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Building Virtual Worlds

Comparing the Values Behind Virtual Worlds in Academic Scholarship

and Video Games

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Declaration

I declare that this dissertation has not been submitted as an exercise for a degree at this or any other university and that it is entirely my own work.

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Abstract

Virtual worlds have recently emerged as innovative tools in studying, preserving, and presenting history and cultural heritage. Within the digital humanities, scholars have begun deploying virtual worlds as a method of academic scholarship, using the digital environments to analyze the past and convey their arguments. In this thesis, I compare the emerging practice of using virtual worlds as an academic tool with the use of virtual worlds in video games. Through the comparison, I seek to uncover the value systems that underlie virtual world creation for both scholarship and video games and how those values interact with each other when a project simultaneously engages with academic and entertainment goals. Additionally, I strive to further the understanding of employing virtual worlds as tools for knowledge creation and documentation within the digital humanities. To accomplish this, I analyze three specific virtual world projects based in history, each with different groundings in academic and entertainment interests. I examine the development and decision-making process that went into building the virtual worlds for the academic virtual world project *Contested Memories: The Battle of Mount Street Bridge*, the scholarly video game *Walden, a Game*, and the commercial video game *Assassin's Creed Origins*. Ultimately, my analysis suggests virtual worlds built as academic tools focus on maximizing communication, virtual worlds in video games focus on creating an engaging player experience, and in-between cases negotiate a balance between the two.

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Introduction

In today's day and age, a person can tour the Louvre, visit the Great Pyramid of Giza, and relive famous battles from World War II without leaving the comfort of their own home, all through the use of virtual worlds. Virtual worlds are perhaps best known for their use in video games as the 3-dimensional environments that players' avatars occupy and explore (Bartle 2004). Ongoing advancements in graphics and computing have resulted in virtual worlds becoming more detailed, immersive, and interactive than ever, leading to increasingly high-quality gaming experiences. However, gaming is only one possible application for such technology. Beyond their use in entertainment, virtual worlds have emerged as innovative tools in studying, preserving, and presenting history and cultural heritage. Different fields have readily adopted 3D modeling practices to create virtual museum experiences, run historical simulations, and reconstruct archeological sites (Markopoulos et al. 2020; Kenderdine 2015; Pujol-Tost 2017; Johnston 2020; Paradis et al. 2019; Schreibman and Papadopoulos 2019). Within the digital humanities, scholars have begun deploying virtual worlds as a method of academic scholarship, using the digital environments to analyze the past and convey their arguments. Though the place of virtual worlds in scholarship is still an ongoing discussion, it represents an intriguing avenue for digital humanities research moving forward.

Talking about virtual worlds requires a bit of definitional detangling, particularly regarding the distinction between virtual worlds and video games. Virtual worlds originated as computer games and thus have a close association with gaming and entertainment (Bartle 2004). Consequently, many definitions of virtual worlds reflect gaming approaches (Papadopoulos and Schreibman 2019). According to Bartle (2004), the distinguishing conventions of a virtual world are that it has rules (referring to the physics of the world), it is persistent, interactions take place in real-time, players have an embodied presence in the world, and the world is shared. Following these conventions results in a virtual world resembling an avatar-based, multiplayer social environment like *Second Life*. Scholars have often rested on the social elements of virtual worlds to distinguish them from video games. Games were described as goal-based systems, engaging players through artificial conflict and

storytelling (Salen and Zimmerman 2003; McCall 2012; Johanson 2015), whereas virtual worlds had open-ended goals and environments that supported socialization and communication (Johanson 2015; Bartle 2004). However, gaming experiences today continue to evolve and vary wildly, to the point where there is no conclusive definition of what constitutes a game beyond featuring interactivity (Coltrain and Ramsay 2019; Gallagher 2021). By such standards, these multi-user virtual worlds arguably qualify as games themselves through the requirement of avatar-based interactions. While *Second Life* and similar online social environments still count as virtual worlds, they make up only one type of virtual world. Thus, not only are Bartle's conventions insufficient for distinguishing virtual worlds from games today, but they also define virtual worlds too narrowly, especially for the purposes of this paper.

Crucially, the uses of virtual worlds have expanded beyond digital socialization, necessitating a reevaluation of the term. As Papadopoulos and Schreibman (2019) point out, the *Second Life* conception of virtual worlds neglects more recent approaches which use the virtual environments as tools in research and education. Indeed, the vast majority of historical virtual worlds lack the necessary conventions to qualify as virtual worlds under Bartle's definition, such as avatars, multiple users, persistency, or communication tools (Papadopoulos and Schreibman 2019). Investigating historical virtual worlds, particularly in the context of research and scholarship, thus necessitates operating with a broader definition. When stripped back to the most basic interpretation, a virtual world is a computer simulated setting or environment "comprising computationally generated rules [or physics] and 3D content" (Johanson 2015, 111). This definition is more useful for discussing virtual worlds as deployed in the context of historical research and education since it does not constrain the shape the virtual world takes or how it is used. Additionally, expanding what classifies as a virtual world still incorporates the previous definitions; only now, the inclusion of avatars and multiple users is optional. The consequence of this broader definition is that the distinction between video games and virtual worlds becomes more fluid, resting on the mechanics that accompany the virtual world setting and the developer's intentions. Ultimately, in this thesis, a virtual world refers to a digital environment in isolation, accompanied by few to no game mechanics. A 3D video game can then feature virtual worlds as its settings.

Virtual worlds and video games can benefit digital humanities research by offering immersive and personalized experiences. These qualities make them effective teaching tools since they convey information engagingly. Virtual environments present users with multisensory experiences, creating a sense of immersion and engagement with the digital setting and its material (Kenderdine 2015). Immersive virtual environments can lead to positive learning outcomes when used for education by creating connections between symbolic and experiential information (Hutson and Olsen 2021). The interactive nature of virtual worlds and video games can also increase users' engagement with otherwise challenging humanities theories by turning the passive activity of accessing information into an active discovery experience (Gallagher 2021; Kenderdine 2015). Such agency grants users control over the learning process, letting them find new meanings on their own and create individualized memories of the material (Kateros et al. 2015; Kenderdine 2015; Johanson 2015). The combination of immersion and interactivity makes virtual worlds and video games ideal vehicles for modeling humanistic theories as they can express complex ideas, provide dynamic context, activate a wide range of thought styles, and encourage empathy (Coltrain and Ramsay 2019; Jagoda 2014). However, such benefits also come with drawbacks. As Burdick et al. (2012) explain, virtual environments have a "seductive force of seamless presentation," transmitting information in a cohesive image that often discourages further questioning. Thus, digital humanists engage with virtual worlds and video games not only for their pedagogical advantages but also to bring a critical perspective to their outputs (Burdick et al. 2012)

The use of virtual worlds for scholarship versus entertainment invites a compelling comparison since both spaces employ similar development practices to achieve different ends. Even more compelling is the fact that these two applications of virtual worlds are not mutually exclusive. Countless video games take place in real present-day or historical settings, having reconstructed existing locations and historical sites for players to explore. The pedagogical capacity of video games for conveying history and heritage has led many scholars to position video games as cultural heritage in their own right and valid subjects of digital humanities research (Coltrain and Ramsay 2019; Wilson, Saklofske, and The INKE Research Team 2019; Eklund, Sjöblom, and Prax 2019; Schreibman and Papadopoulos 2019). Meanwhile, some digital

humanities projects have started using video games as a form of ludic documentation, employing game mechanics along with the virtual worlds to transmit and reinforce a central argument. Such use coincides with a growing amount of literature exploring how virtual worlds and video games can function as methods of digital humanities scholarship rather than its subjects (Wilson, Saklofske, and The INKE Research Team 2019; Ruberg 2018; Gallagher 2021; Spring 2015). In both cases, developers build a video game with a history-based virtual world. However, each have distinct motivations behind their virtual world's construction and separate intended uses for the final game. At the same time, game developers in each context must balance both academic and entertainment interests when building their virtual worlds. The overlap between these two spheres provides an opportunity to compare virtual world development in both contexts and explore the compatibility of those value systems when the contexts combine.

In this thesis, I compare the emerging practice of using virtual worlds as an academic tool with the use of virtual worlds in video games. Through the comparison, I seek to uncover the value systems that underlie virtual world creation for both scholarship and video games and how those values interact with each other when a project simultaneously engages with academic and entertainment goals. Additionally, I strive to further the understanding of employing virtual worlds as tools for knowledge creation and documentation within the digital humanities. Virtual worlds can potentially define the future of digital humanities scholarship as research methods become increasingly technologically advanced and video games grow more established as legitimate cultural objects and vehicles for information. Thus, insight into how various virtual world projects manifest in an academic context and how that differs from more conventional uses in entertainment proves invaluable. While many sources have discussed the place of virtual worlds and video games as both the subjects and outputs of digital humanities scholarship, few have explored them from the perspective of their development and the decision-making processes behind them. In articulating the values systems that define the development of virtual worlds in academic and entertainment contexts, I seek to make implicit knowledge explicit and offer a foundation for future engagement with virtual world-based scholarship.

To accomplish this, I combine a literature review with a detailed analysis of three specific virtual world projects. The projects include a virtual world built specifically for academic use, a virtual world in a video game meant primarily for academic use, and a virtual world in a video game meant primarily for entertainment but which had a significant grounding in history and heritage. I analyze these projects and their decision-making processes based on various articles documenting each project's development. While there are many uses for virtual worlds within the digital humanities, I focus specifically on applications in history and cultural heritage. Hence, each virtual world project considered in this thesis contributes to historical scholarship or meaningfully engages with history. I look at these three types of virtual worlds to compare how the projects and the resulting virtual worlds differ when the end goal is scholarship versus entertainment, as well as the in-between cases where both aims have an influence on the development process. Such comparison allows me to uncover a more comprehensive view of the value systems involved in creating virtual worlds in both spheres and how those spheres overlap.

The first chapter of this thesis surveys the current state of knowledge concerning the use of virtual worlds and video games in academic scholarship, including their affordances, constraints, and current standards within digital humanities research. Chapters two through four each explore one of the chosen virtual world projects, describing the project, its development, and the significant decisions the developers made when constructing the project's virtual world. Chapter two focuses on the academic virtual world project *Contested Memories: The Battle of Mount Street Bridge*. Chapter three covers the scholarly video game *Walden, a Game*. Chapter four covers the triple-A video game *Assassin's Creed: Origins*. In chapter five, I analyze the development process for the three projects, compare and contrast them with each other, and articulate the different values underlying the decision-making for each virtual world. Finally, chapter six presents my conclusions and suggests potential areas for future research.

Literature Review

Virtual Worlds and Video Games in Digital Humanities Scholarship

Understanding the place of virtual worlds and video games in digital humanities research first requires familiarity with critical making. Critical making is an approach to studying the link between technologies and social life by combining critical thinking with physical making (Ratto 2011). Scholars build a material output through research, design, reflection, and reconfiguration (Ratto 2011). Crucially, the goal of critical making is not the resulting product but the activity of creation itself. The construction process becomes a site for conversation, analysis, and reflection, bringing a critical perspective to insights from scholarly literature and lived experiences (Ratto 2011). Within digital humanities, making as a form of research represents an essential investigative method (Jagoda 2014; Wilson, Saklofske, and The INKE Research Team 2019; Burdick et al. 2012; Ruberg 2018). As Burdick et al. (2012) describe, digital humanities is a production-based endeavor where design is an indispensable method of "thinking-through-practice." Researchers test theoretical issues through the design of implementations, and the implementations become loci of theoretical reflection and elaboration (Burdick et al. 2012). Thus, critical making emerges as a fundamental framework for digital humanities research, especially in the context of new technological tools, bringing a critical lens to the technological output of a project and its development process.

Academically focused virtual worlds and video games find grounding in digital humanities scholarship through appreciating their design and development as a type of critical making. The virtual world, or video game, is the material output; therefore, the design process becomes the main area for analysis and critical reflection. In practice, game design can function as a way for researchers to work through different concepts essential to their scholarly questions as they attempt to represent those ideas visually or through game mechanics (Jagoda 2014). Additionally, the iterative creation of game-based experiences allows researchers to explore the consequences of different choices and variables (Wilson, Saklofske, and The INKE Research Team 2019). The possibilities for deep conceptual engagement and ongoing

experimentation through game design lend themselves to the same thinking-through-practice indicative of critical making and digital humanities.

While virtual worlds and video games fit within existing research strategies, they also present opportunities to push the digital humanities field forward. Ruberg (2018) argues for viewing game making, specifically queer indie games, as an alternative form of digital humanities that suggests new strategies for making meaning through and from digital tools. Though virtual worlds and games may not resemble traditional digital humanities projects, they still explore the intersection of the digital and the human, approaching humanistic inquiry through digital tools and reconsidering digital media through a humanistic lens (Ruberg 2018; Gallagher 2021). Beyond their benefit to conducting research, virtual worlds and video games also offer mechanisms for using digital frames to critique social and cultural issues. In the case of queer indie game making, researchers can use video games to interrogate the place of queer subjects in American culture and simultaneously bring queer and intersectional perspectives to video games to investigate the politics of the medium (Ruberg 2018). In addition to the act of game making—or virtual world making—assisting the researchers in their inquiries, the resulting world or game is also beneficial in ways textual scholarship cannot match. The interactive nature of the virtual projects allows researchers to convey their findings or cultural critiques while also recreating the discovery process for the readers (Ruberg 2018; Wilson, Saklofske, and The INKE Research Team 2019; Gallagher 2021; Coltrain and Ramsay 2019). Thus, the innovation of virtual worlds and video games extends beyond research methods to documentation.

Though virtual worlds and video games present new research and documentation possibilities, they do not fundamentally alter the nature of humanistic research and scholarship. Making virtual worlds for scholarship in the humanities requires tools and approaches already at humanists' disposal to be reapplied to a new landscape that includes a broader field of inquiry (Johanson 2015). Likewise, the process of designing, playing, analyzing, and evaluating games calls for modes of intellectual flexibility that have long been a foundational feature of humanities and its related disciplines (Jagoda 2014). These foundational tools can be seen in the relationship between virtual world and video game design and critical making, as well as in

how researchers use such virtual projects as scholarship. As Johanson (2015, 122) writes, "to argue is the stuff of scholarship." Presenting an argument grounded in evidence is the foundation of scholarship, regardless of its form. Virtual worlds and video games have an intrinsic capacity for storytelling and being interpreted as stories, smoothly allowing them to function as arguments (Johanson 2015). The technology has changed, and the form of scholarship looks different, but the work of the digital humanist to present a grounded argument remains the same.

Much of the literature points out similarities between scholarship in the form of virtual projects and traditional texts, particularly in terms of the challenges they face. Schreibman and Papadopoulos (2019) highlight what they call a "parallel path" between virtual world and textual scholarship as both grapple with reconstructing their texts based on existing and imperfect evidence, finding ways of making the decision-making process visible, and how to deal with ambiguity. Despite the different mediums, academic virtual worlds still strive for scholarly standards and thus deal with the same problems. Of course, the ways of resolving each issue differ between forms. Virtual worlds' distinctive medium brings with it exclusive conventions for conveying information, such as an educational experience. While such conventions may influence a player's potential interpretation of the material, they are no more limiting or influential than standard practices in written humanities scholarship (Coltrain and Ramsay 2019). For example, a video game might employ graphic stylization and make emotional and visual appeals, all of which can influence the humanistic interpretation conveyed through the game (Coltrain and Ramsay 2019). However, humanists can also include stylized writing in their written scholarship, appeal to emotions through vignettes or personal anecdotes, and use charts, diagrams, and illustrations that can affect readers' interpretations (Coltrain and Ramsay 2019). Finally, all forms of historical scholarship are subject to selectivity and simplification, condensing time, generalizing space, and simplifying historical processes to present an easily comprehensible representation of the chosen period (Chapman 2012; Coltrain and Ramsay 2019; Shaw 2015).

While academic virtual worlds and video games feature many similarities to traditional scholarship, it is necessary to remember that they are not the same as academic texts. Virtual

worlds and video games have distinct affordances that do not fit easily with more traditional media forms (Copplestone 2017). Virtual world scholarship operates through a fundamentally different communication form, which requires new strategies from researchers on the presentation level and new strategies from readers on how they engage with the scholarship. However, scholars continue to judge academic virtual worlds and video games by the same standards as traditional scholarly media (Copplestone 2017). Under such standards, virtual world projects are often deemed lacking in sufficient scholarly argumentation unless accompanied by some explanatory text (Johanson 2015; Balmer 2014). Though there is nothing inherently wrong with deploying virtual worlds and video games as a supplement to existing scholarly practices, requiring the accompaniment of a more traditional article ignores the 3D medium's specific affordances and limits the potential for innovating scholarship. Widespread acceptance of 3D scholarship thus depends on reimagining what scholarly products look like, such as placing greater emphasis on creating meaningful analogs for the discovery process in 3D space rather than importing traditional methods from older scholarly forms (Coltrain and Ramsay 2019). When judged by the standards of their medium, virtual worlds and video games show a remarkable capacity to stand on their own, not just as a supplement to traditional documentation.

Virtual worlds offer many unique benefits to digital humanities scholarship and research, particularly in history and cultural heritage. As described previously, virtual worlds facilitate multisensory experiences and user-directed exploration, making them effective educational tools by conveying information in immersive and engaging ways (Kenderdine 2015; Hutson and Olsen 2021; Gallagher 2021). Such immersion is beneficial for history- and heritage-based virtual worlds since it establishes presence, or a sense of being in a real place and time, allowing users to more effectively engage with the digital environment and the knowledge it generates (Pujol-Tost 2017; Kateros et al. 2015; Kenderdine 2015). Another advantage to working in virtual space is the ability for researchers to include in-world annotations in their projects. Annotations can include textual explanations, sounds, videos, and even highlighting around paths or objects of interest (Johanson 2015; Papadopoulos and Schreibman 2019). Researchers can use annotations to bolster a virtual world's communicative abilities, cite

scholarly sources in-world, and increase engagement through interactivity (Johanson 2015; Papadopoulos and Schreibman 2019). In addition to the pedagogical advantages, virtual worlds also present new opportunities for research and discoveries. Researchers can use digital environments to visualize absent information, model lost or otherwise inaccessible spaces, and view sites from new angles and perspectives (Egea-Vivancos and Arias-Ferrer 2021; Johnston 2020). The virtual expansion of access and exploration allows researchers to see new relationships between objects and uncover stories about the spaces and people that were invisible in their time or overlooked by history, such as those of slaves and laborers (Johnston 2020).

Video games share many of the scholarly advantages that virtual worlds bring to digital humanities, but they also contribute their own distinct advantages to scholarship. Video games feature the same immersion, interactivity, and user agency present in virtual worlds but to a much higher degree. As a result, video game worlds can convey experiences and relate scholarly understanding in a way few other academic works can (Casey 2021). The high interactivity grants video games a superior capacity to handle multiple options and outcomes, allowing researchers to present analyses where players explore multiple interpretations rather than advancing a single theory (Coltrain and Ramsay 2019). Including rules and game mechanics on top of the virtual world also makes video games effective at expressing complex ideas and modeling humanistic theories (Coltrain and Ramsay 2019). Through simulations, role-playing, or interactive cause and effect, players get to see and experience different ideas play out for themselves. Bogost (2007) calls this kind of experiential communication "procedural rhetoric," referring to how video games use mechanics, rules, and interactions instead of words or images to convey a particular argument or ideology. Though perhaps not as straightforward a form of communication as text or even annotations, video games' procedural rhetoric can result in a more embodied form of learning. By playing the game, players engage in similar modes of interpreting and negotiating meaning as when reading but with an added layer of doing (Chapman 2012). Overall, video games can provide a more flexible scholarly experience and can leave players with a deeper and more personalized understanding of the subject matter.

Despite the many benefits virtual worlds and video games bring to digital humanities scholarship, they also come with many drawbacks. The most prominent limitation of both virtual worlds and video games is the problem of preservation and sustainability. The long-term sustainability of 3D visualization outcomes and documentation is crucial to establishing standardized methodologies and academic legitimacy for virtual worlds and video games in scholarship ("London Charter" 2006). Unfortunately, most 3D outcomes have relatively short life spans (Hermon, Sugimoto, and Mara 2007). Video games are subject to hardware and software obsolescence five to ten years after release (Kraus and Donahue 2012). Virtual worlds face similar obsolescence as the platforms used to build the virtual worlds quickly become incompatible with different web browsers (Papadopoulos and Schreibman 2019). The responsibility for sustaining and preserving scholarly virtual worlds and video games rests with the individual researchers or game developers, who must continuously maintain their projects. This responsibility is less of a problem in the video game industry, where studios have more people and resources to maintain their games (Kraus and Donahue 2012). Additionally, player communities often actively preserve the software and artifacts of their favorite video games, filling in the gaps when studios let a game break (Kraus and Donahue 2012). However, virtual worlds and scholarly games tend to come from independent developers and thus lack the internal resources and audience to support long-term sustainability for their projects without intense personal investment.

For virtual worlds, the problem of sustainability also leads to a problem of accessibility. Ideally, researchers would host virtual world projects online where others could easily find and engage with them. However, due to the computational power required to host the worlds online and conduct various analyses, most researchers create their virtual world projects for offline use (Schreibman and Papadopoulos 2019). Only the individual or team who worked on the virtual world has access to it, making it difficult for outside researchers to learn from each other's projects (Schreibman and Papadopoulos 2019). Additionally, general audiences cannot find or access the offline models, resulting in the virtual medium's pedagogical benefits going completely unexploited. The current norm for the majority of 3D scholarship is that the virtual model exists electronically, but the knowledge generated from it is documented in a journal

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article and illustrated by static 2D images of the virtual world (Schreibman and Papadopoulos 2019). Though the accessibility issues do not impede virtual worlds' usefulness as a research tool, they limit researchers' ability to deploy virtual worlds as scholarly documentation.

The limitations of video games in scholarship primarily center around the fact that they are games and need to be playable. One of the most significant deterrents to integrating video games into scholarship is the association of gaming technology with recreation and leisure (Egea-Vivancos and Arias-Ferrer 2021). While this association is a matter of audience mindset rather than a limitation of video games, it affects how researchers engage with the technology. There always exists some expectation that a video game offers players an enjoyable experience, even in the case of games designed to function in an academic capacity (Bartle 2004; Johanson 2015). Such expectation poses a challenge to researchers as scholars have noted an inverse relationship between increasingly realistic gameplay features and a video game's playability (Papadopoulos and Schreibman 2019; Rejack 2007). In other words, the closer a video game comes to properly simulating reality, the less enjoyable it becomes to play the game. As a consequence, researchers must inevitably make concessions to realism in their academic games to produce a playable experience (Papadopoulos and Schreibman 2019; Rejack 2007). This leads to another limitation of video games in scholarship, which is the inability of researchers to properly document the decision-making processes in-game, at least to the same extent as textual scholarship. Researchers cannot document every compromise to realism made without massively disrupting immersion and playability, making it difficult for audiences to ascertain how carefully developers designed their game worlds to represent the real world without outside information (Rejack 2007). Thus, researchers intent on using video games for scholarship must not only balance playability with accurately conveying reality but also grapple with documenting their process.

Established Values and Ongoing Discussions

Perhaps the most noteworthy attempt at articulating a value system to underlie virtual world creation is the London Charter, which aims to establish internationally standardized principles for using computer-based, 3D visualizations in cultural heritage research (Hermon,

Sugimoto, and Mara 2007; "London Charter" 2006). The London Charter outlines a series of principles, including choosing the most appropriate visualization method for the research aims, planning for long-term sustainability and accessibility, and properly documenting the decision-making process along with all relevant research sources ("London Charter" 2006). The values at the core of these principles, and the approach they outline toward building virtual worlds, are ones of academic rigor and scholarly presentation. It is not enough for a virtual world to successfully communicate an argument; it must also back up all information it presents and reveal the research process behind its findings, just as all textual scholarship must do. While such academic standards are instrumental, the London Charter has many limitations that prevent it from becoming widespread. For instance, it recommends a level of detail in documentation that is difficult to achieve and does not make the decision-making process more transparent (Papadopoulos and Schreibman 2019). Additionally, its principles apply equally to all 3D outcomes without accounting for differences in discipline, methodology, objectives, and uses between projects (Hermon, Sugimoto, and Mara 2007). Thus, for the purposes of this paper, the London Charter proves more helpful in establishing a baseline for considering academic standards when designing and evaluating virtual world projects rather than offering a fully articulated value system.

Setting aside concerns for academic rigor, the rest of the literature centers virtual world design around the values of effective communication and user engagement. The need to convey an argument and findings permeates researchers' every decision when designing their virtual worlds (Papadopoulos and Schreibman 2019). Take, for example, the choice of a visual style. As Paradis et al. (2019) describe, the goal of creating a scholarly virtual world is not to digitize reality but to obtain "a tool to further our understanding and conception of past reality through efficient realism" (880). These virtual worlds are research and communication tools; therefore, realism, or exactly recreating a historical site, is only valuable insofar as it contributes to understanding the past and imparting insights to users (Paradis et al. 2019; Pujol-Tost 2017). However, communication is not the only vital consideration in virtual world design. Recent virtual worlds have increasingly focused on creating an engaging user experience (Pujol-Tost 2017). When listing the elements in an ideal virtual reconstruction, Pujol-Tost (2017) included

the qualities of visually interesting and varied as well as immersive and multisensory. Such attributes are not necessary for a virtual world to effectively communicate, but they support user engagement and make interacting with the virtual world a more pleasant experience. Thus, the literature presents communication and user engagement as significant underlying motives in designing scholarly virtual worlds.

In contrast to virtual worlds, video games operate on completely different design principles that affect their representations of history. At the most basic level, commercial video game design is determined by three factors: business, technical, and gameplay (Bartle 2004). Business, or consideration for cost and profit, has a surprisingly significant influence on depictions of history and heritage in commercial video games. The primary concern for commercial video games is minimizing risk and maximizing sales, leaving designers constrained to approach history and heritage according to existing portrayals that have proven to sell well rather than thoughtfully engaging with the past (Copplestone 2017). Technical factors also affect how games represent the past. Hardware and software limitations dictate the level of detail and immersion developers can achieve in their historical reconstructions (Cassone and Thibault 2016). Gameplay, meanwhile, serves as the primary mechanism through which games engage with history, aside from its virtual world. Developers implement history and heritage into games through setting, game dynamics, and narrative while translating history through a present perspective, the technological medium, and ludic considerations to create the final game (Cassone and Thibault 2016). Historical elements get integrated into gameplay, but translating history's infinite complexity into a precise set of rules for players to follow inevitably requires a simplified representation (Cassone and Thibault 2016; Shaw 2015). Thus, successfully designing history-based video games requires balancing business, technological, and ludic constraints.

While history-based commercial games have educational value, they are not the same as scholarly games, which have their own unique design considerations. Spring (2015) defines "scholarly games" as video games based on original primary source research that forms an argument and closely examines a historical topic. Researchers ground the design process for scholarly games in their historical goals, objectives, or perspectives (Spring 2015). To maintain

an academic focus, Egea-Vivancos and Arias-Ferrer (2021) suggest that researchers continuously consider the academic context in the design process and use various means to reinforce information. The most salient means of delivering information is, as always, gameplay. When determining gameplay, the chosen historic setting—the virtual world— impacts the options available to researchers. A small virtual world might work best with puzzles or mini-games, while a larger environment can support more exploration-based objectives (Kateros et al. 2015). Beyond considering the setting, researchers draw the game rules and mechanics for scholarly games from the explored heritage and historical questions (Spring 2015). However, once again, researchers must balance history with gameplay. While video game development prioritizes gameplay above all else, scholarly games shift the priority to historical facts, which complicates the design process (Spring 2015). This shift results from the fundamentally different objectives between video games and scholarly games. For video games, all aspects of the game serve to reinforce a theme, but in scholarly games, all aspects reinforce the researcher's thesis and argument (Spring 2015).

The inherent differences between entertainment and scholarship lead to the first ongoing discussion surrounding academic uses of virtual worlds and video games: the role of enjoyment in scholarship. According to Papadopoulos and Schreibman (2019), the crucial difference between using virtual worlds in games versus for academic purposes is that games privilege users' immersion over historical accuracy, while scholarly virtual worlds prioritize historical accuracy above immersion. As discussed previously, researchers consider users' experience of scholarly virtual worlds, but they do so in terms of how well users receive the intended facts and argument. The goal is not to have users suspend disbelief through an immersive environment but to provide a contextualized environment for users to better understand and draw their own conclusions about the created world (Papadopoulos and Schreibman 2019). This preference for delivering facts over constructing an immersive experience makes sense with using virtual worlds as a tool for scholarship. When preparing texts, historians write for a specific academic audience where their concern is how well their argument and thesis hold up, not how much pleasure a reader gets from their engagement

(Spring 2015). The academic norm is that scholarship comes before enjoyment, and virtual worlds easily conform to this convention.

For video games, the hierarchy between scholarship and enjoyment becomes more complicated. Game technology inherently implies fun (Johanson 2015). Players voluntarily participate in video games expecting to get some amusement out of their experience (Bartle 2004). The expectation for entertainment is so great that Johanson (2015) warns, "build a virtual world on gaming technology without acknowledging "fun" at your peril" (122). Hence, scholarly games must center the player in their game design, regardless of whether the game is intended only for other academics (Spring 2015). Instead of scholarship being paramount to the design process, as is the case with virtual worlds, the video game medium requires researchers to balance academic interest with satisfying gameplay. Researchers must assess the relevant primary source material and determine the most enjoyable way for players to engage with it, not the most efficient means of communicating it (Spring 2015). The fun does not necessarily supersede scholarship, but it at least shares salience in the game design process. Such deviation from the academic norm carries consequences for accepting video games as scholarship. The very quality of being entertaining prompts many critics to discard the academic merits of video games altogether (Egea-Vivancos and Arias-Ferrer 2021; Casey 2021). At the same time, others have argued that it is simplistic to exclude video games from the discussion for the crime of being enjoyable (Casey 2021). Either way, scholarly games cannot ignore fun; they can only strive to achieve a balance between scholarship and entertainment.

The second and last ongoing discussion within the literature worth mentioning is the role of historical accuracy in video games, specifically history-based commercial video games. A considerable appeal of history-based games is their level of historical detail (Shaw 2015). However, as mentioned before, creating an enjoyable ludic experience requires developers to simplify historical narratives (Shaw 2015; Kapell and Elliott 2013; Cassone and Thibault 2016; Rejack 2007). Simplification is not inherently problematic as all representations of history are reductive on some level, even in scholarship (Chapman 2012; Coltrain and Ramsay 2019; Shaw 2015). The issue is that while scholarly games strive to balance historical accuracy with game mechanics, commercial games blatantly prioritize gameplay over accuracy. For example, in

Assassin's Creed III, set during the American Revolution, the Native American player character can rip down wanted posters to reduce suspicion from the guards, allowing the player to pass through town less hindered (Shaw 2015). This mechanic makes sense from a ludic standpoint of letting players resolve obstacles, but it is at odds with the stigma and suspicion a Native American would realistically face in colonial society regardless of how many wanted posters they removed (Shaw 2015). Prioritizing gameplay then undermines the relevance of the time period, and the historically marginalized identity players inhabit throughout the game. Such dissonance raises questions about commercial game designers' responsibility to convey all aspects of a game's chosen historical setting and how factual their portrayals need to be.

Crucially, commercial video game designers care about their depiction of the past, though their approach differs from scholarly standards. Video game developers tend to relate accuracy to physical and visual components of the games, like buildings or artifacts (Copplestone 2017). Consequently, efforts toward historical fidelity focus primarily on the virtual environment rather than incorporating game mechanics into the historical representation. Further, commercial video games ground their depictions in historical authenticity rather than accuracy (Nielsen 2017; Mochocki 2021). The distinction between accuracy and authenticity is subtle but vital. Accuracy is about getting the historical facts right; authenticity is about matching the experience and expectations of the past (Kapell and Elliott 2013; Mochocki 2021). A large part of the perception and feeling of authenticity relies on players' out-of-game knowledge of and attitudes toward the relevant history and heritage (Mochocki 2021). Accordingly, many anachronisms in history-based games result from designers catering to widespread expectations over historical facts. For instance, *Assassin's Creed Unity*, set in eighteenth-century France, depicts Notre Dame with its famous spires, which were not built yet when the game takes place, to fit how players expected the cathedral to look (Makai 2018). In a way, authenticity becomes a compromise between entertainment and accuracy. Designers can deviate from history in the game environment and mechanics for the sake of enjoyable gameplay, and so long as the representation of the past feels authentic to modern-day players, the game can still maintain a sense of realism in the historical setting (Cassone and Thibault 2016).

Naturally, video game developers and academics have conflicting views on how essential accuracy is when depicting history and cultural heritage in video games. Cultural heritage practitioners position accuracy as an integral aspect of heritage-based games (Copplestone 2017). This stance comes from the view that video games have the potential to act as authoritative sources of information (Copplestone 2017; Spring 2015). Under this view, regardless of the author's intent for the video game, its pedagogical capabilities impart a responsibility to convey correct information to players (Copplestone 2017). However, most commercial video games fall short of this ideal. Developers consider accuracy unimportant in video games or at least contingent on the type of game (Copplestone 2017). This makes sense considering their aim is to make a successful commercial product, not scholarship or even an educational tool. Critically, prioritizing entertainment and historical authenticity over accuracy does not inherently make commercial video games worthy of condemnation. Video game designers have different goals from historians, and while critics may identify problems in a historical interpretation, it is unfair to blame designers for getting facts wrong or intentionally misrepresenting the past (McCall 2012). Most scholars agree that analyzing commercial video games in terms of their accuracy or veracity is less fruitful than questioning how and why depictions of history and heritage appear in video games as they do (Chapman 2012; Kapell and Elliott 2013; McCall 2012; Shaw 2015).

Contested Memories: The Battle of Mount Street Bridge

     Contested Memories: The Battle of Mount Street Bridge is an academic virtual world project led by Susan Schreibman and Hugh Denard as part of the Humanities Virtual World Consortium. The virtual world focuses on the Battle of Mount Street Bridge, a significant battle during the 1916 Easter Rising in Ireland, where a small detachment of Irish Volunteers fought against two battalions of British soldiers (Hughes, Campbell, and Schreibman 2017). Notably, there is extensive documentation covering the events and aftermath of the battle, but little agreement over what happened during key events and the exact number of casualties the British suffered during the battle ("Easter 1916" n.d.). Through a combination of traditional historical research and virtual world-based methods, *Contested Memories* sought to answer the research question: how many casualties did the British forces suffer at Mount Street Bridge (Hughes, Campbell, and Schreibman 2017; Papadopoulos and Schreibman 2019)? Ultimately, researchers found through their historical research that the most likely number of British casualties was much lower than the most canonically accepted figures (Hughes, Campbell, and Schreibman 2017). Though the virtual world did not answer the primary research question, it supplied a crucial understanding of how the outcome could have happened (Papadopoulos and Schreibman 2019). Utilizing a virtual world allowed researchers, for the first time, to test the accuracy of assertions from Irish witnesses compared to those from British military witnesses regarding how the battle played out ("Easter 1916" n.d.). Additionally, the virtual model offered a way to spatially and temporally map the complex movements of hundreds of British soldiers and provided clearer evidence of the battlefield terrain, including lack of cover and obstacles in the way of storming buildings, than possible with a 2-dimensional map (Papadopoulos and Schreibman 2019).

     The virtual world for *Contested Memories* consists of a 3D reconstruction of Mount Street Bridge at the time of the Rising and a simulation of the battle between Irish Volunteers and British soldiers in the virtual battle site ("Easter 1916" n.d.; Papadopoulos and Schreibman 2019). To create this virtual world, researchers focused on reconstructing the physical landscape and incorporating the soldiers' behavior and capabilities for the simulation. Critical

aspects included the strength and disposition of the Irish Volunteers—their battle-readiness and the arms and ammunition they used—and the numerical strength of the British battalions (Hughes, Campbell, and Schreibman 2017). The simulation employed a variety of methodologies, such as modeling events based on historical data and controlling the decision-making of agents via a behavior tree ("Easter 1916" n.d.). Researchers modeled combat using different statistical methods and concepts from the game design field ("Easter 1916" n.d.).

The *Contested Memories* project and the development of its virtual world was deeply rooted in research. The project team collaborated with multiple historians and ballistic experts investigating the battle site to more accurately construct both the virtual world and battle simulation ("Easter 1916" n.d.). They used conventional archival research and meetings with the military historians to document different sources that provided evidence for the buildings that were occupied during the battle, participant accounts, and the accuracy of weapons used (Papadopoulos and Schreibman 2019). Additionally, with the help of ballistics experts, researchers performed controlled experiments with period-accurate guns and shooters of various skill levels to mirror and gain insight into the Irish Volunteers' situation (Papadopoulos and Schreibman 2019). Lastly, researchers used period photographs and visits to the modern-day battle site to aid their virtual reconstruction and enhance their spatial conception of the event (Papadopoulos and Schreibman 2019). They took a rigorous approach to mapping the spatial and temporal contours of the battlefield, reconstructing buildings and streets down to more minor details like tram lines, trees, shrubbery, and hoardings (Hughes, Campbell, and Schreibman 2017).

The project team experimented with different visual styles and representations for the virtual world. Early project iterations implemented a schematic representation of the battlefield that omitted features such as natural lighting, building textures, and road features (Papadopoulos and Schreibman 2019). In the end, however, researchers opted for a more detailed and realistic model. Crucially, this was not an exclusively aesthetic choice. Feedback from a group of military historians early in the development process indicated to the project team that the schematic representation did not provide enough context for a primary audience to properly utilize the research (Papadopoulos and Schreibman 2019). Adopting more visual

realism then served to contextualize the simulation and the knowledge it generated for audiences, increasing the virtual world's utility in addition to its visual appeal.

    Construction of the virtual world focused on accurately recreating the physical environment of the battle site. This job was easier for researchers since they had access to detailed cross-referenced sources about how the battle was waged spatially (Papadopoulos and Schreibman 2019). Additionally, the Battle of Mount Street Bridge primarily took place on one city block, providing researchers with a constrained environment they could accurately reconstruct in its entirety rather than a large battlefield they would need to compress into a functional 3D model (Papadopoulos and Schreibman 2019). To construct the model, the project team started by taking a laser scan of the area, which is essentially unchanged today from 1916, to produce a highly detailed point cloud (Papadopoulos and Schreibman 2019). Creating the virtual environment directly from the point cloud's automatic mesh reconstruction proved too noisy and computationally intensive for real-time visualization, so researchers used the point cloud as an accurate reference to simplify modeling the street from scratch (Papadopoulos and Schreibman 2019). The team then used Google Earth imagery, the 1911 Ordnance Survey map of Dublin, photographs taken after the Rising, and site visits to construct any areas and structures not covered by the point cloud or no longer present (Papadopoulos and Schreibman 2019). Finally, researchers depicted any building pivotal to the battle for which there was no photographic evidence using gray schematic models created from the Ordnance Survey map, visually separating them from the evidence-based renderings (Papadopoulos and Schreibman 2019).

    On the presentation level, *Contested Memories* also considered user engagement. The team's objective with the battle simulation was to allow users to modify parameters such as the general behavior of agents, the accuracy of shooting, reload time, ammunition spent, average time spent in cover, and cover preferences, all of which let users investigate different ways the battle could play out in terms of the number of casualties ("Easter 1916" n.d.). The team also wanted users to be able to view the simulation from various angles and vantage points, choosing a hosting platform that allowed users to explore the virtual world without predetermined paths, views, and orientations so they could discover new insights on their own

("Easter 1916" n.d.; Papadopoulos and Schreibman 2019). On top of encouraging exploration, researchers also incorporated interactivity into the virtual environment, employing clickable hotspots that included textual information or multimedia annotations on a side panel (Papadopoulos and Schreibman 2019). The multimedia annotations could incorporate informational videos or sounds, such as recordings of period-accurate gunfire, that could develop users' spatial awareness and further their understanding of factors like echoing that could have been critical in preventing British soldiers from locating Volunteers shooters (Papadopoulos and Schreibman 2019). While researchers included interactive elements, they were careful not to gamify their virtual world. Users entered the world disembodied—rather than occupying a soldier's perspective—so as not to encourage users to "take sides" by choosing an avatar or having them play out the battle as a gamified experience (Papadopoulos and Schreibman 2019). Further, researchers did not want additional avatars in the scene distracting from the world's historicity in the event of multiple simultaneous users (Papadopoulos and Schreibman 2019).

Finally, the technical issues *Contested Memories* ran into during its development are worth noting. Initially, the project team selected Unity 3D, a closed-source game development platform, to host the virtual world (Papadopoulos and Schreibman 2019). The project team chose Unity 3D because it supported highly detailed models and seemed to emerge as the standard platform for virtual worlds, allowing partners to focus on the scholarly content rather than dealing with technical issues (Papadopoulos and Schreibman 2019). However, by the end of the project's first phase, the Unity 3D Webplayer was no longer supported by most web browsers, requiring researchers to optimize their model to run in Unity WebGL instead (Papadopoulos and Schreibman 2019). The switch to Unity WebGL necessitated simplifying the original models to reduce complexity, resulting in the online version of the virtual world functioning as a more traditional abstract than a complete presentation of the team's research (Papadopoulos and Schreibman 2019). The end product features a narrative-driven camera and voiceover providing an overview of the battle, during which users cannot interact with the scene (Papadopoulos and Schreibman 2019). However, even this version is not accessible online at the time of writing.

Walden, a Game

      Walden, a Game is a playable virtual world/first-person video game translation of Henry David Thoreau's *Walden* (Fullerton 2020a; 2019). The game was developed by Tracy Fullerton, a game designer and educator focusing on experimental gameplay. Since its release, *Walden, a Game* has functioned successfully as an independent commercial game, an art piece, and an educational tool teaching students about Thoreau's year-long experiment in living at Walden Pond (Fullerton 2020a). When developing the game, Fullerton wanted to move away from gameplay based on conquest and competition to instead focus on the reflective possibilities of play (Fullerton 2020a; 2019). According to Fullerton (2020a), Thoreau's time at Walden Pond presented an ideal grounding for such gameplay as his experiment in living already had many game-like elements, offering a unique set of constraints and an elusive goal complete with a compelling setting. The game challenges players to find a balance between fulfilling the necessities of living and finding inspiration in everyday life—the purpose of Thoreau's original experiment (Fullerton 2019). However, it does not present Thoreau's solution to his quest as the only answer, instead allowing players the space to push against Thoreau's answers and discover their own. Through a relatively slow pace of gameplay, *Walden, a Game* grants players time to unpack their experiences and make their own meaning through interpretation and reflection (Fullerton 2019). By engaging and playing with Thoreau's ideas about work and life through *Walden, a Game*, players can understand them in a visceral manner that is distinct from approaching them through reading (Fullerton 2020b).

      Creating the game world of *Walden, a Game* involved extensive research into both Thoreau's writing and historical records. The game's virtual world setting comprises a detailed simulation of Walden Pond and its environs around 1845. It was essential to Fullerton to depict the natural environment as Thoreau experienced it, not as it looks in the modern day (Fullerton 2020a). Luckily, Thoreau, a surveyor, extensively documented these areas in his writings, providing the development team with highly detailed records to work from when reconstructing the historical landscape (Fullerton 2020a). To model the woods, which shape, contours, and trails have changed over time, Fullerton triangulated between recent US

geographical data and period maps of the trails and landmarks to determine the virtual layout (Fullerton 2020a). For the virtual flora and fauna, the team indexed Thoreau's book for all references to the natural world and identified the most-mentioned trees, plants, and animals to populate the environment (Fullerton 2020a). The game also includes other locations, such as the nearby town of Concord and relevant shops, as well as letters sent to Thoreau from friends, family, and colleagues. Unlike the natural environment, Thoreau did not document elements of society in his book on Walden (Fullerton 2020a). Hence, Fullerton relied on biographical research and deep reading of Thoreau's extant personal correspondence to determine what other locations, people, and letter contents to include in the game (Fullerton 2020a). Thus, everything has a grounding in history or Thoreau's experiences.

While the creation process for *Walden, a Game*'s world was deeply rooted in historical research, it had less commitment to strict accuracy when recreating the historic environment. Thoreau's *Walden*, the primary source material for the game, is a personal memoir and an explicitly subjective account of Thoreau's experiment (Fullerton 2020a). Hence, Fullerton sought to simulate Walden Pond and the surrounding woods as Thoreau wrote about them, not as they existed at the time of his experiment (Fullerton 2020a). The game aimed to be a translation of Thoreau's writing rather than a model of the historical environment, prioritizing his worldview and experiences at the pond over following exactly the descriptions of the natural environment (Fullerton 2020a). Such an approach allowed the team leeway to interpret different virtual world elements and make changes to support gameplay. For example, Fullerton dramatically reduced the size and complexity of Thoreau's famous beanfield as the accurate field would be too big and take too long for players to engage with during the game's short day-night cycle (Fullerton 2020a). The design of tasks and interactable objects remained thoroughly grounded in textual and historical research, but their final form ultimately relied on creative judgments on how best to abstract them for meaningful inclusion in the game world (Fullerton 2020a).

Commitment to reflective gameplay also significantly impacted how Fullerton and her team approached designing *Walden, a Game* and its environment. They began the design with an "experience goal" in mind, namely embodying Thoreau's experiment in living, and then

assessed how the world, activities, and pace of play could support this experience (Fullerton 2019). For the virtual world, Fullerton (2020a) set out to create an interactive landscape that could reflect Thoreau's personal experiences and philosophical ideas, including his deep engagement with nature. The team created a single layout for their 3D terrain that dynamically changed materials over eight distinct seasons, providing enough spatial consistency for players to grow familiar with the environment but also enough visual progression that they had reason to continuously take notice and explore their surroundings throughout the game (Fullerton 2020a). Trees, animals, and arrowheads found throughout the virtual environment had associated quotes or thoughts from Thoreau, which also changed with the seasons and got recorded in a journal upon discovery (Fullerton 2020a). These quotes encouraged players to engage with the simulated nature and Thoreau's questions about life. The amount of textual "relics" to be found, along with their seasonal dependencies, ensured players would not collect all the quotes in a single playthrough and would end the game with a unique journal based on their in-game experience (Fullerton 2020a).

Fullerton and her team also designed the game mechanics and activities to support a reflective experience. The game tracks two variables that players must balance: energy, relating to the daily tasks players must perform for survival, and inspiration, relating to seeking out the small wonders of nature (Fullerton 2020a). While energy keeps the player alive, inspiration directly impacts the look and feel of the virtual environment, adding or removing color, sounds, and opportunities for interaction depending on the player's inspiration level (Fullerton 2020a). This mechanic aimed to prompt players to think about how their choices affected the world and their experience of it, presenting engagement with the natural world as equally vital to living as food and shelter (Fullerton 2020a). Fullerton designed the game's activities similarly to encourage players to reflect on their choices in interacting with nature and society. For example, players can take surveying jobs that simultaneously fulfill the necessity of making money and exploring nature, but they must eventually confront the fact that these jobs will lead to people developing over and destroying Walden Pond's most pristine and beautiful areas (Fullerton 2020a). Through activities like this, Fullerton presented players with the same tensions Thoreau grappled with between basic survival, finding meaning in nature, and the

responsibilities one has to society. Crucially, Fullerton offered no judgments on the correct way for players to resolve this tension or find balance in their approach to living. The game allows players to make their own choices, either following or diverging from Thoreau's actions as they determine how they want to spend their year living at Walden Pond (Fullerton 2020a; 2020b; 2019).

Lastly, Fullerton intentionally designed *Walden, a Game* to have a slow pace of play. As mentioned, the game employs a slow pace so that players have time to engage with Thoreau's ideas and reflect on their own experiences in the game (Fullerton 2019). One way Fullerton accomplished this pace is by making daily tasks deliberately time-consuming. When designing activities such as tending to the beanfield or building shelter, the team wanted the tasks to be simple enough for players to complete through a bit of daily maintenance yet challenging to grind out in one go (Fullerton 2020a). In the case of the beanfield, fully tending to the field takes players an entire in-game day of work with a rest in the middle to refuel their energy (Fullerton 2020a). These tasks not only slow the player down but also present players with the difficulties of living simply away from the luxuries of society, making players think about what they want to accomplish each day and how they wish to approach living. Fullerton also built time for reflection into the game's day-night cycle. At the end of each day, the game shows players the journal with all the thoughts from *Walden* they have collected (Fullerton 2020a; 2019). Players receive as much time as they want to review the journal before moving on to the next day, providing players the opportunity to reflect on the ideas they have found, the path they have taken through the experiment, and whether they would like to adjust their approach going forward (Fullerton 2019).

Assassin's Creed: Origins

Assassin's Creed Origins is a triple-A action role-playing video game published by Ubisoft and is the tenth installment in the *Assassin's Creed* series. *Assassin's Creed* games are well known for their historical settings, with landscapes, architecture, and significant historical figures specific to the chosen time period being staples of the franchise (Poiron 2021). Continuing in this trend, *Assassin's Creed Origins* takes place in ancient Egypt during the Ptolemaic period, a choice initiated by the mystery still surrounding the time, the interest and curiosity it inspires from the general public, and the opportunity to include famous figures like Julius Caesar and Cleopatra (Casey 2021; Poiron 2021). The game features an expansive open-world recreation of ancient Egypt, including several cities along with stretches of wilderness and ocean for players to explore (Nielsen 2017). Many have singled out *Origins'* game world as the most remarkable of the franchise, praising the level of detail and accuracy with which it depicts the ancient setting (Casey 2021; Mol 2018; Politopoulos et al. 2019; Walker 2018). *Origins* is also notable as the first *Assassin's Creed* game for which Ubisoft released a Discovery Tour mode (Poiron 2021). The Discovery Tour is a game mode that prioritizes education, removing combat and narrative elements from the game and replacing them with guided tours so players can freely roam around the environment and learn about Egypt's history (Nielsen 2017; Poiron 2021). While the game developers put much effort into reconstructing Ptolemaic Egypt, their goal was not to create a museum of ancient buildings but a living and immersive sociocultural environment for players to inhabit (Nielsen 2017).

The design process for *Origins* began with research. The development team started with a general idea for the time period, conducted foundational research through encyclopedias and other books, then turned to movies and television shows to see how the entertainment industry had previously tackled the subject (Nielsen 2017). In addition to their own inquiries, Ubisoft consulted specialists and academic advisors such as art historians, heritage experts, archeologists, and weapons specialists, involving them in the creative process from the beginning (Nielsen 2017; Poiron 2021). Teams of in-house historians and Egyptologists advised the development of the initial game's virtual environment as well as its interpretation of

ancient Egypt's daily life and Ptolemaic history (Poiron 2021). The game developers even secured deals with universities to access as much information on ancient Egypt as possible (Nielsen 2017). This foundation of research and expert consultants formed the backbone of all content in the game and helped developers recreate ancient Egypt in the virtual world as faithfully as they could achieve (Nielsen 2017; Poiron 2021).

Developers approached designing the game and its world by balancing creativity with historical credibility. Much information about ancient Egypt is still unknown, and the development team used these uncertainties as opportunities to be creative and define their own elements in the game (Nielsen 2017; Poiron 2021). However, developers always rooted their decisions in research and history (Nielsen 2017). When constructing the virtual landscape and daily life within it, the Ubisoft artistic team took inspiration from historical objects and artworks, extrapolating from these references to create a living and breathing simulation of ancient Egypt (Poiron 2021). In-house historians and experts on the creative team critiqued developers' inventions, ensuring they could create a pure fiction still grounded in history (Nielsen 2017). Beyond making things up, developers also had to determine the best way to represent the elements of the ancient environment and society for which there were multiple theories. In such cases, the development team often went with the most consensual version (Nielsen 2017). For example, players can explore the ancient streets of Memphis, which developers based on clay models of Egyptian houses found in tombs, despite the exact layout of Memphis not surviving clearly enough in the archeological record to be recreated accurately (Casey 2021). The creative team used the evidence at their disposal to inform their virtual construction and then filled in the gaps to create a complete landscape. At the same time, the developers were also willing to explore more crazy theories like incorporating references to aliens building the pyramids (Nielsen 2017).

The game developers admitted that *Origins* is not a wholly accurate portrayal of ancient Egypt, but they aimed for it to be an authentic one (Nielsen 2017). An example of the developers' dedication to historical authenticity over accuracy is the language characters speak in-game. No one knows what ancient Egyptian was, so Ubisoft hired linguists and Egyptologists to develop a language based on existing research and create a realistic audio environment for

players to experience (Nielsen 2017; Poiron 2021). Though the result was not accurate to the language ancient Egyptians spoke, it was authentic to the historical time and place. While developers held historical authenticity as an important goal, it was by no means their top priority when constructing their virtual portrayal of ancient Egypt. For instance, when putting together the crowds of people occupying the virtual world, the creative team chose to prioritize diversity over following the demographics of Egypt at the time (Nielsen 2017). Even more than representation, developers had to consider players' experience within the virtual environment. The entire game world compressed the real-life layout, with statues and monuments being repositioned so players could see them from afar and locate themselves in the 3D environment (Nielsen 2017). Rather than accurately reproducing the historical area, developers constructed the virtual world with player fun, perspective, and ease of access in mind (Nielsen 2017).

While *Origins'* representation of ancient Egypt features many changes and inaccuracies, it is worth noting just how much the game designers got right. The developers reconstructed the structures and architecture so reliably that Egyptologists could solve in-game challenges using their knowledge of the real-world monuments (Casey 2021). Even more minor details like the plant species occupying the environment remained true to life, with only a single obvious anachronism in the game's flora—the inclusion of mangos, which were not grown in Ptolemaic Egypt—serving as a testament to the creators' success in their efforts (Casey 2021). Though the developers did not explicitly prioritize accuracy in their decision-making, it remained a present consideration throughout the game's development due to the franchise's precedent for pedagogy. Teaching history has been one of the main objectives of the *Assassin's Creed* series since its first installment (Poiron 2021). Further, the games' established audience enjoys learning about history and the landscapes created for each time period, so much so that developers have continued implementing methods of conveying historical information to players, like having conversations with game characters or clicking on specific buildings to read about its history, despite such mechanics interrupting gameplay (Poiron 2021). The significance of history and teaching to the franchise and its audience drove developers throughout their entire process, from grounding *Origin's* development in thorough research and consulting

experts to striving for a factual portrayal of ancient Egypt wherever possible (Nielsen 2017; Poiron 2021).

With *Origins'* Discovery Tour mode, the developers took their dedication to teaching history a step further than any *Assassin's Creed* game had before. As mentioned, the Discovery Tour allowed players to freely explore the map of ancient Egypt without game elements, adding guided tours to teach players about the area and its history (Nielsen 2017; Poiron 2021). Developers meant for the tour to showcase research that did not fit into the game and to engage players interested in learning more about the ancient setting (Nielsen 2017). The mode featured seventy-five tours built around five main themes: Egypt, Romans, pyramids, daily life, and Alexandria (Poiron 2021). To create the tours, Ubisoft collaborated with various famous museums and consulted additional Egyptologists and Hellenists on top of their initial team of experts (Poiron 2021). The historians wrote short, scientific syntheses of the current knowledge on requested themes, which Ubisoft writers cut down further to keep each module brief and engaging for players (Poiron 2021). Ubisoft's main goal was for the tours to be accessible, compelling, short, and visually attractive, with the Discovery Tour providing players with an immersive and informative experience (Poiron 2021). Certain tours, such as the Artisan Tour, were meant to give a general impression of the time period, showcasing colorful drawings, paintings, and sculptures from around Egypt all in one place (Poiron 2021). Other tours strove to inform players about inaccuracies in the game and give them the correct information (Poiron 2021). Additionally, each tour included museum documentation that showed players the actual objects the artistic team took inspiration from when creating the landscape, displaying the historical grounding behind the game's development (Poiron 2021). Overall, reviewers have commended the intention behind the Discovery Tour, and the apparent effort put into researching and crafting the virtual world but offered mixed responses to the tour's success as an educational experience (Mol 2018; Walker 2018).

Discussion and Analysis

Comparing and contrasting the creation process across the three virtual world projects reveals some of the various uses for virtual worlds and how developers approach using them with distinct goals in mind. To begin, *Contested Memories* demonstrates how virtual worlds can function as tools for research and knowledge documentation in academic scholarship. For Schreibman and her research team, visualizing information in 3D space offered unique insights into how the Battle of Mount Street Bridge might have played out, allowing them to explore multiple scenarios in a spatially determined environment. Crucially, the design process for the virtual world functioned as a method of research by helping the researchers examine their sources and test different theories. The detailed data modeling required to build the virtual world helped expose the contradictions in the various accounts of the battle between sources (Hughes, Campbell, and Schreibman 2017). Further, the researchers tested the disparate accounts against the virtual model for accuracy and feasibility (Hughes, Campbell, and Schreibman 2017). Thus, developing *Contested Memories'* virtual world contributed directly to the project's research, serving as a tool for experimentation and critical reflection. In this way, *Contested Memories* showcases the use of virtual worlds within a critical making framework where the design and development process proved equally important to the final 3D model.

Interestingly, the values that emerge throughout the development process for *Contested Memories'* virtual world largely align with those identified in the literature for virtual worlds. In particular, Schreibman and her research team followed many of the tenets outlined in the London Charter (2006), such as considering style choice according to its success in addressing the research aims, documenting their process, using annotations to convey the status of information and cite their sources, and grappling with their project's sustainability. Such adherence to the London Charter's principles makes sense, given that *Contested Memories* is a virtual world project meant explicitly for academic research. In seeking to exhibit virtual worlds' capacity for research and communication, the research team naturally built their model according to standards meant to ensure the intellectual and technical rigor of 3D visualizations. The issues the team encountered concerning their project's sustainability also

reflect the literature. Having what initially appeared to be a standard hosting platform phased out significantly limited what form the virtual world's online version took and rendered the offline version, which more fully embodied the paradigm of scholarly virtual worlds the research team desired (Papadopoulos and Schreibman 2019), inaccessible to audiences. Such an outcome serves as a reminder that a virtual world's final form remains subject to technological capabilities, regardless of creators' intentions.

Overall, every decision made when building the virtual world for *Contested Memories* served to back up the project's argument and promote the effective conveyance of information. Take, for example, the choice of the virtual model's virtual style. While researchers eventually opted for a realistic representation, they only implemented realism after it became clear that a schematic representation did not provide enough context for the primary audience to utilize the model. The researchers approached the visual style from a position of efficiency and clarity, proceeding with the option that best conveyed the desired information as opposed to what was most visually appealing. They displayed similar values in how they designed the virtual world's user experience, prioritizing information delivery over immersion. Researchers designed the virtual world to be interactive and self-guided but made users disembodied spectators, so the experience did not become too game-like. This allowed users to explore the various outcomes of the simulated battles without turning the simulation into a war game, keeping the focus on the project's research and findings. The team also employed immersive multisensory elements only when it enhanced users' understanding of the simulation, such as including audio of gunfire to help users comprehend the battle's chaos and British soldiers' confusion. At the same time, they were willing to break users' immersion to portray moments of ambiguity properly. Use schematic representations for significant buildings with no reference material deliberately broke the virtual world's visual consistency to highlight areas of guesswork. At every step, the researchers made decisions prioritizing the clear transmission of information and their thesis in the virtual world.

Of the three virtual world projects, *Contested Memories* placed the greatest emphasis on the historical accuracy of its virtual world. The research team utilized laser scanning and extensive reference material to exactly recreate the battlefield's landscape and did not render

in detail any critical buildings for which they lacked photographic evidence. While historical accuracy was clearly essential to the research team, its influence over decision-making comes with a bit more nuance. As Burdick et al. (2012) explain, the purpose of historical simulation environments is not simply to reconstruct a historical reality but to investigate a state of knowledge, foregrounding interpretation, analysis, and experimentation. *Contested Memories'* virtual world was a backdrop for its research, where adherence to historical accuracy was necessary insofar as it contributed to the proper understanding and authoritative presentation of their thesis. Researchers included details in the landscape like tram lines, foliage, and hoardings because they provided context for how a small number of Irish Volunteers held off two battalions of British troops, not because they were necessary to the accuracy of the scene. Additionally, the schematic representations not only allowed researchers to avoid inaccurately depicting certain buildings but also visually differentiated the buildings with and without reference to users who would otherwise have no way of discerning the different statuses of information in the model. Thus, the team's priority of supporting their argument and effectively communicating information fundamentally motivated their attention to historical accuracy when building their virtual world.

Moving on from *Contested Memories*, Fullerton's *Walden, a Game* shows how video games can function as a type of scholarship, where the virtual world is grounded in history, and the game mechanics support the exploration of the central ideas. Though *Walden, a Game* does not present original research or an argument in the same way *Contested Memories* does, its explicit interrogation through reflective gameplay of Thoreau's *Walden* and his ideas on living thoroughly fulfills the definition of a scholarly game. The game world is firmly grounded in historical research, and the mechanics are drawn directly from and interact with the questions on living being asked. Additionally, Fullerton cited her primary sources in-game by incorporating quotes from the original *Walden* text and Thoreau's other writing, showing players the source material that the game adapts. The experimental design process that went into creating the game also qualifies as critical making since developing a ludic translation of *Walden* required a deep exploration of the text and iterative engagement with Thoreau's ideas and questions. More importantly, Fullerton's aim was not just to create a video game but to explore the

possibilities for reflective gameplay and push the boundaries of what games might look like in the future (Fullerton 2020a; 2019). Thus, *Walden, a Game's* development was the site of research in history, literature, and game design, engaging the praxis of critical making in digital humanities scholarship.

Rather than making all decisions to convey research effectively, every choice made in the development of *Walden, a Game* promoted reflection and engagement with the central ideas. Fullerton made the virtual world large, interactive, and dynamic across multiple seasons to encourage continuous exploration and engagement with nature, activities that were crucial to Thoreau's ideology. Meanwhile, the development team designed all tasks and interactable objects to support a slow pace of gameplay, simultaneously highlighting the tedium of survival and granting players time to reflect on their in-game experiences and the consequences of their choices in how to live. Even the game's core mechanics were devised to immerse players in the basic premise of Thoreau's experiment in living simply, requiring players to balance survival with finding inspiration in nature. Most notably, Fullerton and her team fashioned the virtual world and game mechanics to work in tandem to engross players in Thoreau's ideas. For instance, having the inspiration variable affect the virtual world's vibrancy and interactivity added consequences for neglecting exploration and prompted players to consider the difference between mere survival and living a satisfying life. In this way, the environment and game mechanics worked together to produce a more immersive and thought-provoking experience. Such interaction is notable since gameplay adds a mechanism for communication that does not exist in projects such as *Contested Memories*, which is limited to conveying information through just its virtual world and annotations.

A consequence of this added layer of communication is that the mechanics and gameplay of *Walden, a Game* started taking precedence over historical accuracy. As described in the literature, concessions to realism and historical accuracy are often required in video games to make enjoyable playing experiences. *Walden, a Game* was no exception, with Fullerton and her team abstracting tasks and altering features of Walden Pond so that gameplay activities did not become too arduous or boring. However, such divergence from accuracy is not necessarily a bad thing. The game's mechanics and gameplay support its

argument—in this case, opportunities for engagement with and reflection on Thoreau's ideas—and strict adherence to the virtual world's historical accuracy could get in the way of that argument, especially when the details are unimportant. Take, for example, Fullerton's decision to simplify Thoreau's beanfield since the accurately dimensioned field would take too long for players to tend to. The exact size and location of Thoreau's beanfield had little impact on players' ability to reflect on his ideas about living, but the mechanics of tending to the field did. Thus, the simplified beanfield, while inaccurate, ended up better supporting the game's theme. Rather than building their virtual world around a research question that required accuracy in the environmental details, as in *Contested Memories*, the developers for *Walden, a Game* built their world to support the game's mechanics and reflective experience goal, making historical accuracy less of a priority.

An additional difference between *Contested Memories* and *Walden, a Game* is that the scholarly game's designers engaged far less with presenting ambiguity in their historical information. Similar to Thoreau's memoir, which presents multiple years at Walden Pond as a one-year experiment (Fullerton 2020a; Weisenburg 2018), the game developers made no distinction between which elements of the game and its world were drawn from history or Thoreau's texts and which were fabrications for the game or the result of guesswork. Part of the reason for this is that the game world, though based on historical research, is not a historical reconstruction. *Walden, a Game* is a translation of Thoreau's subjective account of his experiences, making it already multiple steps removed from historical fact. Further, as discussed previously, Fullerton and her team prioritized conveying Thoreau's worldview and experiences over constructing Walden Pond precisely as he described it. It was more important for players to engage with Thoreau's ideas to achieve the game's reflective experience goal than to consider the historical accuracy of the virtual environment. This stands in contrast to *Contested Memories*, where the researchers were willing to break immersion to display areas of uncertainty. For *Walden, a Game*, the developers focused on creating a cohesive gaming experience, prioritizing player immersion above depicting the decision-making process and status of information in the final product.

Finally, *Assassin's Creed Origins* shows the difference between a scholarly game and a history-based commercial video game where the virtual world is grounded in research and history, but all else focuses on entertainment. Despite having educational uses, *Origins* is decidedly not a scholarly game. While its historical setting is based on thorough research, the game does not present a specific argument or deliberately promote any historical analysis. Notably, the game's mechanics have no connection to its portrayal of history. Compared to *Walden, a Game*, the developers for *Origins* maintained a separation between the virtual world and gameplay, ignoring the game mechanics' communicative capacity and leaving the task of presenting the historical interpretation to the virtual world. A possible reason for the separation is that *Assassin's Creed* is an ongoing franchise with pre-established gameplay and consistent mechanics across games, leaving little room to reinvent those mechanics to support depicting each game's historical period. That is not to say the developers treated history merely as a backdrop to the gaming experience. It is significant that the franchise continues to implement elements that support learning about the historical period but are potentially disruptive to gameplay as this departs from the literature that suggests gameplay always comes before history in commercial video games. The developers' willingness to interrupt gameplay to teach history indicates that they do value their historical portrayal. However, these moments of pedagogy remain separate from, and therefore supplemental to, the core gameplay experience.

Ultimately, the creators of *Origins* made all decisions in developing the game's virtual world to promote an entertaining player experience, explicitly privileging engagement above historical fidelity. The very structure of the virtual world was built to accommodate gameplay and navigability rather than historical reconstruction. Additionally, developers readily altered smaller details in portraying ancient Egyptian daily life to align with modern ideals like diversity and gender equality. As expected from the literature, the game designers unambiguously aimed for historical authenticity instead of accuracy. Consequently, the developers tailored their depiction of ancient Egypt to coincide with audience expectations. Of the three virtual world projects, *Origins* was the only one to research the popular depictions of its historical period in entertainment. Conforming to player expectations directly supported the game world's historical authenticity, engaging players by creating an experience that felt true to their

knowledge of the period. Further, despite the franchise's commitment to teaching history, the developers prioritized player immersion above confronting the complexities and uncertainties in the current understanding of ancient Egypt. Like in *Walden, a Game*, *Origins'* game world offered a visually cohesive and immersive experience at the cost of presenting no distinction between the elements grounded in historical evidence versus those fabricated to fill in gaps. However, unlike the scholarly game, such immersion strictly engaged players in the world rather than encouraging their ponderings on specific ideas. At its core, *Origins* is a commercial game meant for entertainment, and the decisions developers made when creating the virtual world reflected such purpose.

 Origins' Discovery Tour makes the video game an excellent point of comparison to the academically oriented virtual world projects. On paper, the Discovery Tour sounds like *Contested Memories'* offline model; both are self-guided, non-interactive explorations of a digitally reconstructed historical environment accompanied by an informative voiceover and multimedia annotations. In practice, however, the Discovery Tour exposes the fundamental differences in constructing virtual world experiences for entertainment versus scholarship. In addressing many of the game's inaccuracies, the Discovery Tour highlights the extent to which the game's virtual world was designed for gameplay rather than conveying information. Additionally, though conceptualized as an educational tool, the Discovery Tour experience still prioritized entertainment and engagement over properly delivering information on the setting's history. Ubisoft determined a maximum reading time that would best hold the audience's attention during the tours and severely limited the space historians had to explain complicated and nuanced topics about ancient Egypt to fit within that time (Poiron 2021). The focus on engagement came directly at the expense of the tours' information. Further, the Discovery Tour did not cite any of its sources in-game, offering players no way to corroborate any of the factoids the tours presented (Mol 2018; Politopoulos et al. 2019; Walker 2018). Overall, the Discovery Tour proves one cannot just take a virtual world designed for a video game and turn it into a successful scholarly experience without an explicit intention for communication and scholarly standards.

However, the success of *Origins'* game world and the existence of the Discovery Tour prove commercial video games still have a place in history and cultural heritage, though not necessarily in an academic capacity. While the developers had questionable success turning *Origins* into an intentionally educational tool, they still put obvious care into their portrayal of ancient Egypt and got a substantial number of details right when constructing the virtual world, making the game a valuable experience regardless of whether it meets academic standards. Arguably, commercial video games' most significant contribution to history and heritage comes from their freedom to explore historical possibilities unbeholden to academic constraints. As Casey (2021) points out, *Origins* allows players to experience Ptolemaic Egypt as it might have been without getting caught up in arguments over certainty. Beyond contributing to immersion, the lack of hierarchy between fact and fiction in the virtual world presents a potential version of ancient Egypt as a cohesive reality, which is informative even if inaccurate. The problem is if players confuse fiction with fact. Scholars agree that historically-based commercial video games have a significant capacity to act as authoritative sources, delivering information effectively and believably (Spring 2015; Copplestone 2017). Such an assertion prompts scholars to call for greater accuracy in history-based commercial games, given the risk of players accepting incorrect historical information. However, in the case of *Origins*, the creators were very clear with their claims of authority. Sources on the game's development consistently emphasized its overall historical inaccuracy (Nielsen 2017; Poiron 2021). *Origins* never presented its version of ancient Egypt as true to what the past actually looked like. Its value to history and heritage exists in facilitating exploration and imagination, offering an entertaining way to engage with the past.

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Conclusions

In this thesis, I analyzed three historically based virtual world projects, each with different groundings in academic and entertainment interests, to determine the different value systems that influence how developers construct virtual worlds for scholarship versus entertainment. Ultimately, my analysis suggests virtual worlds built as academic tools focus on maximizing communication, virtual worlds in video games focus on creating an engaging player experience, and in-between cases negotiate a balance between the two. *Contested Memories* displayed the most straightforward conformity to academic standards, with researchers constructing their virtual world similarly to textual scholarship in how it documented their research outcomes and emphasized historical accuracy. The team used the environment to convey as much information visually as possible, deploying annotations and multisensory immersion to supplement and enhance users' understanding of the research. The developers for *Walden, a Game* also centered on communication, combining the digital environment with reflective game mechanics to embody Thoreau's ideas. Rather than documenting and relating information, the virtual world provided users with a more experiential, visceral understanding of the themes explored in Thoreau's writing. However, the increased focus on users' experience necessitated concessions to scholastic considerations such as the virtual world's historical accuracy and in-world documentation. In contrast, the *Origins* developers ignored scholastic considerations, focusing their virtual world entirely on user experience. The game world and mechanics no longer communicated historical information or a central thesis, instead catering to gameplay needs and player immersion. Since *Origins* was a commercial product, the developers had no obligation to build their virtual world according to academic standards. Entertainment remained the top priority, leaving all commitment to historical accuracy—or authenticity—up to developers' discretion.

Another insight to come out of my analysis is the ways in which the development process for virtual worlds in all contexts contributed to knowledge creation and documentation in the digital humanities. Each project demonstrated a connection to the literature on critical making. Building a virtual world allowed researchers to model their data and iteratively test

theories in a spatially determined 3D environment. The addition of gameplay elements in the scholarly game prompted researchers to consider texts, concepts, and historical contexts from new perspectives as they translated them into meaningful game mechanics. Even the commercial video game offered historians the opportunity to visualize historical imaginaries, extrapolating fragmentary evidence into a full vision of the past. In all cases, the virtual world or game design process furthered the developers' understanding of their historical subject matter, giving them a valuable place in history and heritage scholarship as a tool, if not an explicit output.

It should be noted that the scope of my study limits my insights. Due to the difficulty of finding and accessing scholarly virtual world projects, I have only explored one example of virtual worlds in an academic project, scholarly game, and commercial video game. Consequently, it is difficult to generalize the value systems I have uncovered to how all developers approach building virtual worlds in each context. Instead, my investigation offers an exploration of virtual worlds' benefit to digital humanities scholarship and a foundation for subsequent inquiry into their use and development. Future research might include a more in-depth study of academic virtual worlds and video games, looking at a broader range of projects to gain a more comprehensive understanding of developers' approaches to designing virtual worlds in academic and entertainment contexts. An additional limitation of my study is that my analysis was limited to information recorded in articles documenting the development process for each virtual world project. Thus, further investigations such as this would benefit from interviews with video game designers and researchers engaged with virtual world methods to gain first-hand insight into virtual world development, design considerations, and the decision-making process. Additionally, future studies could give more explicit focus to the technology involved in creating virtual worlds and video games, if the technologies used differ between contexts, and how technological capabilities affect the final shape of the virtual world.

Virtual worlds and video games have a lot to offer the digital humanities as research tools and scholarly products, especially in the context of history and cultural heritage studies. The combination of visual communication and textual annotations delivers information clearly and adds an understanding of spatial and temporal complexities beyond the capabilities of

traditional articles, bringing historical research to life for users. Depending on the subject, scholarly games can be even more effective at presenting humanities arguments through a virtual world. The video game medium allows for more nuanced engagement with ideas by creating an embodied learning experience with the game's mechanics. Despite their benefits to research and their remarkable pedagogical capabilities, the fact remains that virtual worlds and video games conflict with traditional expectations for what constitutes a scholarly output. Virtual world projects are still a relatively new practice in digital humanities scholarship, and it remains unclear how accepted they will become as standalone documentation methods. In the meantime, researchers are building virtual worlds to act as meaningful tools in the documentation and presentation of history and cultural heritage research, pushing the boundaries of digital humanities scholarship into the technological future.

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