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Immersive Indies: On Immersive Strategies in Independent Games for Virtual Reality (VR)

Michael Walter
United Arab Emirates University (UAEU) (Al Ain, United Arab Emirates)

Since gaining popularity in the early to mid–2000s, indie video games have been extensively researched. Studies have had to keep abreast of the rapidly developing video gaming industry, which the indie sector is helping to inform. Few studies, however, analyse how the indie game sector compares in virtual reality (VR), as an emerging and immersive medium. The relatively novel VR sector lends itself to the experimental nature of indie development, particularly as the mainstream sector has had little influence in VR, and gaming conventions have yet to be established. In this article I analyse how indie games in VR are informing immersive experiences for the player. More specifically, I argue that the lack of mainstream pressure in VR, and reluctance to fully embrace the physicality of the medium, enables indie developers to lead in immersive VR gaming. Analysis of my own autoethnographic experience of prominent contemporary indie games for VR, framed by the Player Immersive Experience (PIE) model (Walter, 2025), demonstrates how the implementation of a 'full' virtual body, and player agency through freedom of movement, are used both

Desde que ganaron popularidad a principios y mediados de la década de 2000, los videojuegos independientes han sido objeto de una extensa investigación, y los estudios han tenido que mantenerse al tanto de la rápida evolución de la industria, en la que el sector independiente está contribuyendo significativamente. Sin embargo, pocos estudios analizan cómo se compara el sector de los juegos independientes en la realidad virtual (RV), un medio emergente e inmersivo. El sector de la RV, relativamente novedoso, se presta a la naturaleza experimental del desarrollo independiente, particularmente porque el sector principal ha tenido poca influencia en la RV y las convenciones de juego aún no se han establecido. En este artículo, analizo cómo los juegos independientes en RV están configurando las experiencias inmersivas para el jugador. Más específicamente, sostengo que la falta de presión del mercado principal en la RV, así como la reticencia a abrazar plenamente la corporalidad del medio, permiten a los desarrolladores independientes liderar en los juegos inmersivos de RV. El análisis de mi propia experiencia autoetnográfica con destacados juegos

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to affect gameplay systems and to elicit a heightened sense of immersion in VR video gaming experiences.

Keywords: *indie video game, virtual reality (VR), immersion, digital embodiment.*

independientes contemporáneos para RV, enmarcado a través del modelo de Experiencia Inmersiva del Jugador (PIE) (Walter, 2025), demuestra cómo la implementación de un cuerpo virtual 'completo' y la agencia del jugador a través de la libertad de movimiento se utilizan tanto para afectar los sistemas de juego como para provocar una mayor sensación de inmersión en las experiencias de videojuegos de RV.

Palabras clave: *videojuego independiente, realidad virtual (RV), inmersión, encarnación digital.*

Independent —or indie— video games started gaining popularity in the early to mid–2000s, and scholars have studied, among other aspects, their production (Ruffino, 2013), their characteristics, meaning and cultural significance (Lipkin, 2013; Garda and Grabarczyk, 2016; Pereira, 2021), their stylistic elements (Juul, 2014; 2019), and their challenges in the dynamic gaming landscape (Crogan, 2018). These discussions seem increasingly relevant as the indie sector appeals to more players, leading to a market share of 48 % of game revenue on Steam in 2024 (Video Game Insights, 2024). Recent successes include *Palworld* (2024), selling over 30 million units (Statista, 2025) and *Lethal Company* (2023), with over 14 million units sold on Steam alone (Video Game Insights, 2024). The capacity for indie developers to create larger games, with more complex worlds and systems that retain massive player bases is increasingly resemblant to that of mainstream video games, which has begun to blur the lines between the two sectors. The commercial and critical success of *Baldur's Gate 3* (2023) illustrates this complexity. As a self-published game initially releasing in early-access (traits of independent games) yet possessing many trademarks of mainstream or 'AAA' games, such as a larger development team, the use of motion capture and an expansive world and narrative, it became the first game to win all five major 'game of the year' awards (Serin, 2024). It is clear that as the indie game sector exerts its ability to provide full, high quality gaming experiences that appeal to millions of players —studies need to keep abreast of how indie games are informing the industry.

However, very few studies have examined how indie video games compare in the realm of virtual reality (VR), as an emerging medium. Pawel Grabarczyk (2020) highlights how discourse surrounding indie games and VR may seem at odds. On one hand, dialogue of VR suggests a kind of "techno fetishism",

involving discussions around ever increasing "resolutions, degrees of field of view" and "eye-tracking" (Grabarczyk, 2020). While indie games, on the other hand, prioritise *authenticity* and *honesty* and exhibit an "anti-industrial attitude", pushing back against the idea that "…video games through technological progress are moving on a linear path towards realism" (Juul, 2014). This attitude is referred to as the "independent spirit" and is central to indie game production (Grabarczyk, 2020). Notably, as Pawel Grabarczyk (2020) rightly points out, VR games necessitate a certain level of graphical and performance fidelity to be playable, and as not to cause motion sickness. Nonetheless, the majority of VR only video games offered on Steam are indie games, which at the time of writing, is 52 %[1]. Of the top five best-selling VR games on Steam, listed here in order of most revenue: *Beat Saber* (2019), *Half-Life: Alyx* (2020), *Blade & Sorcery* (2024), *Gorilla Tag* (2023), *Vtol VR* (2017), *Half-Life: Alyx* (2020) is the only non-indie VR video game.

Pawel Grabarczyk (2020) attributes the high number of indie VR games to three key reasons. Firstly, for *practical reasons*; as competition for indie games increased, VR has become a new market space for developers to differentiate themselves, particularly as VR technology and development tools have become readily more available (Grabarczyk, 2020). Secondly, *independent spirit and style*; though the indie spirit may seem philosophically opposed to the technologically concerned aspects for VR, as mentioned above, indie games are often "heralded as innovative, fresh and experimentative", all of which are expected in VR as a novel medium (Grabarczyk, 2020). Furthermore, the independent style (discussed further below) is continuously changing, having seemingly adopted "low polygonal untextured graphics" which suits development of VR games, particularly with the popularity of less powerful VR headsets such as the Oculus Quest (Grabarczyk, 2020). Thirdly, *the lack of mainstream/AAA video games in VR*; *Half-Life: Alyx* (2020) is considered to be the only genuine AAA video game for VR (Carter and Egliston, 2025). However, I would also include *Horizon Call of the Mountain* (2023), as a AAA game built exclusively for VR. Since major video game companies have not invested heavily into VR, many of the big-budget games available for VR are in fact *ports* from traditional platforms —which uniquely positions the indie sector in VR to "become the new mainstream as they are the pioneers of the new technology" (Grabarczyk, 2020).

Moreover, VR has been suggested to offer unparalleled immersion by adding further dimensions or "additional layer[s]" to the video gaming experience, particularly by integrating the player's physical movement into the virtual world (Bender and Broderick, 2021). Tracking technology is used to track the VR user's

1 Following Pawel Grabarczyk (2020), this percentage was calculated by assessing the frequency of games tagged as "indie" and "VR" on Steam (the largest digital distribution platform for PC). Notably, it has decreased in comparison to Pawel Grabarczyk's (2020) 67 %. This may be because players and developers may not find it necessary to tag a game as indie on steam for the VR market, as there are no real alternatives.

movements and their relation to the world around them, to simulate into a VE. Thus, VR affords a more natural 'embodied' mode of interacting in the digital world, which makes it appealing to video games. However, as an emerging medium, the extent to which video game developers embrace the immersive affordances of VR varies extensively. For example, more mainstream games like *Half-Life: Alyx* (2020) and *Horizon Call of the Mountain* (2023) do not implement a full virtual body for the player, while in indie games such as *Blade & Sorcery* (2024) and *Bonelab* (2022), the player is 'fully embodied' in' the playable character. This lack of consensus in game design can be found in many aspects of video games in VR, as developers consider the various challenges brought by the physical nature of the medium, and the industry continues to establish proven formulas.

Natural movement in VR is another example that remains one of the medium's most prominent challenges, as one is limited by physical space to move in large VEs (Nilsson *et al.,* 2018). The manner in which VR game developers implement player movement, such as locomotion, thus becomes critical, as it can be a major cause of simulation sickness (Grabarczyk, 2020) or cause unintended positional drift (UPD), in which the player is unaware of any unintentional changes in their physical position —which could result in collision into physical objects around their play space (Lim *et al*., 2026)[2]. Because of this, mainstream-leaning VR games tend to restrict player movement, limiting whether, or how, they can run or jump in the virtual world. This is arguably to safeguard players who may be new to VR (a relatively novel medium), and to avoid their feeling nauseated or physically hurt. However, limiting player movement in this way (which are options expected in most traditional games), can feel like restricting the player's agency, and may feel like a step backwards in what is expected of contemporary immersive gaming experiences. These challenges, however, can be fertile ground for indie developers, who can be more experimental and embrace more of the affordances of VR. In contemporary indie VR games, such as *Blade & Sorcery* (2024)*, Bonelab* (2022), *Contractors Showdown: Exfilzone* (2024) and *Into The Radius 2* (2024), for example, the developers seem more willing to experiment with player comfort or convenience, in favour of maximising immersion —which more profoundly demonstrates the capacity of VR as a platform for gaming.

In this study, I examine how the indie game sector has informed immersive experiences in VR. More specifically, I contend that due to the lack of mainstream alternatives, indie developers have creatively pushed the boundaries of immersive gaming experiences, particularly in regards of digital embodiment and gameplay mechanics. In order to explore the nature of immersion in VR video games, I employ the Player's Immersive Experience (PIE) model (Walter, 2025) as a framework. Analysing my autoethnographic experience of the above

2 Locomotion refers to the various methods to virtually walk in a VE. As opposed to teleporting around a virtual space, users in VR may have the *locomotive* options to move forward in space by swinging their arms to simulate walking, or to use the joystick on their controller for steering locomotion —similar to traditional flatscreen games.

contemporary indie VR games, I focus on 'ludological immersive strategies' to examine how they are innovating gameplay in VR, and 'bodily immersive strategies' as VR fundamentally brings more of the player *into* virtual worlds through digital embodiment. It is necessary to first establish what is meant by 'indie', for the purposes of this study, after which I define the concept of 'immersion' as it pertains here, and its context within VR video games.

DEFINING 'INDIE' (AND MAINSTREAM OR AAA) VIDEO GAMES

A consensus definition for 'independent' or 'indie' video games remains elusive (Pereira, 2021). Defining the concept(s) means considering various aspects of video games, from their history, development cycle, funding, publishing, visual and mechanical design, audiences, and game culture (Simon, 2013). At their core, indie games oppose or diverge from mainstream or AAA (also known as triple-A) video games —which are developed and published by larger companies/ conglomerates, such as Sony Interactive Entertainment, Microsoft or Electronic Arts (EA), which have significantly higher budgets and larger development teams. Nadav Lipkin (2013) describes the development of mainstream video games as "corporate in nature and capitalist in ethos. While not universally fairly, the mainstream is characterized as emphasizing profit and popularity over creativity and artistry". This mainstream prioritisation of profit can be seen in their monetisation practices, such as their incorporation of 'loot boxes' or 'microtransactions' which are potentially "financially and psychologically exploit[ive]" to players (King and Delfabbro, 2018). Indie games, on the other hand, stand in "opposition to the mainstream culture, to the corporate game industry, to its work practices, to its focus on profit over innovation, and to its supposed creative blandness and artistic impersonality" (Pereira, 2021).

This 'opposition' has manifested in the visual design of indie games, particularly post 2004, which embraced a certain graphical look resemblant of older or simpler games. Jesper Juul (2014; 2019) refers to this as the "independent style", which "…uses contemporary technology to emulate low-tech and usually "cheap" graphical materials and visual styles…". While the cheaper look of some indie games is at least in part due to the high cost of development tools (Lipkin, 2013), Juul (2014) argues that the *independent style* refers to games intentionally developed with a simplistic design in favour of *authenticity*. However, as Nadav Lipkin (2013) notes, mainstream developers have adopted the independent style in certain games, and indie developers have in-turn developed games with the technological and graphical prowess of AAA games, "mak[ing] it harder to evaluate a game's "indie-ness" by its appearance".

For the purpose of this paper, I will employ Maria Garda and Pawel Grabarczyk's (2016) model in reference to the meaning of 'independent' and 'indie' video games, as they differentiate between the two terms. Firstly, independent games are understood as having at least one of three types of independence: *Financial independence*, in which the developer self-funds their own game; *Creative independence,* in which developers have creative freedom to develop a game

as they please without external pressures; *Publishing independence,* in which developers are also the publishers (at least upon the initial release) of the game (Garda and Grabarczyk, 2016).

Secondly, 'indie' should not be understood as an acronym of the 'independent', following Maria Garda and Pawel Grabarczyk (2016) (despite the term's etymology, as they point out), but rather as reference to "contingent properties" or "indie markers" to further categorise a type of independent game. These indie markers include an 'experimental nature', 'small budget and low price', 'retro style', 'small team' and 'indie mindset' to name a few (Garda and Grabarczyk, 2016). These identifiable traits are ever changing, as Leônidas Pereira (2021) argues, and can be used to identify the 'indieness' of a given game.

DEFINING IMMERSION (AND ITS CONTEXT WITHIN VR)

Video game developers posit immersion as the central purpose for playing video games (Dansky, 2021). Scholars have thus studied the phenomenon since the emergence of game studies as a field. However, since the experience of immersion is multidimensional, as video games are multifaceted and ever developing, the meaning around the concept, its constitution, and how to consider the experience is still being informed (Ermi and Mäyrä, 2005; Calleja, 2011; Therrien, 2014; Nilsson *et al.,* 2016; Walter, 2025). Janet Murray's (2017) frequently referenced description of immersion offers a foundational understanding of the experience:

> [As] a metaphorical term derived from the physical experience of being submerged in water [...] [immersion is] the sensation of being surrounded by a completely other reality [...] that takes over all of our attention, our whole perceptual apparatus. We enjoy the movement out of our familiar world, the feeling of alertness that comes from being in this new place, and the delight that comes from learning to move in it. [...] [I]n a participatory medium, immersion implies learning to swim, to do the things that the new environment makes possible.

In other words, immersion refers to the *transportation* of one's *presence* to a virtual environment (VE). Presence (short for telepresence) here, refers to the subjective experience of one's consciousness or perception *in* a VE (such as a video game), to such an extent, that one fails to notice or acknowledge the mediation that is taking place (Slater and Wilbur, 1997; The International Society for Presence Research, n.d.). The more the medium affects one's senses and allows one to interact within the VE, the more immersive the medium, and thus, the higher or more convincing the sense of presence it can elicit.

Video games employ a variety of methods to immerse players, for example, through use of audio/visual fidelity, narrative, gameplay mechanics, characters, music or challenges. Scholars have thus framed immersion as a phenomenon experienced through multiple dimensions (Ermi and Mäyrä's, 2005) sensory, challenge-based and imaginative immersion (SCI) model, and Calleja's (2011) Player Involvement model). VR further adds dimensions to the immersive

gaming experience by perceptually blocking out external distractions and filling the player's field of vision with a VE in which they can interact using physical, bodily motion. Players are thus 'more convincingly' present *in* the game. The *Player's Immersive Experience* (PIE) model offers a revised framework of immersion as experienced in VR video games particularly and will be employed in this paper (Walter, 2025). Through the PIE model, immersion in VR can be accounted for and understood through the experience of eight dimensions or "immersive strategies", namely: sensory immersive strategies; bodily immersive strategies; game feel, affective, and empathetic immersive strategies; world-building immersive strategies; narrative immersive strategies; ludological immersive strategies; social immersive strategies and immersion disruption (Walter, 2025). These immersive dimensions are integrated and not experienced in isolation from each other. Nor are they experienced equally during gameplay, as some video games incorporate more immersive strategies than others (Walter, 2025).

Due to the scope of this paper, I limit my analysis to *bodily immersive strategies* and *ludological immersive strategies,* following the PIE model (Walter, 2025). Considering *bodily immersive strategies* is particularly relevant given VR's foundational premise of incorporating physical interaction within virtual environments (Lanier, 2017). Bodily immersive strategies refer to the extent to which a player feels 'embodied' *as* a video game character during gameplay (Walter, 2025). This digital embodiment in video games is experienced at a phenomenological level, not implied fictionally or imaginarily, but rather "as a composite of flesh and technology, objectively existing within synthetic space" (Klevjer, 2012). VR arguably heightens the experience of digital embodiment, affording the user to interact more naturally with the virtual world from the perspective of the virtual body as if it were their own. Kilteni *et al*. (2012) refer to this experience as the *sense of embodiment* (SoE), which they define as "the sense that emerges when [a virtual body's] properties are processed as if they were the properties of one's own biological body". These properties include: the *sense of self-location* (the feeling of being inside a body); the *sense of agency* (having total control over the body); and the *sense of body ownership* (the feeling that one's sensations are occurring from the virtual body) (Kilteni *et al.,* 2012). While the SoE in VR can heighten the player's level of immersion, it can also profoundly affect gameplay experiences, as trivial systems like reloading a weapon using physical gestures become mechanics players must methodically learn (Bender and Broderick, 2021).

I also analyse *ludological immersive strategies*, following the PIE model (Walter 2025). This dimension is concerned with the gameplay and mechanical aspects of the video gaming experience. These include Mihaly Csikszentmihalyi's (2008) seminal *flow theory* (which considers the game's balance of challenge and progression), game progression systems, pacing and learning curves, as well as systems such as combat and health management (Walter, 2025). In other words, this dimension considers how a player is immersed by the ludic (playful) aspects of a game, and the extent to which VR attempts to elevate this immersion (Walter, 2025).

Thus, following these definitions, a clear tension emerges between the commercial safeguards of the mainstream sector and the experimental 'independent spirit' in VR video games. While AAA developers often prioritise player comfort by limiting physical agency and embodiment, the indie sector increasingly prioritises immersive strategies outlined in the PIE model to maximize immersion. This study argues that financial, creative, and publishing independence allows indie developers to treat the challenges of VR, such as 'full' digital embodiment and unrestricted locomotion, not as obstacles to be avoided, but as fertile ground for innovation to afford player experiences only possible in VR. The following analysis examines how these specific 'bodily' and 'ludological' strategies enable indie titles to pioneer a more profound sense of immersion than their mainstream counterparts.

RESEARCH METHOD

Given the phenomenologically isolated nature of the player's senses in VR, in this study I employ an autoethnographic method to examine the experience of immersion. Autoethnographies stem from ethnographies, in which researchers *immerse* themselves into particular cultural contexts and extract their informant's (or their own) *experiences* as data, making them "a popular method for researching virtual worlds and online computer games" (Brown, 2015). Autoethnographies, however, more closely consider the researcher's *own lived experiences* as data, and as in this case within a video gaming context, cyber or digital autoethnographies explore the researcher's embodied experience in virtual space (Atay, 2020). More specifically, I assume the role of a "researcher-critic", which Stuart Bender and Mick Broderick (2021) refer to as a "self-aware scholar willing to immerse themselves in the VR text under analysis and capable of reflecting on the experience they have had". These reflections of my immersive experiences will employ phenomenological description, following Stuart Bender and Mick Broderick's (2021) "VR phenomenology", which "privileges the subjective experience of the researcher-critic" as the focus of the experience. My phenomenological descriptions of immersion will be framed through the PIE model (Walter, 2025). I will be particularly concerned with the bodily and ludological immersive strategies employed in the following indie VR games: *Blade & Sorcery* (2024), *Bonelab* (2022), *Contractors Showdown: Exfilzone* (2024) and *Into The Radius 2* (2024).

These four games have been selected as prominent and contemporary examples of indie VR development, some of which are top-selling VR games on Steam. Furthermore, all four titles are first-person action/combat games, providing a direct comparison to the design choices of the few existing AAA VR games (*Half-Life: Alyx* (2020) and *Horizon Call of the Mountain* (2023)), both of which are of the same genre. Each title was played extensively to account for their various sandbox, survival, or multiplayer designs. The narrative campaigns for *Bonelab* (2022) and *Blade & Sorcery* (2024) were fully completed both prior to and repeated during the course of this study.

An autoethnographic approach allows for more prolonged exposure within the video games in question, facilitating a more in-depth account of one's immersive experiences in the game —which is necessary, considering the phenomenon's complexity. Paradoxically, the subjective feelings of immersion and presence involve a lack of awareness of the technology and mediated process. Thus, to assist in my analysis and to employ the observational tool of reflexivity, I recorded my gameplay sessions of each game using Open Broadcaster Software (OBS). These recordings served to provide references and examples for my descriptions and ensured that 'moments' of immersion could be analysed retrospectively without being lost to the mediated experience itself.

ANALYSING BODILY AND LUDOLOGICAL IMMERSIVE STRATEGIES IN CONTEMPORARY INDIE VR GAMES

As VR video game development continues to mature, features and game designs will become more refined. At present, however, VR games (even of similar design or genre) have inconsistent approaches to similar aspects. As highlighted above, this lack of unanimity in game design persists in the level of embodiment incorporated in VR video games. Integrating a 'full' virtual body in a VR game is challenging. A typical consumer headset has tracking sensors on the head-mounted display (HMD) and on the controllers and so it can only *predict* the movements and location of the rest of the user's body as they move. If the virtual body is portrayed incorrectly, it can disrupt immersion, presence, the SoE or nauseate the player (Eubanks *et al.,* 2020). For this reason, Valve settled on 'floating hands' (Image 01) in *Half-Life: Alyx* (2020), according to Design Manager Robin Walker (Reeves, 2020). While the virtual body in *Half-Life: Alyx* is accounted for, to an extent, using sounds and while it can be interacted with (to heal for example) (Walter, 2025), the lack of a '*full*' virtual body can create ludological limitations that could affect immersion, as I argue below.

Image 1. *'Floating hands'*

Source: *Half-Life: Alyx* (2020), screenshot by author.

By contrast, in many contemporary indie games, including all four I analyse here, the player inhabits a 'full' virtual body. As I look down, I can see the rest of my virtual body (Image 02). While I may not be able to move my entire virtual body independently, as I can my hands or head (since these are tracked), the body responds intuitively to my overall movements. As I walk using steering locomotion, my VR legs simulate a walking motion. Seeing my virtual legs grappling against the wall as I look down while climbing in *Bonelab* (2022) provides further visual feedback for my actions. The presence of this virtual body only heightens the SoE *in* the game, as it reinforces my *senses of self-location, agency and body ownership* (Kilteni *et al.,* 2012; Eubanks *et al.,* 2020). While technical glitches caused by inhabiting a 'full' virtual body may occasionally occur (such as misrepresenting the current position or posture of my *physical* body), the level of immersion elicited from the inclusion of a full virtual body more often outweighs the disruption it can cause.

Image 2. Inhabiting a 'full' virtual body

Source: *Into The Radius 2* (2024), screenshot by author.

Perhaps more importantly, having a full virtual body in VR can also affect gameplay design and systems —areas in which indie developers seem to lead. In *Blade and Sorcery* (2024), for example, I can get shot by arrows which stick into various parts of my virtual body, and which I can then pull out. Removing arrows from my virtual body is a satisfying action that plays well into the immersion and fantasy roleplay of the game. This arguably would not work without a full virtual body. Similarly, in *Contractors Showdown: Exfilzone* (2024), I can get shot in various limbs across my body, and depending on the severity of the wound, a physical action is needed to apply the appropriate healing method. These include wrapping a bandage over the appendage, stapling the wound shut, or injecting it. These methodical, *bodily* actions are a core feature of military simulator (MilSim) shooter games such as *Escape from Tarkov* (2017), in which all actions such as movement, healing, shooting or reloading are slower and more meticulous for the sake of realism. The affordance of a full virtual body in VR facilitates this game design. To wrap a bandage around my arm in *Contractors*

Showdown: Exfilzone (2024) I must wind it around the wounded arm, with the wounded arm also instinctively assisting in the winding motion to speed the process up. This is a natural, kinaesthetic interaction that feels authentic and more immersive as it more closely aligns my physical intentions with the virtual actions in the game.

Moreover, a 'full' virtual body in VR also enables the use of diegetic menus and inventory systems, to further immerse the player in the VE by grounding functional mechanics within the virtual space. In many traditional flatscreen video games, a player may bring up their inventory by pressing a dedicated button to access a non-diegetic menu that exists outside of the game world for the player to manage. While this design has become standard in traditional flatscreen video games, VR developers are yet to establish interface and inventory system conventions (Grabarczyk, 2020; Pandey and Sorathia, 2025). In mainstream VR games such as *Half-Life: Alyx* (2020) or *Horizon Call of the Mountain* (2023), the player accesses a non-diegetic weapon wheel menu to select their weapon. While some items such as ammunition can be stored or drawn by physically reaching over shoulder, these games seemingly opt for more familiar methods used in traditional flatscreen video games. This is possibly to sustain more efficient gameplay, as the player can quickly access their desired item without fumbling. By contrast, many indie VR games, including all four indie VR games analysed here, utilise the *player's virtual body* as a diegetic interface for inventory management (Image 03). Larger weapons are stored on the player's back and can be accessed by reaching over the shoulders, while smaller weapons are kept on the hips or on the player's chest. In the MilSim VR games, like *Into The Radius 2* (2024) and *Contractors Showdown: Exfilzone* (2024), the player wears a chest rig to expand their bodily storage, allowing them to easily access more items such as flashlights or healing tools. In addition, the player wears a backpack, accessed from over the shoulder, which is used to store miscellaneous items gathered in the game. Within these backpacks the storage is managed using physical movements in free space, as opposed to a menu system.

Image 3. A quiver of arrows stored on my left hip with a sword on my right (left) and the player's inventory is managed using physical movements in a backpack system (right)

Source: *Blade & Sorcery* (2024) (left) and *Into The Radius 2* (2024) (right), screenshots by author.

Implementing diegetic inventory management systems that rely on the player's virtual body can present challenges and lead to awkward player experiences. If reaching for a weapon or item on my body without looking, for example, I may pick up the wrong item, which could be a frustrating in certain scenarios. Similarly, I may end up losing items, thinking I have stored them but have in fact dropped them without noticing. This kind of embodied, diegetic interface is also slower than traditional non-diegetic interfaces, and at times may be less convenient, as the increased effort required to use diegetic interfaces for simple tasks may inadvertently cause frustration —particularly in non-gaming VR contexts such as training applications (Dickinson *et al.,* 2021).

In VR video games, however, diegetic systems can lead to increased engagement, immersion and presence (Pandey and Sorathia, 2025). The physicality of these embodied, diegetic interfaces can be satisfactory in and of itself and can create immersive situations that are unique to VR gaming. Having to look down to my chest rig to see whether I have any grenades left or fumbling as I unintentionally grab the wrong weapon during combat can make for interesting gameplay that feels slower, yet, often more convincing than traditional flatscreen gameplay that features conventional non-diegetic interfaces and storage systems. Furthermore, managing where I store the various items on my virtual body or backpack further adds a layer of personalisation and nuance to the experience, which is not offered by traditional systems.

As shown here, it is owed to inhabiting a 'full' virtual body (which is interactable) that can heighten the SoE *in* the game. While it is useful to adopt systems and designs from traditional video games, as they have matured over decades, the SoE and physicality afforded by VR offers players unique gaming experiences that often require alternative approaches that embrace these VR features —in which indie developers are seemingly pioneering. By not incorporating a 'full' virtual body, developers risk limiting other ludological systems that can be improved in VR.

Player movement is another major challenge for VR game developers, as highlighted above. Since the player cannot physically walk, run or jump to be simulated in the game, these movements are often done using the controllers. VR games frequently offer teleporting or steering locomotive options for walking and running, while jumping is regularly performed with a button on the controller (if offered at all). While steering locomotion may afford a higher sense of presence for players (Clifton and Palmisano, 2020), experiencing one's own virtual body move in space while their physical body remains stationary can quickly become nauseating, particularly for newer VR players, as Hirobe *et al*. (2025) find. VR gamers likely need to condition themselves to this simulated movement, a process referred to in the VR community as acquiring one's 'VR legs'. This is done by initially playing VR games that require little to no virtual walking, and then gradually playing more trying games with locomotion and sprinting/jumping options.

Potentially, in efforts to avoid nausea and appeal to a wider player base, mainstream VR games like *Half-Life: Alyx* (2020) and *Horizon Call of the Mountain* (2023) severely limit the player's movement. This can dampen the sense of

agency the player has over the virtual body, which could disrupt immersion. In *Half-Life: Alyx* (2020), for example, there is no ability to sprint or jump, which can disrupt the urgency established in various game scenarios. It undermines the game's tension if I am only able to (slowly) walk around during a gun fight, or from a monster. *Horizon Call of the Mountain* (2023) limits player movement further during combat encounters. Enemy engagements in the game typically take place in some form of 'combat arena', during which the player is limited to only moving sideways, as if on an invisible rail along the outskirts of the arena, without the ability to freely move forward or backward. This is dramatically dissimilar to the traditional flatscreen *Horizon* games, in which players are free to engage the encounter as they please in the open-world. These movement limitations are designed to safeguard players from getting nauseated, while also trying to elicit immersion, but ultimately, they can limit what VR potentially offers best: the player's agency over their virtual body. It seems counterintuitive to restrict player movement on a platform that involves their body as closely to the experience as VR does. As Elena Kalina and Mina Johnson-Glenberg (2020) indicate, presence and engagement are negatively affected if player agency or *active embodiment* is lessened —even in VR.

Indie VR developers on the other hand, seem more willing to free the player to move as they like. This level of freedom is almost expected in a modern gaming experience. In indie VR games such as *Blade & Sorcery* (2024), *Bonelab* (2022), *Contractors Showdown: Exfilzone* (2024) and *Into The Radius 2* (2024), I am able to sprint (either by pressing down on the controller or by swinging my arms faster) to more quickly traverse greater distances in the game. Sprinting is also used to evade incoming attacks or find cover more quickly, which feels essential and more immersive in many encounters. The inclusion of unrestricted jumping in these games further enhances player agency by allowing for vertical exploration and additional interaction in combat. Climbing is also largely featured in games like *Blade & Sorcery* (2024) and *Bonelab* (2022), as the player is often required to climb to areas to progress. These games are entirely physics based and so the player is likely able to climb anything that could hold their body's weight (if they can grip it), as opposed to pre-defined climbing paths. If the player falls in the game, they fall at the expected speed as per the game's physics engine. Whereas in *Half-Life: Alyx* (2020) and *Horizon Call of the Mountain* (2023), the player's fall is drastically slowed down as to not discomfort them. These decisions that cater for player comfort can ultimately affect the gaming experience overall, limiting the extent to which the developers can immerse players in the game. While the appeal of VR is arguably 'unparalleled' immersion, mainstream game developers seem to artificially restrict themselves. Though the abilities to run or jump in VR can be challenging to implement, and take time to get used to, they allow the player to experience the true extent of immersion that the medium has to offer. This is best illustrated by a descriptive experience of the giant stone golem boss encounter (Image 04) at the end of the more challenging dungeons in *Blade & Sorcery* (2024).

Image 4. The giant stone golem boss encounter

Source: *Blade & Sorcery* (2024), screenshot by author.

The engagement with the giant stone golem begins with a large drop into the boss arena, and the only way to progress through the level is to defeat it. This is done by shattering the crystals on its body. These crystals can be shattered using medieval weapons or magic, all while evading the golem's own attacks and spells. During the battle I am free to move around the whole arena and engage the golem as I see fit. Some of the crystals are positioned on top of the golem, requiring the player to climb the golem itself, often while it is moving, to destroy them. While it can be bewildering to hold onto the golem as it swings around in VR, it creates a highly immersive gaming experience and plays well into the fantasy of the game. To make things more challenging, some of the golem's crystals are shielded, and require the player to first break a larger shield crystal located around in the arena, often in high-up areas. The player reaches these crystals by climbing and swinging across gaps, while evading rocks and spells being thrown by the golem. This sense of scale and verticality in the environment, and the freedom afforded to the player to traverse unrestrictedly through it, is not experienced it more mainstream VR games. Jumping down from a high ledge onto the moving golem can be a daunting, vertigo-inducing prospect for newcomers to VR, yet the immersion of the experience is arguably unmatched by mainstream games (Image 05).

Navigating this level of agency and movement in VR requires significant habituation. I found my initial experiences with this type of game design to be physically discomforting, to reiterate Hirobe *et al.* (2025). Now, having been conditioned to this type of gameplay, I find that this unrestricted movement facilitates a deeper sense of presence, making it amongst the most immersive gaming experiences available. It is owed to this level of agency, *in* an interactable 'full' virtual body, that I find I return to indie games rather than to mainstream ones in VR. While the level of detail, graphical fidelity, voice acting, animation or narrative of mainstream VR games like *Half-Life: Alyx* (2020) and *Horizon Call of the Mountain* (2023) may surpass that of indie VR games, indie developers seem more willing to accommodate experienced VR gamers to live-out their fantasies in immersive game worlds.

Image 5. Jumping down towards the giant stone golem

Source: *Blade & Sorcery* (2024), screenshot by author.

CONCLUSION

Through their ability to more freely experiment with game design, indie game developers can have transformative effects on the industry (Garda and Grabarczyk, 2016). This is evident in their impact within the VR space, particularly with little competition from the mainstream sector. Indie games have become, as Pawel Grabarczyk (2020) argues, "the reference point of how a VR game looks like, and they have set the horizon of expectations for the new technology". In some ways, indie developers in VR are delivering experiences indistinguishable from mainstream games, producing games with a high graphical fidelity (illustrated by *Blade & Sorcery*) that elicit substantial levels of immersion and presence. The four indie games analysed here also do not appear to employ any form of *independent style*, following Juul (2014; 2019), as there is no mainstream to defy. Instead, they seem to prioritise immersion by affording a greater SoE and player agency with unrestricted movement. Though new players may need to habituate themselves to play these VR games, by doing so they gain access to the new immersive depths that VR has to offer. This reiterates Janet Murray's (2017 emphasis added) sentiment regarding the experience of immersion; "in a participatory medium, *immersion implies learning to swim*, to do the things that the new environment makes possible".

In this paper, I have highlighted that while much has been written on the progress and influence of the indie video game sector, very few studies have considered how indie games fare in VR as an emerging medium, a gap this study helps to address. I argued that the indie sector has pioneered in delivering what Rick Lane (2020) calls VR's "promise of unparalleled immersion", as AAA VR developers seemingly constrain themselves to cater for the mainstream. This is evident in the implementation of a 'full' virtual body and the agency elicited by the freedom of movement provided to the player, which I illustrate through the analyses of four prominent, contemporary indie games developed exclusively for

VR. Lastly, I maintained that indie VR games seem to employ these immersive strategies to influence gameplay mechanics to create unique gaming experiences only realisable in VR.

Michael Walter is a South African academic, currently lecturing in the Media & Creative Industries Department at the United Arab Emirates University, Al Ain, United Arab Emirates. He received his PhD in Digital Culture & Media from the University of Pretoria, South Africa in 2024. His thesis focused on the multidimensional experience of immersion in video games and virtual reality (VR), for which he developed the Player's Immersive Experience (PIE) Model, a framework to analyse the complex nature of the immersive experience in (VR) video games. A publication, conference presentation and book chapter, have emanated from his PhD. He completed his undergraduate and master's degrees at Nelson Mandela University in Port Elizabeth, South Africa. Walter continues his research in video games and immersive media such as VR.

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