Google Glass has already offered but also as a reality supplement, with the result that the existing environment is not only expanded, but also visually changed (Levy 2017).

## 3 Current practical uses of reality enhancements

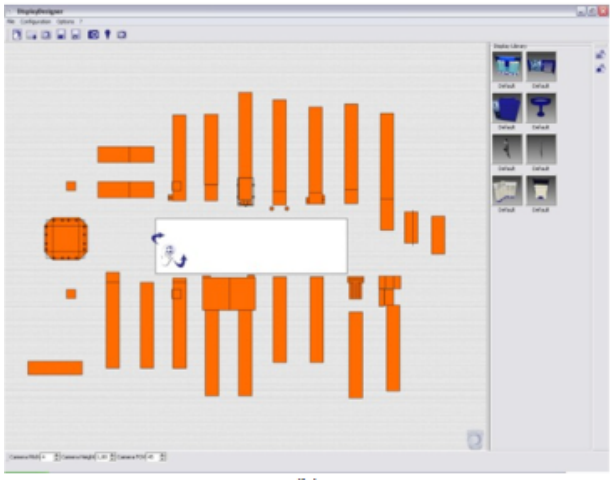
VR and AR techniques are used in many different contexts. At NASA it is used for training, criminology uses it for crime scene reconstruction (van Gelder / Otte / Luciano 2014). Dath discusses the benefits of high-resolution 360-degree views for crime scene reconstruction, which have the advantage of static quality over blurry video. VR could counteract the "flood of information" at the real crime scene, as this could be visited again and again in the VR, without the hustle and bustle of the actual site:

> "Also moving the video camera too quickly over areas with low resolution might result in poor visualization. This is addressed when 360° photos are taken so that they cover the whole crime scene, enabling the user to "return" to the initial scene. VR could thus act as a complement to images and video recordings, aiding the investigation with spatial and holistic information [10] that might be lacking otherwise. VR could also address the issue of excess of visual material existing during an investigation, mentioned by a CI. This could be done by compiling large amounts of visual material in one place. A VR design could thereby act as a complement and compiling tool, gathering all digitalized documentations and putting them in context and correlation to each other" (Dath 2014).

5 NeuroSky Inc.: http://www.neurosky.com, 10.6.2018; Emotiv Systems: http://www.emotiv.com, 10.6.2018
6 Osterhout Design Group - http://www.osterhoutgroup.com/home, 20.06.2018

The consumer goods industry uses the illustrated technologies for the design of retail space (Guidi / Micoli / Casagrande / Ghezzi 2010, 288).


(a)




The question of how technology can influence the will and perception of people is one of the most exciting challenges. The use of VR for crime scene reconstruction as well as for organizing retail space shows that people use virtuality to understand, control, or manipulate other individuals:

> "People often react to virtual experiences as though they were real-world experiences. And it´s this reaction that sets the stage for influence dynamics to play out. Technology innovators have only begun to explore the persuasive possibilities of computer-simulated experiences. This is perhaps the most promising new path for computers as persuasive technologies" (Fogg 2003, 61).

But unlike the “real” reality, the virtual reality can be changed and restarted. However, Fogg also reports the opposite case: to simulate drunk driving, the car ride does not take place in the VR, but in true reality. Instead of a joypad and a VR headset, a modified vehicle, which can be driven both

in "normal" as well as in "drunk driving mode", is used. The vehicle reacts unpredictably and with the tools and sensations of real reality, which lets the sober driver experience the quality of driving in a drunken mode (ibid., pp. 79).

Museums like the British Museum[7] or the American Museum of Natural History[8] use the technology for virtual tours - whereby it has to be noted that both museums selected a different partner from the industry, whose products (Oculus eyewear in the case of the British Museum, Google at the American Museum of Natural History) are featured. Nevertheless, Rae / Edwards (2016) after an evaluation of the British Museum reported that the immersive experience was highly welcomed and a learning effect was recognizable and that prior to their visit many potential visitors found the technology itself interesting enough to become interested in the museum:

> "On review, the evaluation from the Virtual Reality Weekend suggests a VR environment helped the family audience to understand the Bronze Age, a complex part of the British Museum's collection, and that VR environments are of value to understanding our collection objects. Feedback and visitor demographics show that Samsung Gear VR headsets were a particular draw for teenagers and adults and that many visitors saw value in using the headsets alongside interacting with handling objects to learn about historical periods" (ibid.).

Even the evacuation of aircrafts can be practiced and optimized using VR methods. Chittaro (2012) reported on the attempt to simulate the aircraft evacuation as a "serious game". While this is not a CAVE VR environment according to the reported definitions (the control was done on a PC using a standard keyboard), the results are described as convincing:

> "Overall, the experiment showed that serious games that simulate risk experiences can be a very effective tool for changing attitudes concerning personal safety topics, as well as for learning purposes: just playing a game level for 2-3 minutes resulted in a considerable improvement of users' self-efficacy and knowledge" (ibid., 224).

Out of these described possibilities, those that occur in the social or psychological/therapeutic area are of particular value as they suggest to what extent religious beliefs can be studied, probably in combinatation with methods for brain wave measurements which are known for localizing religious emotions in the brain (see below). The combination of VR/AR by using, for example, the "Emotiv BCI Mind Controller" could provide interesting results by replicating the findings of Newberg and Sayadmansour (see below) with gamers or users of VR environments.

7 https://blog.britishmuseum.org/new-virtual-reality-tour-with-oculus/, 20.6.2018
8 https://www.amnh.org/explore/news-blogs/news-posts/museum-joins-with-go-to-launch-virtual-reality-visits, 20.06.2018

### 3.1 Selected Examples of previous research on the use of VR

Theatrical Performance: An experiment conducted in 2000 sought to find out if the number of stage rehearsals (and the associated costs of travel, stage design, lighting, etc.) could be reduced if actors were rehearsing interacting in a VR space while being instructed by a director. The possibilities of acting out and, above all, showing emotions were technically very limited at the time of testing, but the result is described as impressively positive since the necessity of physical contacts and thus number of rehearsals could be reduced while the actors were still able to get into their roles and integrate into the mix of characters (Slater / Howell / Streed / Pertaub / Gaurau 2000).

Archeology: As it was mentioned earlier in this article, applications with a cultural and sensual relevance to VR/AR are used in archeology. In addition to the restoration of objects and buildings, the psychic effect of lighting, size and acoustics seems to be important for the issues discussed here. Since the impression of sacral objects or buildings as well as of rituals (and their binding and socially integrating effect) is not only a consequence of their meaning for an expression of faith but also the exhibition of authority and power and the way these are shown. With the help of VR it is possible to get a better understanding of them in terms of context than just by means of descriptions or reconstructions (as models) (Cassidy / Robinson 2017). In the context of real-world embedding, for example in the surrounding landscape or in comparison to today, VR/AR replicas make processes of understanding and acceptance easier as have Sierra / de Prado / Soler / Codina shown (2017), in this case even by using the *Unreal-game engine* to let users visit a medieval town and to (virtually) walk its streets.

School / preschool: preschool children suffering from autism were prepared for school with VR technology. Ip, Wong, Chan et al. developed six VR scenarios that were tested with over 100 subjects in a fully immersive CAVE facility. Initial results showed that the children developed significant improvements, for example, in the recognition of their own and foreign emotions and social reciprocity (Ip / Wong / Chan / Byrne / Li / Yuan / Lau / Wong 2016).

Anxiety and Panic Attacks: established game technologies have been used to successfully treat fear of heights (vertigo or acrophobia) (Rothbaum / Hodges / Kooper / Opdyke / Williford / North 1995), fear of flying (aviophobia) or fear of animals (arachnophobia: spiders etc.) (Fogg 2003, 74). Therapeutic approaches using VR/AR in order to treat patients suffering from post-traumatic stress symptoms were also effective (Botella / Quero / Banos / Perpina / Garcia Palacios / Riva 2004).

Social phobias and schizophrenia: The possibilities of treating social phobias with images or real confrontations are limited. The tone of voice and the thereby expressed information as an audio file are only weak indications for people who are afraid of direct confrontation. VR environments or AR techniques can project animated faces on 3D objects /dummies (“virtual agents”) and put audio

to this animation or video, allowing the patient to encounter fearful situations in a safe space and with psychotherapeutic support. After Russell (1994) presented his outcomes at the beginning of the VR lifecycle, Gutierréz-Maldonado / Rus-Calafell and González-Conde (2014), among others, developed new approaches to the field and benefited from previous research endeavours. Still, whether schizophrenia can be treated with computer games is unclear. A literature research of various disciplines dealing with learning and cognitive as well as cerebral processes of change has provided indicators for a possible usability of computer games as a treatment option, but further investigation is required, according to the researchers (Suenderhauf / Walter / Lenz / Lang / Bordwardt 2016, 33).

Emotions/non-verbal communication: Today the recognition and utilization of emotions is possible with off-the-shelf game hardware like Microsoft's Kinect camera. Different states can be detected through posture and facial expression which can then have an alternating effect on the storyline of the game. Peñas and Peinado (2017) studied different postures and emotional states (lacking religiosity).

Their intention was to have the system analyze the player's mood by decoding their posture. These can then feedback into game interactions, dialogues and game situations. Interestingly, given the limitations of the experimental set-up (only a few postures and facial expressions are available, very basic dialogue structures) the test subjects felt that the system could read their minds. Obviously, they clearly overestimated the true capabilities of the system— a discovery that shows that humans still seem to over-estimate technologies eagerly or suspect "hidden functions" (see below). Recent research setups could include and harness data such as heartbeat or pulse.

Motor skills: Abuhashish et al. (2015) researched the influence of emotions on motor skills (although they narrowed it down to "happy" and "sad"). Their goal was to depict realistic emotional states of video game characters. Based on the realization that sad people walk differently than happy ones, they noticed that in most video games the characters' movements do not change no matter how the storyline develops. Their experiment aimed at identifying the player's emotional states and bringing these into movements within the VR space. Basori / Daman / Sunar and Bade (2007) have already pursued this approach. Their arrangement also contained the seven emotions used by Peñas and Peinado (2017) later: Anger, Fear, Disgust, Sadness, Joy, Interest and Surprise (ibid., 28). Future research could also integrate the moods of confidence or faith, which would be of interest for theology and religious education. However, it is necessary to feed hierarchies and architectures of intentions into data processing systems, as Tomasello / Carpenter / Call / Behne and Moll (2005) point out that emotional states result from the balance between intention and purpose (ibid., 677). However, at the same time they are part of culture/interculture— emotions and actions are observed, registered and evaluated against the background of everybody's individual experience of enculturation (ibid., 680). For VR systems and collaborative problem-solving scenarios (whether

in games or educational environments), understanding and accepting the intentions of "the other" are just as important as they are in “real” reality. In this light social awareness can be received and developed in different cultural settings and portrayals.

### 3.2 Thoughts on findings in practical and theoretical discussions

It is obvious that practical acting in a virtual space can treat fears (and phobias) effectively:

> "VR allows structuring therapy like a special and protected environment. The virtual environment is, in fact, a “safe” environment. This aspect of “as if” from VR is of great importance, as it can be considered to be an intermediate key step between the consulting room (completely protected) and the real environment (totally threatening). Multiple situations, difficulties, unforeseen events, errors, dramatic consequences can be practiced; although, “in fact”, nothing happens. In short, the patient feels safe in the virtual situation and, supported by the therapist, can face the feared context at his own pace and without risks" (Botella / Quero / Banos / Perpina / Garcia Palacios / Riva 2004, p. 39).

Rehearsing actions in role-playing games (ibid., P. 40) and repeatable actions can also reduce anxiety and allow the patient to develop new self-confidence through self-efficacy (ibid., 40). This self-efficacy has been regarded as a notably more powerful predictor for acting successfully than merely reflecting on past processes and their assumed continuation into the future (Bandura 1977, 211).

VR could be used not only for treating phobias, but also as a training tool to nudge attitudes and develop behavioral change. It has been used to train doctors who showed lack of empathy when dealing with bad news for cancer patients. Doctors should learn to understand the world from a different perspective. For this they were confronted with everyday situations of cancer patients and had to go through these typical frustrating situations (Fogg 2003, p. 78).

This list is not intended to be complete and can not make any statements on the validity of the procedures and results given by other authors and researchers. However, it points out the steadily increasing importance of VR for more and more fields of human social economics.

The chosen examples of i.e. the psychotherapeutic practice are of great interest in another aspect in the context of the above presented statements. For one, the great confidence in the light of virtual treatment possibilities becomes apparent in the research reports. Botella et al. even go so far as to state that:

> "A few years ago, we already highlighted VR potential in the field of psychological therapies and the facts occurred until now show that said potential was real. All works, carried out in the field of

> psychological therapies, prove that in less than a decade this new tool has shown a remarkable utility for the treatment of many psychological disorders (...). Indeed, nowadays VR is of remarkable use (...). (...) VR has a series of advantages when we compare it with the traditional therapies" (Botella et al. 2004, p. 39).

The results from this as well as other studies seem to confirm this positive expectation, but they are also reminiscent of Joseph Weizenbaum's observations. His very limited Artificial Intelligence program "Eliza" from 1964 attracted the attention of American psychiatrists like Kenneth Colby who were fascinated by the possibilities of using computer sciences and artificial intelligence in psychiatry. Although the program did not actually explain anything but simply replied with more or less seemingly intelligent but pre-formulated queries based on the users' input, quite some psychiatrists believed that a computer-generated counseling would be the future of psychotherapy:

> "Colby believed that there could be a healthy therapeutic relationship between people and a computer program because, although a human therapist is not actually present, the program was obviously written by one" (Turkle 1995, 106).

Weizenbaum rejected these ideas firmly. Fogg later also warned of idealizing technology:

> "(...), the simulation is just another gee-whiz technology experience, not a vehicle for changing attitudes or behavior" (Fogg 2003, 74).

This VR-environments being just at the beginning of its "hype cycle" let us hope for and expect much more effective approaches in the near future.

In terms of religion, the benefit of VR or AR would be, above all, a social one: people could perform rituals together, attend church services or the Friday prayer in selected places, deliver sermons, and come together at freely selectable locations and watch atmospheric or celestial phenomena.

The already tested experiments of connecting motor skills and emotionality also allow further reaching considerations. A VR system can translate mood and brain activities into appropriate landscapes, colors, lights, and symbolic settings of transcendency that may be completely different for each individual participant creating a technically assisted form of mass hallucination that is analyzed and can be controlled with any positive or negative consequences to some extent. Mass panic like in Mecca in September 2015 or suicide, as observed in the past especially in cults (see about the Heaven's Gate, Jonestown or Branch Davidian mass suicides: Lee 2017) would be both preventable as well as transportable.

In turn, theology and religious education could contribute by defining typical behaviors of believers or spiritually touched people, and making them viable for game developers as well as pointing out opportunities and risks from their point of view.

Boundaries can also be clarified and can be crossed deliberately, or borderlines can be made tolerable. Ancient ritualized scenarios of human sacrifices or mutilations like circumcisions can be observed and evaluated regarding their impressions on the spectator in simulation, although measuring and supervising the real reactions of an audience could be interesting too.

## 4 Observations on immersion and virtuality, feelings and emotions

The credibility and relevance of technical environments are of great importance. Users approach technologies often with either a certain skepticism or expectation. Both can, caused by flaws in the design, quickly disappoint high flying hopes (Fogg 2003, 130). Users are willing to open up to technology if they know that the system observes and evaluates individual actions, but is treating all participants equally (ibid., 197). With this being granted, other people do not even have to be portrayed realistically, as long as they are represented as avatars in the VR (ibid., 198).

To go beyond the limitations of the *physical* and *visual* world was also the attempt of religious meditation. Spencer-Hall calls medieval meditation manuals "visionary scripts" which should help the believer to immersely "feel" the life of Christ directly through his/her own imagination.

> "For the skilled, 'visualising becomes seeing'. The ultimate aim of seeing was to become fully present at the moment in which the event occurs" (Spencer-Hall 2018, 193).

Still it should be noted that to date even the most advanced VR systems merely illustrate and do not overcome human biological and cognitive limitations, as Hornbeck / Barrett (2008) criticized on the example of Second Life (SL):

> "SL residents are situated in SL by way of an avatar, which serves as a resident's 'zero point' of perception and social contact. One can go a little outside, but cannot move entirely beyond one's avatar. For example, one cannot be viewing books in a SL library while one's avatar is soaking up rays on the beach. Resident and avatar are inextricable, and so the latter is an important part of one's online identity. Consequently, great amounts of time, effort and money go into avatar construction" (ibid., 5).

As mentioned above— important in terms of religious education and theology— in addition to the three “I” of Immersion, Intensity and Interaction which were mentioned earlier, Botella et al. define a fourth "I"— “imagination”. This refers to contexts of meaning beyond the technical conditions and thus includes what users see in the VR or what they contemplate. The fourth "I" guides a variety of intentions into virtual space (Botella et al., 2004, 39 f.). At the same time, this non-technical “I” enfolds the scope of religion which, being invisible, is more difficult to judge.

At this point, technical solutions and neurological interpretations can be combined with VR — studies on the effect of religious symbolism on individuals (Newberg et al. (2014) and the effect of perceived optical symbols with religious content on the cognitive processes of the brain (ibid. 83) could be replicated and measured under VR conditions. Newberg found significant effects of religious symbolism in both the visual and emotional brain areas (ibid., 91). It is highly imaginable that an immersively experienced VR environment could emphasize this effect or even change it drastically.

The evaluation of brainwaves, of emotional impulses and the cerebral blood flow of the different brain areas of meditating and non-meditating individuals measured by Newberg et al. (2010) promises fresh impetuses on virtuality’s impact on religious awareness and sentiment per se for further research. The researchers measured changes in the frontal lobe of long-term meditating individuals, possibly rooting in meditation practice (ibid., 902). The frontal lobe of the brain is connected with the limbic areas and is involved in the processing of attention, emotions and memories (ibid., 903). From a religious, educational and game study perspective, it could now be significant to what extent not only meditation, but also VR has an impact on emotions and memories and how religious states of consciousness relate to these.

Sayadmansour observes that in addition to quantitative mounds of data, the human brain also collects and processes qualitative data, transforming them into “holistic” concepts which help to understand the world. Such "neurotheological" (Sayadmansour 2014, 52) mechanisms possibly connect secular with transcendental perceptions in the processing moment:

> "One of the major issues that neurotheology faces, is the problem of the ability to determine the subjective state of the subject. This is also a more universal issue in the context of cognitive neuroscience. After all, one can never know precisely what a research subject is thinking at the precise moment of imaging. If you have a subject solving a mathematical task, one does not know if the person’s mind wandered during the task. You might be able to determine if they did the test correctly or incorrectly, but that in and of itself cannot determine why they were right or wrong. The issue of the subjective state of the individual is particularly problematic in neurotheology. When considering spiritual states, the ability to measure such states empirically while not disturbing such states is almost impossible" (ibid., 54).

These kinds of effects, states of consciousness or disorders, could be much better targeted in VR (in the sense of controlling or avoiding certain situations, emotions, visions and so on). Positive or negative religious expectations and beliefs can affect well-being and consequently mental stability as well as specific diseases.

In turn, religious crises can lead to or intensify mental health issues, such as depression or anxieties. According to a research by Leurent et al. (2013, 4), this applies to spiritual as well as religious individuals compared to secular individuals. The authors suppose that individuals who are prone to depression might possibly be increasingly searching for spiritual or religious explanatory models than secular individuals. They suggest that people with depression may be more interested in spiritual or religious explanations than secular ones, and may fear mutually reinforcing effects. It is to be feared that these effects might be reinforcing each other (ibid., 10).

Crises like that often cause difficulties for secular psychotherapy or drive concerned persons back into the setting of their denomination (e.g. a sect) which possibly may have evoked or caused the crisis in the first place.

The results of King et al. also suggest that a strong faith frequently leads to a deteriorated performance in clinical therapy settings (King / Speck / Thomas 1999, 1292 & 1297 - in opposition: Tabei / Zarei / Joulaei 2016, 3).

VR/AR technologies could support emotional states in various simulated secular as well as religious situations and reveal them for analysis. The adequate classification of emotional states in such scenarios would be necessary for this, as suggested by use of the emotiv-apparatus, which can then be applied to 3D animated models. That way users communicating with avatars in a VR environment get to sense the avatars' emotions and reactions more realistically. Abuhashish et al. have submitted a pilot project as mentioned before and assure that their model can be used in both computer games and medical contexts (ibid., 160). It should be mentioned, however, that a system like that also enables manipulations. As false prophets and sects deceive and scam trusting people in reality, engineered or misread emotions, religious expressions or impulses may lead believers to fall for the religious empathy of a technical system or to be faked by human avatar leaders: the real user behind the virtual avatar does not have to be empathic himself, but by help of the technology, the user/ believer might interpret it this way and adapt all actions accordingly.

Banos / Botella and Perpina (1999) also warn of negative effects, precisely because "VR is a medium defined in terms of its effects on both basic and major psychological processes" (ibid., 288) and fear that the lines between the different realities may blur (ibid., 289):

> "(...) as virtual environments become a part of our natural environments, the distinction between the computer´s reality and the conventional reality will fade away, and humans will need to become more

> sophisticated in our reality judgements. In the case of VR, even its name suggests a possible psychological effect that sometimes is not welcome: the growing confusion between virtual reality and physical reality" (ibid., 289)

This means that people have learned to base their decisions on realities, but now they are increasingly basing their decision making on irrealities, which on the other hand become new but distorted realities. Even the creator of the VR term Jaron Lanier himself voiced concerns (Biocca / Lanier 1992):

> "There have been a lot of media technologies recently that are just slightly interactive, like the Nintendo machines at home. And in my view, just a slight bit of interactivity might be worse than no interactivity at all. For one thing, it forces the user into the psychology of a rat being trained to operate a maze. Also, there's a problem that it's sort of an enforced form of compulsive behavior. There's no doubt that all of us - and let's say adolescent boys in particular - go through a period where they are interested in killing things and aggression. But I think the point is if they do it in a playground, it's part of a fluid process which continues to grow and change. But if they get caught up in a little interactive loop, in some sort of a simulation entertainment product, then they get stuck in it and relive the same loop again and again and again. (...) You need to get a good grounding in the physical world" (ibid., p. 163).

From a point of view of religious education Lanier's idea of a VR initiation rite or "initiation ceremony" for children of a certain age is interesting and similar to a confirmation in catholic and protestant church:

> "That's probably gonna be a controversial idea, but I think that's a good idea. And it could be framed positively. There could be a nice sort of ritual for kids when they get old enough to use simulators. They could be introduced to the mysteries of the simulation world, and that could be a lot of fun. So it doesn't have to be framed as a prohibition at all. It could be actually a very nice thing, but I think something like that should be done in the future" (ibid., 164).

He is proposing a ritualized transformation into an expanded world. According to Wagner, players who introduce their avatar into a new world grow with their tasks and experiences and also undergo a ritualized process of transformation which leads to a goal represented by "levels" or stages, similar to rites of passage (Wagner 2012, pp. 159).

## 5 VR, learning and religious education

Social and cultural principles serve to structure society and its inherent constellations of power, and draw on conventions which have evolved and have been established among members of a society or of a milieu as social (and religious) beliefs for generations.

However, the real and also the world of narration and imagination are part of a "biological reality". They have limits by which VR is not limited in the first place. Birth and death are among these boundaries. Traditions, narratives and memories are interwoven within these boundaries and have a truly life-sustaining character: they protect against life-threatening mistakes or make life easier (Heim 1991, p. 32).

However, it has to be noted that these kinds of limits barely exist in VR, at least not in the conventional and expected form. The VR's non-physicality or non-embodiment not only grants freedom, but also reveals another significant limitation:

> "An avatar can enact a 'kneeling' animation while praying, but can´t engage in the traditional sacraments" (Kaburuan 2012, 65).

Furthermore, there can be no physical damage, destruction or punishment in case of illegal or dishonest or heretic behavior. However, it is possible to reduce the rank of a user or to exclude him from certain functions and areas of the VR before, finally, a virtual user resp. the avatar could be deleted. Virtual exclusion may entail further deviance phenomena in a "shared", "liked" and mobile virtual reality. Otherwise any application could simply be restarted just as an avatar could be recreated.

Wagner points out that there are more crucial boundaries of VR for religious practice and representation: religions provide answers and require the observance of rituals and the faith in firm principles. VR, however, is the exact opposite - VR promises freedom and almost unlimited optionality (Wagner 2012, pp. 221). Sacred texts, whose contents and even words or spellings have been codified for centuries and which should not or must not be changed, get a different meaning in multi-optional contexts.

Joint experiences or learning in VR may offer new options in education. Slater et al. (2000) wanted to find out if people could solve puzzles together that were written on the walls of virtual rooms. The researchers were less interested in the correct solution of the task but rather in observing the social interaction. While the avatars lacked important visual characteristics and comprehensible behaviors, there was social interaction nevertheless. Interestingly, participants were most likely to be credited with leadership skills by the group if their technical equipment was superior to the

others, so their (technically endorsed) performance possibly expressed "power". The leadership characteristics assigned in virtual settings were not confirmed in real/physical settings afterwards (ibid., 41 and 44). Also technical imperfections were an important subject in the group discussions. These obviously cast an influence on the contentual tasks (ibid., 46). On the other hand, less well-equipped participants reported social experience as well as respectfulness towards other gamer avatars.

In the first decades of home-computers human imagination was needed to interpret the text output of adventure games. Today the need for imagination is being lowered within computerized environments. This is particularly true for the educational sector and it is not surprising that religious communities such as Christians, Jews and Muslims have already used the virtuality of Second Life to establish their own representations there (see: Kaburuan 2012, 3). Kaburuan has recreated the Via Dolorosa and the hill of Golgatha in Second Life for his dissertation project, giving users the opportunity to follow the path to crucifixion (ibid., p. 34). He measured the rate of use (ibid., pp. 51) and also interviewed them based on a questionnaire (answers and reaction: 51-55) at the end of the tour. The reactions were extremely positive and the using rates proved to be particularly high at Easter.

The advantage of VR for the field of education and especially for religious education is that this way otherwise imagined content or content which would normally be presented two-dimensionally can be visualized in a targeted and focused manner. The visualization can happen in terms of shape, dimension/size, haptic as well as in terms of lighting and aura. Experiencing ancient sanctuaries the same way as believers of the past millennia did is an exclusive possibility in VR. Above all, this experience is completely risk-free. Neither encroaching rituals of violence nor outbreaking animals or natural disasters like draught which also had great influence on religions' substances and rites, need to be feared. In addition, as already mentioned, groups of people can expose themselves to the same influences and describe their experiences within a narrow time frame and from different cultural, religious or other perspectives. Diverse groups like that could also be studied regarding their willingness and ability of solving problems when confronted with a shared challenge.

VR will supersede neither teachers nor textbooks. However, it goes above and beyond illustrations or animated graphics of processes and can complement most elaborate technical descriptions with visual understanding. Learning individuals can focus on the truly vital information and will not be distracted by information irrelevant to the process of learning (weather, teacher's clothing, their own mental state, group quarrels, being attracted physically, etc.).

## 6 Individual experiences enhanced by VR

In VR's first hype in the early 1990s Rheingold wrote:

> "One way to see VR is as a magical window onto other worlds (...). Another way to see VR is to recognize that in the closing decades of the twentieth century, reality is disappearing behind a screen" (Rheingold 1991, 19. Cited by: Stanovsky 2004, 168. German version: Rheingold 1992, 22).

Today, the screen is no longer a barrier, and both areas overlap, which is especially true for AR. Wagner argues in a similar way when she says that online and offline spheres are flowing in and out of each other in modern life designs and become "persistent liminality" (2012, p. 159).

Despite the variety of international research and publications on VR/AR, the knowledge acquisition is still heavily dependent on the respective state of the art or the technical limits and approaches (as well as the researchers' expertise) at the time of a research. In addition, many related disciplines are just discovering the field and are developing it for themselves. This gives reason to expect focused approaches and hits theology and religious education largely unprepared:

> "In VR worlds such as SL, on the other hand, where we can retain control over phenomenal inputs, we may proceed by examining what has been put into the user. Which conditions suffice for a religious or spiritual experience, and which do not? Perhaps by using VR and borrowing from media theorists specializing in religious content, we can approach these questions with greater precision. For media researchers, examining this gap in affective content and how this gap narrows or widens with new technologies could help to explain how VR, and media generally, contributes to the 'mediatization' of religion and to the 'enchantment' of popular culture" (Hornbeck / Barrett 2008, 19).

How can theology and religious education explain, comment on or even benefit from this development?

The quest for meaning especially in western countries is still enormous, but it has changed—a process that is labeled "spiritual turn" by Houtman / Aupers (2007). Established state churches benefit less from this quest for meaning than independent and active denominations such as esoteric movements, free churches and sects (ibid., 305). This has less to do with religion itself rather than with progressive individualization in a globalized and multi-optional consumerized world. Today, at least in western cultures people can choose their church and form of worship of religion; there are no standards or only little social expectations. This leads to a "relocation of the sacred. Gradually losing its transcendent character, the sacred becoming more and more conceived of being imminent and residing in the deeper layers of the self" (ibid., 315).

Consumer societies alienated from religion produce individuals who no longer find any contact partner for their "last questions". Frissen et al. (2012, 83) discuss Max Weber:

> "The "disenchantment of the world", Weber argued, generates a nonreligious and disillusioned worldview. Under the influence of science and technology, he commented, an otherworldly orientation will be gradually replaced by a worldview that is more objective, but undermines – at the same time – the meaning of life. Modern astronomy, biology, physics or chemistry can describe the world as it is, but can (and should!) not teach anything about the ultimate meaning of the world".

They also note that the majority of interviewed World of Warcraft players would agree with this result:

> "Interestingly enough the majority of players of World of Warcraft who were interviewed also subscribe to this existential situation. They are basically nonreligious in a traditional sense and are disillusioned. First of all, they pride themselves on being atheists incapable of believing in "supernatural" or "transcendent" realms and especially traditional forms of religion. One gamer typically argued that "[r]eligions like Christianity and Islam are from the past and no longer relevant for me. They are based on a society from two thousand years ago [...]". Others state that "there's nothing holy about the Bible", that religions are just "fairytales" and that "only fools believe in God". They essentially perceive themselves as too rational and sober to believe and often literally claim that scientific knowledge essentially can solve and demystify all mysteries. As self-proclaimed, "true atheists" they accept many secularizing scientific propositions derived from evolution theory, physics, and computer sciences" (ibid.).

Piasecki received almost identical statements in his study on ideological views of game developers (Piasecki 2016a, summary in English: Piasecki 2016b).

Many people no longer accept premade answers today, but seek their very own meaning by themselves. Sometimes they try to find this in substitutes: drugs, fashion, music, nutrition and, of course, games as a plot and as a medium. Therefore, considering this would be vital in order to know where people experience a "spiritual turn" and when they are in risk of undergoing tendencies of social isolation due to a "spiritual drift" away from society into spiritual sub-cultures. This also helps to find out how to prevent alienation and to establish educational strategies. One thing is certain: anyone who is searching and falls into wrong hands is at risk of manipulation. Technical systems alone cannot be trusted as the modulation of player´s behavioral repertoire is now part of the computer and video games market and a field where big money can be made (Piasecki 2018).

## 7 Discussion: Religion and VR

Faith and religion are individually experienced, but above all, they are community experiences:

> "For where two or three gather in my name, there am I with them." (Matthew 18:20).

> "The believers are but brothers, so make settlement between your brothers." (Qur'an, 49:10)

How can traditional religious experiences be transferred to VR in the light of the research results, observations and thoughts that have been presented so far? Did "digital heaven", as Spencer-Hall puts it, become reality, something that medieval saints tried to reach through meditation (Spencer-Hall 2018, 195)?

Religious activity in VR can occur among several individuals, represented by avatars collectively reading texts or performing and/or watching rituals and visiting sacred virtual places. This way rites and meanings can be experienced and those interested can participate at any time. Other means of access can range up to psychedelic experiences that are easily generated visually by graphic effects and possibly can be increased by real toxic or spiritual drugs, herbs etc. In VR the term "metaphysics" gets an enhanced and updated meaning.

Whether such joint experiences would be more than a leisure activity and truly create shared religious emotions or mental states would need to be tested. The Emotiv-Headsets and cerebral studies of for example Newberg and Sayadmansour, present various technical and theoretical starting points which are worth pursuing.

Kaburuan points out that, on the one hand, religion can be inclusive in VR. Non-Muslims can also go on a "Virtual Hajj" and visit the holy places in Mecca. The operator IslamOnline.net even emphasizes that this "is not just a tool for Muslims, but also for non-muslims to learn about Islam" (Kaburuan 2012, p. 64) - in reality infidels would not be able to access the sanctuary. According to this, VR could be inter-religiously enlightening, instructive and mediating, but also causes follow-up questions:

Is it conceivable and tolerable for someone to take part in a religious rite he does or does not believe in? Or join practises under a fake or real idenity whose content may be mutually exclusive? A Shia Muslim in a Jewish Kabbalah rite for example? Finally it is to be reminded that the offline user (body) and online avatar (spirit) can never be fully separated (Spencer-Hall 2018, 195). And apart from this, would that be desirable or tolerable after all? Does religion not remain bound to firm beliefs as well as to loyalty and fellowship? Can such ties be maintained in the VR?

Religion and VR are not mutually contradictory. Then again especially immersive games often refer to or rely on religions or at least spiritual symbolism:

> "Being “the most mystical” and “the most magical land of all,” so it seems, is an important asset in rivalry in the game as well as in the competition between online game worlds competing on today’s market" (Aupers 2014, 8).

But can played religion compare with practiced or believed religion at all? Although faith is always a vision and, therefore, virtual in a way, experienced faith is mentally virtual while VR’s virtuality is a technically generated one; no one has to believe in it - it can be bought in shops, can be installed and experienced. Its results are untouchable but producible - over and over again. Then again, this also applies to meditation to some degree. This, however, originates in the biological individual. The indivual dives into this VR and it no longer is part of and bound to its own mentally created visions but simply uses a technical product. Other questions concern the identity of a "person". How many identities does someone have, how many is one allowed to have?

> “When people can play at having different genders and different lives, it isn´t surprising that for some this play has become as real as what we conventionally think of as their lives, although for them this is no longer a valid distinction. (...) In my computer-mediated worlds, the self is multiple, fluid, and constituted in interaction with machine connections; it is made and transformed by language” (Turkle 1995, p. 14).

VR could cause fragmentations of identities plus implications and challenges for psychotherapy. Even the question of "presence" raises questions of comprehension— Slater et al. lists the "orthogonal" definitions of "presence" which are not identical in content:

> "The term presence in the virtual environment literature has come to be used to denote the sense of ‘‘being there’’ in a place (for example, Held & Durlach, 1992). An orthogonal attribute of presence in a place is the sense of being present with other people. This attribute is logically orthogonal, because, for example, talking on a telephone with someone might give a strong sense of ‘‘being with them’’ but not of being in the same place as them. It is useful nevertheless to examine the extent to which these two different types of presence, place presence, and copresence are empirically related" (Slater et al. 2000, 41; also Zeiher 1983).

Postmodern and hedonistic individualism no longer accepts an individual to subjugate under any dogma without criticism. However, the post-modern being, who opens up new virtual worlds, is not limited to any specific spirituality and has, in this light, almost infinite possibilities. Self-efficacy

and self-realization are not only social ideals, but are also flanked by technical possibilities for realizing them in virtuality. VR glasses, data gloves or data suits translate human actions into transformable data. Actions and forms of communication from the real world are being currently transferred, too. In the future, online experiences may transform personal behavior and shape identity in a similar way as rock music has not only changed the western taste in music, but also the culture as a whole:

> "Print and radio tell; stage and film show; cyberspace embodies" (Randal Walser, "Elements of a Cyberspace Playhouse" (1990), cited in: Rheingold 1991, 192; German: Rheingold 1992, 290).

Time and dimension become relative as well. One can take part in a VR activity and a conference at the same time, or even both can take place in the VR. Visions, fantasies, descriptions previously reserved for the personal imagination can be experienced identically by multiple personalities.

## 8 Conclusion and a futuristic outlook

Today, VR technologies make the extensive manipulation of artificial environments and virtual objects possible. Virtual physical laws and parameters can be changed in VR as cyberspace allows or requires at any time. Only real time and real biological processes are excluded, then again physical and biological impairments can be overcome:

> "What is happening inside the computer´s processors, or on its screen, may be 'virtual', but the reaction it provokes is material" (Spencer-Hall 2018, 221).

Patients suffering from Parkinson desease can act in VR without any limitations (ibid.), *the crippled can rise* (Luke 5:24).

Heim hoped:

> Should synthetic worlds then contain no death, no pain, no fretful concerns? (...) Yet to incorporate constraints fully, as some fiction does, is to produce an empty mirror over and above the real world, a mere reflection of the world in which we are anchored. (...) Actual cyberspace should do more; cyberspace should evoke imagination, not repeat the world. Virtual reality could be a place for reflection, but the reflection should make philosophy, not redundancy" (Heim 1991, 33).

What faith and religion actually are remains an urgent question, because even in VR faith can not be forced, but as part of a technical framework could be explained by rules and narratives or probably be used in a game's context. It would then be instrumentalized for the purpose of the game - this would still not be true faith. For Durkheim, on the other hand, it was crucial that religion was not just an *imagination* but also concrete *acts* that tie the individual back to society. Wagner discusses that:

> "Our experiences interacting bodily within that world further engage us in the illusion that we truly inhabit the digital space. (...) The relationships developed in the virtual worlds have the ability to become deep enough and important enough to their members that they can be seen in religious terms" (Wagner 2012, 157).

That faith and religion are experiences shared by members of a community, as the Bible and Qur'an emphasize on, was prominently stated by Emile Durkheim at the turn of the 19th century:

> "Religious beliefs, says Durkheim, are "always held by a defined collectivity that professes them and practises the rites that go with them". The beliefs, he argues, are in fact the thing that unites the group. A "church" is "a society whose members are united because they share a common conception of the sacred world and its relation to the profane world, and who translate this common conception into identical practises". If we generalize this idea of a "church" to any group that is bonded together by common beliefs and practises, then it is possible to argue that play communities may be doing some of the same work as explicitly religious ones" (ibid.).

The assumption that religion, transcendance, divinity and mortality may simply stretch out into VR or that games actually already are, could be or may one day become spiritual experiences with a deeper meaning must be spoiled to a certain degree or at least requires deeper theological reflection, due to the nature of its technological "core" (or 'heart' and 'soul' in religious terms). Games share elements from religous narration like biblical apocalypses. Both games and religion share, according to Wagner, certain similarities: otherworldly mediators appear to help the player understand the experiences and succeed the mission. Game settings and religious scripts both offer visions of transcendence, suggesting that there is more to life than our mundane experiences. Both present the approach of the "end of the time" or "end of the world" in a "dramatic sense" (see: Wagner 2012, 204).

Nevertheless, Wagner notes, the "element of secularism inherent in today´s apocalypses marks the most distinctive feature of video game apocalypses". She cites Collins saying "the transcendent nature of apocalyptic eschatology looks beyond this world to another" (ibid.). Games, according to Wagner, "make no such promises. (...) Death in video games is temporary, not

permanent - thus salvation is also temporary. Worlds visited are transient. Enemies defeated are not real. When one turns off the game and returns to one´s daily life, the same hardships, the same problems, the same doubts remain" (ibid.).

Also cultural and intellectual reception environments must be considered and then even more important questions come up in the context of religion and VR: for example, what about ritual clothing? Kaburuan writes about "Virtual Hajj":

> "Sacredness here is in one part determined by the designs of the authors of this space, and in another by the experiences of users moving through and interacting with it in accord with how the Hajj is meant to be experienced (for example, by wearing the appropriate ihram clothing)" (2012, 65).

The sanctity or the ensuing feeling of religiosity depends on the designers and the users. Certainly a religious person can develop sublime feelings when visiting the virtual Vatican or virtual Mecca, but what about other people who they may meet in the form of avatars? How important is religious tolerance or intolerance? Can or may one enter a virtual place of worship dressed indecently? The avatar in a bikini? Or a ritually and correctly dressed avatar in the VR, but controlled by a naked and drunk person in *physical* reality? Can virtual sacred places be violated? It is uncertain whether this would be a problem at all, because any damage or change to any place or structure could be undone but then it is to question who has the authority to do so. Or could any such changes and its influence on social or religious groups be considered and accepted as evolutionary developments in VR? Would the meaning of holy places fundamentally change?

According to which legal laws would sexual assaults or forced acts, incitements to suicide or mass murder or outrages within the VR, which are not exactly rare in the religious sector, be prosecuted? In a virtual environment, with players being located in different countries and cultures, on whose basis would they be charged, judged and convicted? What would be their sentence? Is there a need for religious laws or judgement?

Is virtually indexed but actually perceived fear and intimidation justiciable? To what extent can mental suffering be traced back to artificially generated stimuli and intentions, or can a real trauma be avenged by a virtual attack?

Certainly, however, despite all the multiple and overlapping realities, the biological human will die and the question of what happens with the soul remains. Today, technical systems can already perform authentic non-player characters that depict and recreate reactions and intentions. However, people are moved and motivated by their secret dreams and fears, those that they would not even read aloud to themselves, not even when they are alone. So even if a highly realistic copy of a human being was created and even if it is equipped with AI, it is still a *different* entity, certainly not human.

Man, the biologically thinking individual, ultimately remains alone with her/his inner thoughts for the most of his or her life and everything amounts to the last moment of maximum isolation, death. To reconcile and deal with this, to accept this individually so far remains a realm mainly reserved for religion.

Transferring this last question into the VR, addressing it with AR in everyday life, and looking for new intellectual approaches outside the non-visible world can be a new and valuable task for theology and religious education.

This obviously is how VR can be seen from a religious, confessional, theological standpoint. VR is simply a tool that can be used to visualize religious aspects, facets of religiosity, maybe for education or excitement even, but surely not a representation of the religious in itself.

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## Bibliography

Abuhashish, Faris A. / Zraqou, Jamal / Alkhodour, Wesam / Sunar, Mohd S. / Kolivand, Hoshang (2015): Emotion Interaction with Virtual Reality using Hybrid Emotion Classification Technique toward Brain Signals. International Journal of Computer Science & Information Technology (IJCSIT), Vol. 7, No. 2, April 2015, 159-182

Aupers, Stef (2014): Create your personal Saga - Spiritualization on Games in Advertising, Sociologica - Italian Journal of Sociology online, 3/2014, 1-23

Backlund, Per / Engström, Henrik / Gustavsson, Martin / Johanneson, Mikael / Lebram, Mikael / Sjörs, Emmy (2009): SIDH: A Game-Based Architecture for a Training Simulator, International Journal of Computer Games Technology Online: https://www.hindawi.com/journals/ijcgt / 2009/472672 /, 19.06.2018

Bandura, Albert (1977): Self-efficacy: Toward a Unifying Theory of Behavioral Change. Psychological Review 1977, Vol. 84, No. 2, 191-215

Banos, R. M. / Botella, C. / Perpina, C. (1999): Virtual Reality and Psychopathology. Cyberpsychology & Behavior. Vol. 2, No. 4 1999, 283-292

Basori, Ahmad Hoirul / Daman, Daut / Sunar, Mohd Shahrizal / Bade, Abdullah (2007): The Potential of Human Haptic Emotions as a Technique for Virtual Human Characters Movement to Augment Interactivity in Virtual Reality Game, The International Journal of Virtual Reality, 2007, 7 (2), 27-32

Biocca, Frank / Lanier, Jaron (1992): Insider's View of the Future of Virtual Reality, Journal of Communication 42 (4), 150-172

Böger , Astrid (2010): The American Photography, in: Decker, Christof (Ed.): Visual Cultures of the United States on the History of Painting, Photography, Film, Television and New Media in America Bielefeld: transcript, 99-160

Botella, Cristina / Quero, Soledad / Banos, Rosa M. / Perpina, Conxa / Garcia Palacios, Azucena / Riva, Guiseppe (2004): Virtual Reality and Psychotherapy. Studies in health technology and informatics, 99 February 2004, 37-54

Brookwell, Holly (April 03, 2016): Forgotten genius: the man who made a working VR machine in 1957, online: https://www.techradar.com/news/wearables/forgotten-genius-the-man -who-made-a-working-vr-machine-in-1957-1318253, 20.06.2018

Burrill, Derek A. (2008): The Tryin 'Video Games, Masculinity, Culture, New York: Peter Lang Publishing

Cassidy, Brendan / Robinson, David (11.12.2017): How virtual reality is opening http://theconversation.com/how-virtual-reality-is-opening-up-some-of-the-worlds-most-inaccessible-archaeological-sites- 88286, 21.06.2018

Chittaro, Luca (2012): Passengers' Safety in Aircraft Evacuations: Employing Serious Games to Educate and Persuade, in: Bang, Magnus / Ragnemalm, Eva L. (Eds.): Persuasive Technology. Design for Health and Safety. 7th International Conference, PERSUASIVE 2012. Linköping, Sweden, June 6-8, 2012. Proceedings, Berlin-Heidelberg: Springer, 215-226

Cosson, Chuck (2018): Tool Without a Handle: Online Confessions, online: https: // cyberlaw. stanford.edu/blog/2018/03/tool-without-handle-online-confessions, 18.06.2018

Dath, Cathrin (2017): Crime scenes in Virtual Reality. A user centered study, Stockholm: KTH Royal Institute of Technology, online: https://kth.diva-portal.org/smash/get/diva2:1115566/FULLTEXT01.pdf, 10.6.2018

Frissen, Valerie / Lammens, Sybille / de Lange, Michiel / de Mul, Jon / Raessens, Joost (2012): Playful Identities. The Ludification of Digital Media Cultures, Amsterdam: Amsterdam University Press

Fogg, B. J. (2003): Persuasive Technology. Using Computers to Change What We Think and Do, San Francisco / CA: Morgan Kaufman Publishers

Gartner (2017): Top Trends in the Gartner Hype Cycle for Emerging Technologies, 2017. Online: https://www.gartner.com/smarterwithgartner/top-trends-in-the-gartner-hype-cycle-for -emerging-technologies-2017 /, 19.06.2018

Gelder, Jean-Loius van / Otte, Marc / Luciano, Eva C. (2014): Using virtual reality in criminological research, Crime Science 2014, 3:10, online: http://www.crimesciencejournal.com/content/3/1/10, 17.06.2018

Guidi, Gabriele / Micoli, Laura / Casagrande, Cesare / Ghezzi, Luciano (2010): Virtual reality for retail. 2010 16th International Conference on Virtual Systems and Multimedia, VSMM 2010. 10.1109/VSMM.2010.5665949, 285-288

Gutiérrez-Maldonado, José / Rus-Calafell, Mar / González-Conde, Joan (2013): Creation of a Virtual Virtual Reality Facility for the Assessment and Training of Emotional Recognition Ability Virtual Reality 18 (1 ) March 2014, DOI: 10.1007 / s10055-013-0236-7

Guthke, Karl S. (1999): The Gender of Death: A Cultural History in Art and Literature, Cambridge: Cambridge University Press

Hardwawar, Devindra (13.02.2018): 'Assassin's Creed Origins' virtual tours can actually teach history, online: https://www.engadget.com/2018/02/13/assassins-creed-origins-discovery-tour/, 07.06.2018

Heim, Michael (1991): The Metaphysics of Virtual Reality, in: Helsel, Sandra K / Roth, Judith Paris (Eds.): Virtual Reality: Theory, Practice and Promise, Westport / CT: Meckler Publishing, 27 -34

Heim, Michael (1993): The Metaphysics of Virtual Reality, New York: Oxford University Press

Heim, Michael (1998): Virtual Realism, Oxford University Press

Heim, Michael (2017): Bridging Real and Virtual: A Spiritual Challenge, Journal Religion Film Media Vol. 3, No 1-2017, 159-181

Hornbeck, Ryan G., & Barrett, Justin L. (2008): Virtual reality as a 'spiritual experience': a perspective from the cognitive science of religion. Northern Lights: Film and Media Studies Yearbook, 6(1), 75–90

Houtman, Dick / Aupers, Stef (2007): The Spiritual Turn and the Decline of Tradition: The Spread of Post-Christian Spirituality in 14 Western Countries, 1981-2000 Journal for the Scientific Study of Religion, (2007) 46 (3), 305-320

Ip, Horace H. S. / Wong, Simpson W. L. / Chan, Dorothy F. Y. / Byrne, Julia / Li, Chen / Yuan, Vanessa S. N. / Lau, Kate S. Y. / Wong, Joe, Y. W. (2016): Virtual Reality Enabled Training for Social Adaptation in Inclusive Education Settings for School-Aged Children with Autism Spectrum Disorder (ASD), in: Cheung, Simon K. S. / Kwok, Lam-for / Shang, Junjie / Wang, Aihua / Kwan, Reggie (Eds.): Blended Learning. Aligning Theory with Practices. 9th International Conference, ICBL 2016. Beijing, China, July 19-21, 2016. Proceedings. Cham: Springer Switzerland, 94-102

Kaburuan, Emil Robert (2012): Spiritual Enlightenment in Virtual Worlds. Designing a Religion Site in Second Life, Dissertation, National Cheng Kung University, Cheng Kung, online: https://www.researchgate.net/publication/236179655_Spiritual_Enlightenment_in_Virtual_Worlds_Designing_a_Religion_Site_in_Second_Life_xunishijiezhongdejingshenqidiSecond_Life_youxilidezongjiaowangzhansheji, 10.5.2018

King, Michael / Speck, Peter / Thomas, Angela (1999): The effect of spiritual beliefs on outcome from illness. Social Science & Medicine. 48 (1999), 1291-1299

Konow, David (2013): Before THX: The Cinema Shaking Technology of Sensurround, online: http://www.tested.com/tech/455667-thx-cinema-shaking-technology-sensurround/, 20.06.2018

Lee, Demi (07.04.2017): Whatever Happened To Mass Cult Suicides?, online: https://theestablishment.co/what-ever-happened-to-mass-cult-suicides-f8c0edd66a0c, 22.06.2018

Leurent, B. / Nazareth, Irwin / Bellón-Saameno, J. / Geerlings, Mirjam I. / Maaroos, Heidi Ingrid / Saldivia, Sandra / Svab, Igor / Torres-González, Francisco / Xavier, M. / King, Michael B. (2013): Spiritual and religious beliefs as risk factors for the onset of major depression: An international cohort study. Psychological Medicine, 43(10), 1-12, January 2013

Levy, Steven (18.7.2017): Google Glass 2.0 is a Startling Second Act, online: https://www.wired.com/story/google-glass-2-is-here/, 5.6.2018

Mihov, Dimitar (2017): Pokémon Go is soon getting monster trading and real-time player battles, online: https://thenextweb.com/gaming/2017/02/14/pokemon-go-monster-trading-battles/, 18.6.2018

Newberg, ANdrew B. / Wintering, Nacy / Waldman, Mark R. / Amen, Daniel / Khalsa, Dharma S. / Alavi, Abbas (2010): Cerebral blood flow differences between long-term meditators and non-meditators. Consciousness and Cognition 19 (2010), 899-905

Newberg, Andrew B. / Johnson, Kyle D. / Rao, Hengyi / Wintering, Nancy / Dhillon, Namisha / Hu, Siyuan / Zhu, Senhua / Korczykowski, Marc / Johnson, Katrina (2014): Pilot Study of the Effect of Religious Symbols on Brain Function: Association With Measures of Religiosity, Spirituality in Clinical Practice 2014, Vol. 1, No. 2, 82-98

Peñas, G., & Peinado, F. (2017). Towards basic emotion recognition using players body and hands pose in virtual reality narrative experiences. CoSECivi.

Piasecki, Stefan (2018): Winners or victims? Discussing identity tracking and behavior analysis in next-gen video games from a digital civil rights perspective. Connectist: Istanbul University Journal of Communication Sciences, 54, 141-162. https://doi.org/10.26650/CONNECTIST406162

Piasecki, Stefan (2018): Credere et Ludere. Computer und Videospiele aus religionspädagogischer Perspektive, Baden-Baden: Tectum

Piasecki, Stefan (2016): Erlösung durch Vernichtung?! Religion und Weltanschauung im Videospiel. Eine explorative Studie zu religiösen und weltanschaulichen Ansichten junger Spieleentwickler, Kassel: kassel university press

Piasecki, Stefan (2016): Redemption through Annihilation?! – Game designer´s views on religion, culture and society and its influences on digital games. Heidelberg Journal on Religion on the Internet. Heidbrink, Simone / Knoll, Tobias (Eds.): Religion in Digital Games Respawned. Special Issue, Vol. 10 (2016) (peer reviewed), 45-73, DOI: http://dx.doi.org/10.17885/heiup.rel.23548

Rae, Juno / Edwards, Lizzie (2016): Virtual reality at the British Museum: What is the value of virtual reality environments for learning by children and young people, schools, and families? MW2016: Museums and the Web 2016. Published January 28, 2016. Online:

https://mw2016.museumsandtheweb.com/paper/virtual-reality-at-the-british-museum-what-is-the-value-of-virtual-reality-environments-for-learning-by-children-and-young-people-schools-and-families/, 20.06.2018

Rapp, A. (2017). From Games to Gamification: A Classification of Rewards in World of Warcraft for the Design of Gamified Systems. Simulation & Gaming. 2017, Vol. 48(3), 381-401

Rheingold, Howard (1991): Virtual Reality, New York: Simon & Schuster

Rheingold, Howard (1992): Virtuelle Welten. Reisen im Cyberspace, Reinbek b. Hamburg: Rowohlt

Rothbaum, Barbara Olasov / Hodges, Larry F. / Cooper, Rob / Opdyke, Dan / Williford, James S. / North, Max (1995): Virtual Reality Graded Exposure in the Treatment of Acrophobia: A Case Report, Behavior Therapy, 26, 1995, 547-554

Russell, James A. (1994): Is There Universal Recognition of Emotion From Facial Expression? A Review of the Cross-Cultural Studies. Vol. 115, No. 1. 1994, 102-141

Sayadmansour, Alireza (2014): Neurotheology: The Relationship Between Brain and Religion, Iranian Journal of Neurology, 2014, 13 (1), 52-55

Sherman, William R. , Craig, Alan B.: Understanding Virtual Reality, Amsterdam: Morgan Kaufmann Publishers, 2003, p.17

Sierra, Albert / de Prado, Gabriel / Soler, Isis Ruiz / Codina, Ferran (2017): Virtual Reality And Archaeological Reconstruction: The There, Back Then, online: https://mw17.mwconf.org/paper/virtual-reality-and-archaeological-reconstruction-be-there-be-back-then-ullastret3d-and-vr-experience-in-htc-vive-and-immersive-room/, 21.06.2018

Slater, M. / Howell, J. / Steed, A. / Pertaub, D.-P. / Gaurau, M. (2000): Acting in Virtual Reality. CVE '00 - Proceedings of the third international conference on Collaborative virtual environments, San Francisco. New York: ACM, 103-110

Slater, Mel / Sadagic, Amela / Usoh, Martin / Schroeder, Raplh (2000): Small-Group Behavior in a Virtual and Real Environment: A Comparative Study. Presence, Vol. 9, No. 1, February 2000, 37-51

Soares, Marcelo M. / Rebelo, Francisco (2017): Ergonomics in Design. Methods & Techniques, Boca Raton / FL: CRC Press

Spencer-Hall, Alicia (2018): Medieval Saints and Modern Screens, Amsterdam: Amsterdam University Press

Stanovsky, Derek (2004): Virtual Reality, in: Floridi, Luciano (Ed.): The Blackwell Guide to the Philosophy of Computing and Information, Malden / MA: Blackwell Publishing

Steuer, J., "Defining Virtual Reality: Dimensions Determining Telepresence", Journal of Communication, 42(4), 1992, p. 73-93

Straaten, Peter van der: Interaction Affecting the Sense of Presence in Virtual Reality, Research Task Final Report, Delft University of Technology, Faculty of Information Technology and Systems, 2000, online: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.33.8755&rep=rep1&type=pdf, 02.07.2018

Suenderhauf, Claudia / Walter, Anna / Lenz, Claudia / Lang, Undine E. / Borgwardt, Stefan (2016): Counter striking psychosis: Commercial video games as potential treatment in schizophrenia? A systematic review of neuroimaging studies. Neuroscience and Biobehavioral Reviews 68 (2016), 20-36

Tabei, Seyed Ziaeddin / Zarei, Nooshin / Joulaei, Hassan (2016): The Impact of Spirituality on Health. Shiraz E-Medical Journal, June 01, 2016, 17 (6), online: http://emedicalj.com/en/articles/20465.html, 22.06.2018

Théophane, Nicolas / Gaugne, Ronan / Tavenrnier, Cédric / Petit, Quentin / Arnaldi, Bruna / Gouranton, Valérie (2015): Touching and Interacting with Inaccessible Cultural Heritage, Presence, Vol. 24, No. 3, Summer 2015, 265-277

Tomasello, Michael / Carpenter, Malinda / Call, Josep / Behne, Tanya / Moll, Henrike (2005): Understanding and sharing intentions: The origins of cultural cognition. Behavioral and Brain Sciences, (2005) 28, 675–735

Traxler, John (2010): Education and the Impact of Mobility and Mobility, An Introduction to Mobiles in our Societies, in: Bachmair, Ben (ed. ): Media education in new cultural areas The German-speaking and British discussion, Wiesbaden: VS publishing house for social sciences, pp. 101-112

Turkle, Sherry (1995): Life on the Screen. Identity in the Age of the Internet, New York: Touchstone

Wagner, Rachel (2012): Godwired: Religion, Ritual and Virtual Reality, New York: Routledge

Weinbaum, Stanley G. (1935): Pygmalion´s Spectacles, Éditions de l'Age d'Or. Online: http://age.d.or.free.fr/fichiers/pdf/Pygmalion's%20Spectacles.pdf, 20.5.2018

Zeiher, Helga (1983): Die vielen Räume der Kinder. Zum Wandel räumlicher Lebensbedin- gungen seit 1945, in: Preuss-Lausitz, Ulf u.a. (Ed.): Kriegskinder, Konsumkinder, Krisenkinder. Zur Sozialisationsgeschichte seit dem Zweiten Weltkrieg, Weinheim und Basel: Beltz, 176-195