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Résumé de l'article

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***Europa Universalis IV* and Deep Learning: Historical Accuracy, Counterfactuals and Historical Themes**

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Abstract

This article examines issues encountered with *Europa Universalis IV* (*EUIV*) in terms of teaching history in adult learning. The article identifies the educational limitations of the game, as well as the types of history that can be learnt from it. The data collected from participant responses is examined in terms of an ongoing concern regarding the balancing of historical accuracy and gameplay in *EUIV*. In this discussion about balance, participants raise common concerns about the historical abstraction, historical misinformation and counterfactual elements within *EUIV*. Nonetheless, the article argues that despite these ahistorical elements, *EUIV* can still potentially portray many of history's larger trends and influences. Given the portrayal of these trends in-game, the article examines the pedagogical utility of the game in terms of narrative engagements with history and the promotion of deeper forms of learning.

Author Keywords

Counterfactual; history; strategy; grand strategy game; game-based learning; deep learning; higher education

Introduction

In the year 1670 our tall ships have sailed past jungles and arid lands to pull into a bay inhabited by a people speaking a strange language. The Dutch had discovered this continent before calling it New Holland, but we cannot yet communicate with the locals. This land is also inhabited by strange hopping mammals and birds that sound almost like they are laughing. While there may be an untouched beauty to this land, the emperor is always looking for new subjects and lands with resources. We proclaim these lands Nueva Extremadura in the name of Fernando of España.

The fantasy scenario presented above is in the style of an After-Action Report (AAR). It may seem like a bizarre story. It may even be historically misleading. But this kind of storytelling in *EUIV* is common. *EUIV* frequently presents alternative histories, and the story above differs from factual historical accounts of the British "discovery" of Australia. As previously discussed, this type of storytelling is known as a counterfactual (Ferguson, 1997, p. 2). The above counterfactual explains "big picture" historical concepts and narratives of discovery, exploration and colonisation that have occurred throughout the world in the past, just without factual details.

To non-players, counterfactuals may seem meaningless when compared to grounded historical

accounts. Nevertheless, when players engage with history mediated by games, counterfactuals are almost a given, as games are defined by player agency.¹ The in-game choices allow players to reflect, learn and make meaningful decisions. In this sense, gamified history is in clear contrast to traditional understandings of history because it is contingent on player choice, while traditional history is static. Although divergence from the static and linear history would seemingly hinder historical education, this paper argues the opposite. While game elements such as player agency cause game history to stray from the factual timeline, this agency can be used as form of active learning that creates opportunities for exploring the complex themes and ideas of history. For example, Anable (2018, pp. 30-31) in her examination of *Kentucky Route Zero* (Cardboard Computer, 2013) found the game's timeline was shaped by the player's choices even if the game's ending remains the same regardless of that player's choices (Hudson, 2020). Similarly, in many counterfactual histories, though the journey and the player's choices are what vary the player's learning experience, the historical outcomes can remain similar to the original timeline because of strong historical factors. Wojnowski (2018, p. 95) points out that historical games are almost always counterfactual as the player can never adhere to historical facts when the game history diverges from their factual timeline. Nonetheless, counterfactuals can be used to understand the broad historical themes and concepts.

Therefore, history games can clearly afford new ways of discovering, learning about and understanding history. Educators could capitalise on this power of gaming, but to do so they must understand the tensions between the portrayal of factual history and the gameplay elements in *EUIV*, which present both opportunities for and challenges to the game's implementation as a pedagogical tool. This article examines responses to the *EUIV* online forum survey on the importance of balancing gameplay and historical accuracy. Both concepts are considered important in the development of believable yet engaging historical worlds. This balancing issue prompts exploration of misinformation, abstraction and omission present in the game, and the challenges these issues pose to the accurate representation of history in games. The article considers how both player and AI engagement within the game further distort historical facts, regularly causing counterfactuals to occur in *EUIV*, though these counterfactual game histories could still be used to teach the player about historical themes and influences. Indeed, the game history can communicate broad historical themes and influences in a meaningful way that also synchronises with deeper modes of learning. Therefore, despite *EUIV*'s limitations, the game can still be effective in communicating broader and deeper understandings of important aspects of history through complex but playful experiences. It is this broader understanding that can be capitalised on and applied within a formal education setting, such as at university, to help promote deep learning.

Method and Research Design

This article draws from two collected data sources: a formal analysis of *EUIV*, and a survey conducted on the *EUIV* game forum (n=331). The exploration of game takes place through a Formal analysis to assess the various and most educationally valuable functions of *EUIV*. This Formal Analysis is then used to inform and design an *EUIV* online forum survey. The online forum survey sought to understand players' views on the learning potential of *EUIV* and uncover the most valuable educational elements of the game.

The Formal Analysis offered insight into the historical and educational knowledge embedded in *EUIV*'s different game elements and mechanics. The researcher used a high-performance gaming PC and a digital copy of *EUIV* to perform the Formal Analysis. The Formal Analysis revealed *EUIV*'s most educationally useful components. The insights from the Formal analysis guided the focus and line of questioning in the *EUIV* forum survey.

The online survey was announced on the *EUIV* forum with a link to a SurveyMonkey poll with multiple-choice and short response questions. The researcher deemed surveys and opinion polls to be the most appropriate and reliable tools for accessing the views of *EUIV* players and fans, as these tools had a wide reach to many people, were anonymous and provided a chance for all participants to respond (Barribeau et al., 2012; Fowler, 2013, pp. 1-2; Krosnick, 1999, pp. 538-539; Roper Centre, 2019). The survey was also considered a straightforward and low-cost method for quickly reaching a large global *EUIV* fanbase with deep knowledge of the game (Krosnick, 1999, pp. 538-539; Weerakkody, 2008, p. 131).

The researcher also recognises the method of self-reporting may hold certain biases (Araujo, Wonneberger, Neijens, & de Vreese, 2017), especially in favour of the game as they are describing an activity they likely enjoy. These potential biases could have influenced their perception of the educational and historical value of the game. However, equally, this passion for the game also means they have a highly experienced understanding of the game, and its advantages and disadvantages. Video games often have related game resources found outside the game itself and these can take the form of wikis, blogs and, of great interest, online fan forums (Sköld, Adams, Harviainen, & Huvila, 2015, p. 59). These resources, especially forums, can contain player strategies, views and raised issues. The researcher therefore saw the *EUIV* forums as an important source to collect a large amount of quality data from knowledgeable *EUIV* players. *EUIV* forum users are required to be the age of 16 years unless the user has parental permission, in which case the age requirement is 13 years and above.

Gameplay vs Historical Accuracy

A recurring theme in the discourse around Grand Strategy video games is the balance between historical accuracy and gameplay. Because choice is a defining feature of games (Juul, 2011), traditional notions of history involving delineated sequences of factual events can be at odds with the interactive choices that give the player agency during gameplay. Player agency often poses a challenge to the traditional understanding of a particular history in *EUIV* because it can change the timeline of events. Conversely, traditional history, if implemented in a game too precisely, can limit or extinguish player agency and compromise the very element that makes *EUIV* powerful, engaging and informative for players.

The tension between effective and pleasurable gameplay and the accuracy of historical elements within *EUIV* was one of the most significant themes raised in the *EUIV* online forum survey. Over half of participants (53.17% or 176/331) thought *EUIV* simulated history "somewhat accurately" because the gameplay did not result in a completely accurate reflection of history. In fact, 27 participants commented on the need to balance both gameplay and historical accuracy. These participants frequently noted that gameplay rather than accuracy was the primary focus of *EUIV*,

shaping the ways historical information was depicted in the game. As one survey participant stated, the role of gameplay in *EUIV*'s design is "to make it enjoyable to play", with the game mechanics "merely mak[ing] a nod to their historical roots". Some participants framed their understanding of the relationship between gameplay and historical accuracy by the design philosophy of the Paradox Interactive development team. As one survey participant commented, "gameplay trumps realism"; they also explained that certain mechanics would never be implemented if they were too realistic and threatened to "reduce [the] fun" of the game. These comments show that *EUIV* players in general have mature understandings of approaches to game design and the challenges of using historically accurate material in entertainment software.

There were similarly considered and nuanced responses from other participants on the progress of history and its representation in *EUIV*. For example, one participant cited the example of the Holy Roman Empire, a political faction in Europe that typically gets stronger as the game progresses, when, in reality, the empire was in serious decline during this time in history (Wilson, 2011). This example shows how the game design prioritises interesting features, such as empire consolidation, over the factual historical events of an empire's dissolution (Wilson, 2011). Another survey participant noted how in-game history may differ depending on whose perspective it is being told from: "This game is not designed to create perfect history, that way it would go the same every time. It's different every time ... we see history depends on whose eyes you look through". So, there is no one true history. There are a lot of different versions of the same historic event, and all can be true. This and similar observations reveal how participants may reject the idea of a monolithic, singular version of "correct" history. As each new game begins, the player not only re-engages in history, they relive it from a different point of view. The player may therefore be able to uncover new fragments of information from the same historical narrative by playing from different perspectives and even on different counterfactual timelines.²

The forum survey results show that *EUIV* players have high standards about the representations of authentic history in the game while also acknowledging that *EUIV* gameplay at times conflicts with the factual history it is trying to represent. They recognised these differences could be reconciled through a balance between gameplay and historical accuracy, even if the game design favours the former.



Figure 1. Balance between history and gameplay

The survey participants' views on the balance between the history and game features are represented in *Figure 1*. On one side, history is represented through historical accuracy and realism³, or at least what is deemed realistic and thus believable (Apperley, 2013; O'Neill & Feenstra, 2016). However, on balance, this representation is in tension with choice and engaging gameplay⁴, player enjoyment⁵ and the practicality of reflecting history.⁶ A game that is excessively realistic would be far too complex, overwhelming and ultimately uninteresting for the player, while also being impractical for the creator to design (GDC, 2016; Wackerfuss, pp. 241 - 244). However, the results show this tension can be useful in contributing to learning historical themes, influences and understanding the contingent nature of history itself.

In addition to considering the importance of a balance between history and gameplay in *EUIV*, it is important to examine not only how history is depicted in the game, but also how players comprehend that history, how they distinguish between what is historically factual and what is not, and how they learn from understanding this difference. By adopting a nuanced understanding of history, the player can adjust (to some extent) and look past the historical inaccuracies in the game to still gain valuable knowledge. If the player can achieve this, they may then more adeptly deal with issues such as misinformation, abstraction and omission of historical information and ultimately counterfactual histories.

Misinformation and the Abstraction and Omission of History

While consumers of media and history have usually trusted the accuracy of sources such as nonfiction books and institutes of knowledge such as museums (Rosenzweig & Thelen, 1998, pp.

21-22), research has shown there is little trust in new digital media, specifically video games (O'Neill & Feenstra, 2016). Although these games have utility as motivational material for historical inquiry, evidence also shows young people still do not take the content of video games seriously (O'Neill & Feenstra, 2016), which could impact on what lessons, if any, they might take from a game. According to research (O'Neill & Feenstra, 2016), young people disregarded video games as a potential source of historical knowledge as they believed games presented unreliable, fantastic or distorted versions of history. This research revealed these same young people were suspicious of the commercial motivation of the developers and therefore distrusted games' depictions of history (O'Neill & Feenstra, 2016).

In O'Neill and Feenstra's (2016) research, participants were asked about historical depictions in the game *Medal of Honor* (DreamWorks Interactive, 1999). Participants remained sceptical about these depictions, even after being informed that the exact historical facts aligned with those presented in-game. In their critique of the game's abstractions and representations of history, they described the lack of "gore" and the inclusion of "instantaneous healing medikits" as unrealistic (O'Neill & Feenstra, 2016). Similarly, 22 of the *EUIV* online forum survey participants considered the representation of history within *EUIV* (specifically, nation management) as too abstracted, unrealistic and incorrect. One survey participant commented on the contradiction between "your king spending one quarter of the national budget on jewels and not having a standing army". Another survey participant complained the replication of governance was over-simplified, with many actions "done in an instant". While another participant indicated that governance and management were three variants of "spellcraft" which is a mocking comment about the apparent inaccurate historical representation of in-game currencies. Clearly, some survey participants would have preferred more precise representations of historical nation management within *EUIV*, and did not think *EUIV*'s historical representations were a "true" picture of history. They also believed the disproportionate numerical and currency representations in-game and instant actions to be ahistorical distortions.

Participants also had strong opinions about what historical elements were "real" and what were not. For example, one participant commented that "some aspects are very accurate ... while others are either plain wrong or wrong due to abstraction", giving the example of a mercury mine being abstracted as a gold mine in-game. In this case, the participant recognised gold was a proxy for another metal (mercury) of strategic value, and that history was therefore being shaped to fit into the game's system and currencies. The issue for this participant was evidently that this abstraction misinformed them about the actual details of history.

While these issues around details seem to be important to players, in the grand scheme it is worth asking whether slight inaccuracies truly affect their understandings of history. The survey results overwhelmingly indicated (95.47% or 316/331) that gameplay frequently encouraged players to seek further historical information outside the game. The players could compare the game with information provided from external sources to counteract or balance the incorrect, abstracted or counterfactual gameplay lessons. It is likely, therefore, that *EUIV* players are not in danger of learning falsehoods through gameplay *if* they engage in historical research outside of the game. It was also apparent from the survey results that many players understood the historical depictions in the game were not a complete history and did not completely do justice to its complexity. While some participants noticed historical misrepresentations, others saw shades of historical

accuracy within the game. The survey indicated a participant consensus (253/331 or 76.40%) that *EUIV* simulated at least some degree of historical accuracy. Perhaps more interestingly, the forum survey participants said complete factual accuracy was neither necessary nor desirable, with 36 specifically commenting that it was not possible to reflect every detail of history. Rather, abstraction was seen as necessary for the players to grasp the deeper meanings behind these historical events, with one participant stating the game's "abstractions make sense", while another said *EUIV* was "necessarily abstracted, it attempts to give a general idea of the complexities and difficulties". Therefore, there may be more value to be found in abstracted and engaging interactions that present overarching historical themes than in those offered by an approach hung-up on technical or historical accuracy. However, players do need to take on a more complex understanding of history in order to distinguish between factual and fictional histories in order to gain knowledge from the latter. As the next section will explain, these types of historical divergences are often the result of player and AI intervention that changes the course of the game's history and at times creates outlandish historical scenarios.

Ahistorical Player and AI Behaviour

In *EUIV*, the choices made by players result in a multitude of game histories. Some players approach the game as a system to explore, expand, exploit and subsequently exterminate (4X)⁷ nations with limited regard for history. Such players target and manipulate in-game variables to win; their focus is not on reflecting or simulating a "real" or even believable history.⁸ In the forum survey data, 21 participants acknowledged players worked against historical accuracy by playing to beat the game, causing the narrative to diverge from factual history. For example, one survey participant stated that *EUIV* "uses a mathematical formula" and that some players engage in "min-maxing"⁹ instead of trying to understand "human sentiment and contextual situations". Participants with similar views mentioned "optimising", aiming to "blob"¹⁰ and being able to "mathematically calculate" efficient strategies to win the game. As a result of these strategies, a player acts without concern for the factual historical timeframe and intentionally compromises the perceived historical authenticity of the game world. Similarly, some participants focussed on expanding their empire as quickly as possible as a means of winning the game. They sought out the most effective strategy for winning quickly, often describing this as a "meta" or "metagame" approach (Boluk & LeMieux, 2017, p. 1; Donaldson, 2016, p. 1). Such an approach is widespread in competitive gaming scenes and among dedicated fan bases. However, by adopting this approach in *EUIV*, players may ignore historical and cultural perspectives completely and could mostly play the algorithm.

One survey participant suggested that while the game's broader historical dynamics were generally correct, player involvement often resulted in strange and unlikely outcomes. Another survey participant suggested that an *EUIV* run through in "observation mode" (where only the AI plays and the player is not involved) produced a more accurate reflection of history than just a regular "play through" with the player. This participant believed the player's nation could quite easily become the most powerful and advanced nation, regardless of which nation they had selected. This perspective is not unfounded as the game encourages players to complete in-game achievements that are based around building small or weak nations into greatness or carrying out a world conquest. Here, farfetched player interventions in history are not only possible options for gameplay, but are often encouraged, typically at the cost of historical authenticity.

Many of these issues align with concerns raised by Galloway (2006, p. 103), who postulates these games are more about players learning the algorithm processes rather than genuine aspects of history and culture. Similar ideas were raised by participants in the *EUIV* online forum survey. They described how play that focused on the metagame came at the expense of learning about history. For example, participants said that targeting in-game award systems, such as forming multiple nations to claim large sections of land, worked against the historical depictions in the game. Moreover, many of *EUIV*'s in-game achievements often required players to perform ahistorical conquests and feats. Hence, to complete the game, the game mechanics and achievements encourage or even require players to exploit the game system to win at the expense of realising outcomes that are more historically accurate.

One participant suggested the player's exploitation of game mechanics also impacted the game's depiction of historical concepts/theories. They noted the player's actions can break historical concepts, such as that of the "balance of power". The balance of power is where a counterbalancing force will oppose the changes enforced by a conquering nation and prevent it developing hegemony in a region (Haas, 1953, pp. 444-445; Levy & Thompson, 2005, p. 1). The balance of power is a consistent feature and theme in *EUIV*, and typically prevents in-game empires from quickly completing world conquests. One survey participant explained how the player's strong influence on their area of the map skewed the game's historical context and further affected the balance of power, making the game simulations¹¹ seem particularly ahistorical. In this way, the player is breaking from the historical or political norms of that time. However, in contrast, another player commented that the game mechanics and the AI correctly simulate the historical European international setting and balance of power.

Another critique of *EUIV* by survey participants is that the AI nations (the algorithmic dynamics of the game) rather than the player's choices are responsible for producing inaccurate reflections of the actions of certain nations or the timing of various events. For example, one survey participant suggested *EUIV* had many "quirks", whereby historical events appeared too early or too late in the game, or were completely ahistorical. The participant cited ahistorical examples of the "Ottomans colonising Oceania, Poland partitioning Germany etc." Another participant described how history could go off track due to the actions of the AI, but also connected this to player behaviour: "AI won't do what real people did in that period of the time, and you – as the player – won't either". Moreover, another participant noted when the AI was in control, England would not perform well on the world stage during the Early Modern era, in contrast to its actual global dominance at the time. The participant noted that in their experience of the game, the AI influenced England in such a way that made it unable to effectively control or manage the English Channel, an important strategic point for England as a nation. In total, 23 participants suggested the game AI worked against historical accuracy. Hence, for some players the issue of historical accuracy was not necessarily due to player-driven counterfactual divergences, but rather the behaviour of the AI.

A concept that can be used to analyse these comments on AI behaviour is that of "black boxing" (Winner, 1993, p. 365).¹² Galloway (2010) sees a beneficial side to black boxing as it hides the inner workings of the game mechanics and thus enables the player to focus on gameplay and more genuinely engage with the historical narrative and related inputs and outputs. The concept of black boxing is represented in *Figure 2*, with the strategies of gameplay shown as an input and gamified history and experience as outputs. In contrast to meta-gamers, many players who focus on

roleplaying may choose to play and interact with the game as a black box. However, while this approach to *EUIV* can help the player focus on history, the extent to which they do so will always be dependent on how that player approaches the game. Thus, a black box approach to *EUIV* shifts the player's attention to engaging in historical roleplay and narratives rather than making choices to primarily maximise player benefits within the game's algorithm.



Figure 2. The game black box process.

This section has shown that both the player and the game AI can shape the *EUIV* world in ahistorical ways, whether through the game's quirky AI, the player's strategic exploitation of the mechanics and code, or merely due to player choice taking history off track. For some players, these ahistorical actions can impact the historical value of the game; however, as discussed, a player may choose to take a black box approach to the game and focus on history through roleplay. In such a case, even if counterfactuals result, these are still grounded in history and therefore reflect a semblance of accuracy.

Counterfactuals and the Underlying Trends and Influences of History

Counterfactual history¹³ is a growing genre of game fantasy that explores alternative trajectories of the past. Scholars and educators consider counterfactuals to be useful for learning history as they show what could have happened based on actual historical themes, influences and relative probabilities (Apperley, 2013; Ferguson, 1997, pp. 85, 89-90). Chapman (2016, p. 233) discusses how some games might be counterfactual, but do not necessarily allow counterfactual *historying* whereby the player makes the decision to diverge from the traditional historical narrative. Other authors such as Ferguson (1999, p. 2), and Tetlock and Belkin (1996, p. 6) point out the importance of counterfactuals as they can help us make future decisions by understanding the hypothetical consequences of a counterfactual timeline. By understanding the consequences in the counterfactual timeline, people can make more informed decisions in the future and in their own timeline. Ferguson argues counterfactuals are a legitimate historical practice as long as they are based on a degree of factual history and are situated within the realm of relative probability and attend to other strong themes and influences in the historical timeline (1997, pp. 85, 89-90). Many of the survey participants indicated that counterfactuals were useful for learning history and appreciated the counterfactual depictions of history in *EUIV*. Twenty-two participants believed the game was inspired by history and quite often offered plausible counterfactual trajectories. In a similar argument to Ferguson (1997, pp. 89-90), one survey participant noted: "*EUIV* is a very good way to understand the factors, ideas, concepts and problems of history." Another participant explained that the game reflects the "trends and forces that shaped the time period", but also cautioned that the game "should not be used to teach about what really happened.". These participants thereby acknowledged that complete historical accuracy is not achieved in *EUIV*.

Nonetheless, they were satisfied with the game's historical accuracy as long as the game seemed "real", had some degree of authenticity, or at the very least the appearance of authenticity or historic verisimilitude (Apperley, 2013). These participants evidently believed counterfactuals could present authentic and informative ideas about the world and were therefore a useful means to understand the underlying influences that have driven historical narratives in particular directions. The participants also acknowledged that these counterfactuals were not outlandish or senseless in their depiction because there was a possibility they could have occurred. Hence, participants with nuanced understandings of history may still find historical value in *EUIV* by understanding the historical parameters in which the game operates as being somewhat flexible, but nonetheless largely probable.

Some participants explained that *EUIV* contained many events, mechanics and other introduced elements that railroaded players towards a particular historical path. This was seen as providing balance between steering players towards a more accurate historical timeline and allowing the player to exercise agency and write their own version of history. One survey participant described how this balance occurred during gameplay:

EUIV being a sandbox game is as accurate as it can be at the start of the game. However, as you continue with the game further into the timeline a divergence can occur from a historical accuracy standpoint. *EUIV* uses many events and decisions along your journey playing your nation and many of them contain information relating to the history of the nation ... These events, mechanics and decisions help to guide not just the player but also the AI in maintaining at least a semblance of historical accuracy, whilst maintaining a level of interesting alternate history.

Another survey participant shared this view, noting the game often became less historically accurate over time, slowly diverging into something utterly different from factual history and reflecting what they called the "butterfly effect". The "butterfly effect" (Lorenz, 2000, p. 91) occurs when one event has a domino effect that could result in a radically different history compared to the original history; that is, the effect relies on a sensitive dependence on initial conditions. Another participant commented on how much of history, both in reality and in-game, occurred by chance through a series of events, rather than due to any clear influences:

"*EUIV* is not a history simulator. It is inspired by history but the moment you select a country and press play, a completely new context is born. Take Prussia for example. In real life it was essentially a fluke that happened through a bunch of random events, and this sort of thing is not really possible to accurately recreate.

This comment illustrates how, through gameplay, *EUIV* players can be exposed to the idea of contingency and the role of elements of chance in history. Apperley (2017, p. 193), in his examination of George Perec's book *Life A User's Manual* (Perec, 1987), notes the importance of contingency in terms of discovering chance encounters of relationships and patterns between "various ideas, people, objects and events." He suggests that contingency could be used in structured but playful environments such as games. For Apperley, contingency allows players to experience and encounter new pieces of knowledge through games. The notion of contingency underlines the usefulness to history education of counterfactuals, which could be used as points of

comparison to reveal that the events they depict might have been just as likely to have occurred as those in widely accepted versions of history. For example, the July Crisis leading up to WWI was precipitated by a series of unusual events that led to the assassination of Arch-Duke Franz Ferdinand, where, by chance, the assassin was in the right place at the right time (Otte, 2014). However, another view suggests some form of conflict of the nature of WWI was inevitable, given the vying interest and interconnected alliances of the nations involved (Clark, 2012, p. 11). Counterfactuals are therefore useful for revealing how strong historical influences affect events, but also how chance plays a major role. In this way, *EUIV* may teach players about the important historical themes and influences that shape larger historical narratives, rather than just about the factual details of historical events themselves. Another issue raised by one survey participant was that *EUIV* did not reflect uncertainties:

While *EUIV* can reflect history, it fails to simulate certain parts of the uncertainty of history. The most obvious example is technology, which is entirely linear, when in fact certain countries developed certain technologies in a very different order.

This comment presents an interesting rejection of teleology, “a mode of explanation in which the presence, occurrence, or nature of some phenomenon is explained by the end to which it contributes” (Walsh, 2008). Here, the participant suggests understanding the outcome of influences is not the most important lesson; rather the lesson is on *how* the historical event occurred. For this participant, it was evidently not enough for the game to only show the emergence of new technology. Rather, they believed the game should also simulate how the processes of technology development are sporadic and often occur by chance.

The participant above perceived an absence of chance in-game which they believed was problematic in reflecting historical progression. However, there were strong results that showed the game’s mechanics can prompt players to reflect on the influences that affect historical events. Players often learn from counterfactuals when they contrast, compare and interconnect in-game history with their factual historical research outside of the game. The survey results showed that the counterfactuals within *EUIV* gameplay taught participants about these themes and influences, thereby contributing to the development of a big picture understanding of history.

Broader Themes and Influences of History

According to Chris King, a senior designer at Paradox Interactive, history is full of “edge cases” and “throws up weird things” (GDC, 2016). His comment echoes some of the above discussion about chance in history. However, King also points out that when designing games, not everything in history should be simulated; rather, what is more important is a focus on designing and depicting the specific history central to a game (GDC, 2016). King believes that historical exceptions outside the norm are distractions within a game (GDC, 2016). Grand Strategy game design, King says, is about trying to capture the broader elements of history within game mechanics (GDC, 2016). He recommends that designers should create abstractions of historical themes and influences as these can be difficult to capture precisely in general game mechanics (GDC, 2016). He even discusses the importance of “shopping around for the right historian for you,” suggesting not all versions of history fitted the *EUIV* design team’s objectives. King explains that, from a design perspective, certain parts of history must be ignored if they do not fall within the scope of the game (GDC, 2016). King’s comments echo some of the survey participants’ responses, such as one who

described *EUIV* as not “a real history” but “quite accurate”, simulating the “rhythms of history, the rise and fall of empires and nations and so on.” Similarly, another survey participant said *EUIV* was “necessarily abstracted, but generally tries to as faithfully as possible represent the ‘broader strokes’, so to speak, and the general trends of the period.” Another survey participant explained that the game was able to “produce a surprising amount of historical trends” including “the rise of the Ottoman Empire (and its decline), the Protestant Reformation and the emergence of Russia and France as regional superpowers.” However, this participant conceded that outside of Europe, the game tends to be “very inaccurate.” Moreover, Kapell and Elliott (2013), Dow (2013) and Wackerfuss (2013) indicate in their research that games often effectively communicate broader historical themes and process. The common thread here is that while *EUIV* may be abstracted and counterfactual in its simulations, it excels at representing broad historical themes and influences. While many of the forum survey participants did not discuss the exact details of historical events, they were able to articulate and often name the broader changes that shaped European and world history, demonstrating the effectiveness of this aspect of the game’s design.

These broader historical changes frequently occur in *EUIV* regardless of player or AI behaviour. The AI behaviour (despite some participants’ beliefs) does in fact often balance the game and pushes *EUIV* to change in certain ways to approximate factual history, simulating historical patterns or at least creating a believable timeline with historical verisimilitude. For example, in-game Europe has a tendency to continue playing a believable alternate reality where large empires form, religions divide (Catholics vs Protestants) and the New World is colonised. However, outside of Europe, there is less attention to historical detail and the AI behaviour tends to be more random, resulting in major historical divergences. This is another example of how the game’s Eurocentric bias may affect player understandings of global and regional historical themes and influences outside of Europe.

In contrast to their views on the game’s success at depicting and simulating the bigger picture, participants voiced concerns about how the details of history can play out inaccurately in-game. One survey participant explained that they believed *EUIV* simulated a lot of important historical changes, but that these were not always expressed precisely, using the example of Portugal colonising Siberia as an example. Similarly, another survey participant commented:

The basic set ups and larger events do present a pretty good picture but the actual gameplay doesn’t always ‘flow’ realistically; as in it’s a bit too easy for really small countries to conquer vast amounts of territory while large ones tend to be worse than they actually were (like how the Ottomans can’t conquer the Mamelukes in one go).

As these participants point out, the Portuguese never colonised Siberia, nor did the Ottomans acquire Mameluke territory through a series of separate wars and land concessions. Nonetheless, *EUIV* does demonstrate larger themes such as Portuguese global colonisation and the influence of the Ottomans in their region.¹⁴ As these responses show, counterfactuals clearly serve as points of comparison and contrast to connect in-game events with factual history.

Another survey participant, using current events as a comparison, described *EUIV*’s depictions as being too broad, meaning significant events could seem like footnotes, unimportant in history:

The game is way too broad to be able to accurately simulate history. There are only so many events in the game, and each with the same outcome each time. I feel like nearly all aspects of history are touched on, but very few are really delved into. An issue with a country in real life that would shake up the entire country and/or world are often reflected with a button giving +2 unrest, for a couple years. Something such as Black Lives Matter in the US right now, as well as US mass shootings, or ISIS in the Middle East, are current issues that are dominating news, politics and world relations. Yet in-game, they might not even be large enough issues to warrant a small event trigger. If they were, Black Lives Matter would be +1 unrest for US. I don't know how mass shootings could be reflected in-game, but ISIS could be nothing more than some rebels occupying a couple of provinces and giving some bad CBs [war justification] that aren't worth using. Everything is so massive and expansive in *EUIV*, that important smaller parts of history could, and are, easily looked over.

By representing historical events broadly, the game is in danger of doing a disservice to the historical significance of some events by reducing them to a modifier rather than something that warrants greater attention. Details and specifics of history are lost to the grander narrative, and in this way the pedagogical value of the game may be reduced, because it does not attend to some of the most influential aspects of history. Arguably, this is because the game mechanics, as King (GDC, 2016) notes, define the scope of the game. For example, *EUIV* is about states, monarchies and the expansion of empires¹⁵, while *Victoria II* (Paradox Development Studio, 2010) is about the movement of people, identities and the free market. Within each scope, only certain events can effectively be represented. Thus, while one might say that Black Lives Matter, as an event, may be represented as +1 unrest in a game, the event would likely form a part of a larger civil or social rights movement, requiring a specific mechanic to deal with them that would result in a very different game. Similarly, mass shootings may be a product of certain issues around arms control, while ISIS might develop alongside the rise of non-state actors and extremism, both requiring different sorts of game mechanics. As King explains, *EUIV* and other Grand Strategy games are only capable of portraying events at a higher level, with more detailed, humanistic and individual elements being best left for another medium or game type (GDC, 2016).

While the current events described above have a very real impact on the individuals that experience them, they are still defined by a series of similar events and dynamics that changed our societies and nations, not necessarily by singular occurrences or the actions of individuals or small groups. *EUIV* cannot consistently represent smaller, seemingly isolated events; rather, it places players on a trajectory towards a better understanding of the themes and influences that shaped history. Through deep and meaningful engagements with the game mechanics and the histories they represent, players can inhabit and learn history from a believable game world that is specifically designed to portray higher level historical narratives.

Surface and Deep Learning in *EUIV*

As shown in the previous section, survey participants were able to distinguish between the broad and the detailed historical understandings they experienced during *EUIV* gameplay. These two understandings of history can be related to the educational concepts of “deep” and “surface” learning (Houghton, 2004, pp. 9-11; Marton & Säljö, 1976, p. 7; Ramsden, 2003, pp. 42-43). Surface learning promotes the unchallenging acceptance of new information, such as when a

learner rote learns or memorises facts, not necessarily understanding how these fit into the bigger picture or being able to link them with other pieces of information. In contrast, deep learning involves linking these broader, more general ideas and concepts together, leading to longer-term retention and a more meaningful understanding of those ideas (Houghton, 2004, pp. 9-11; Ramsden, 2003, pp. 42-43). Deep learning also involves focusing on central arguments and concepts rather than on specific examples or independent facts. The forum survey results show *EUIV* can promote deeper forms of historical learning through the game's mechanics, which can teach expansive themes and influences around the Early Modern era. While *EUIV* does present factual historical examples (e.g. pop-up boxes), it also contains an abundance of counterfactual examples, which embody many of the same concepts found in factual historical narratives. This article opened with an ahistorical, fantasy scenario where Spain colonised Australia instead of Britain. Although inaccurate, the vignette still references core historical ideas of the era, including exploration, colonisation and global empire building. These counterfactuals foster deep learning by presenting central historical arguments and concepts rather than specific examples or independent facts. Hence, these counterfactual stories contain valuable historical understandings and promote deeper forms of learning.

The distinction also has to be made between knowing history as a set of facts and history as a historical narrative. Most traditional historians deal with factual knowledge or facts to inform their knowledge of history, and facts play a significant role in helping the historian tell a wider narrative of history (Husbands, 1996, p. 62). Carr (1986) defines historical facts as those all historians agree upon; however, facts are only relevant when used by a historian (pp. 4-5). Hence, historical facts may only become historical knowledge if told by historians, and this history is, at least in part, down to the interpretation of the historian (Carr, 1986). This process of interpretation is termed "narrative history", and often shifts between fact and supposed fiction (Husbands, 1996, pp. 47-48). Narrative forms of history are used to address wider and complex ideas and themes of history (Husbands, 1996, pp. 47-48). There is value in knowing historical facts that tell us what happened in history. However, the narrative history is often better at explaining the why and how of history which are arguably and often the more interesting and valuable historical understandings. Games depict and help the player construct their own narrative understandings of history, and subsequently engage in the complex historical ideas through active engagement with the history itself. This engagement with the game history as well as the player's curiosity to enquire further about history both inside and outside the game, allows the player to construct their own conceived and complex understanding of history. These complex historical understandings are typically associated with deep learning and are desirable as learning outcome in history education, as opposed to the factual historical memorizations associated with surface learning.

Deep forms of learning also allow the learner to make mistakes without penalty, and reward their learning efforts (Houghton, 2004, pp. 9-11; Ramsden, 2003, pp. 42-43). Games create this potential by allowing players to learn through trial and error, productive failures (Kapur, 2008) and rewards systems. Other forms of deep learning include dispelling misconceptions and having students compare, contrast and interconnect previous knowledge with new knowledge (Houghton, 2004, pp. 9-11; Ramsden, 2003, pp. 42-43). Through play inside the game and research outside the game, the player compares, contrasts and builds on their original knowledge, ultimately constructing new understandings from the learning process. In deep forms of learning, the learner has a clear interest in and curiosity about the subject matter (Houghton, 2004, pp. 9-11; Ramsden,

2003, pp. 42-43). *EUIV* achieves this because it ignites further interest in and research into history. Deep learning principles staunchly reject learning just for the sake of passing tests or undertaking assessments, as these encourage surface learning behaviour, which can lead to the reduced retention of information, an absence of big picture understandings and too great a focus on a single context or idea (Houghton, 2004, pp. 9-11; Marton & Säljö, 1976, p. 7; Ramsden, 2003, pp. 42-43). Interestingly, while games like *EUIV* are played for leisure, they intrinsically motivate players to engage with the game system and subject matter, and thereby afford many of the deeper learning principles for studying history so often sought after in education (Gee, 2009, p. 65).

Figure 3(below) illustrates the sorts of deep and surface historical learning that can occur within *EUIV* gameplay. The analogy of the iceberg shows how history is divided into broader concepts and ideas (deep level learnings) and historical facts (surface level learnings). The survey results show *EUIV* can teach precise surface level learnings through certain game features such as map modes (119/331 or 35.95%) or pop-up events (146/331 or 44.11%). Indeed, the Formal Analysis also showed that many surface level histories (i.e. historical details) can be explored and learnt through *EUIV*'s mechanics. However, many of *EUIV*'s more fundamental and interactive gameplay elements are not suited to teaching surface level history. As the article has shown, playing *EUIV* can successfully teach many overarching historical themes and influences of the Early Modern era. The iceberg thus represents how the facts and details of history are usually apparent and visible on the surface, but that the more important, valuable and meaningful forces of history are often below the surface and invisible. The surface history is supported by the deeper history to create a meaningful whole. The survey results showed that even if the player perceives *EUIV*'s surface history as false or only partially true, the valuable broader understandings and meanings of history can still be uncovered upon deeper examination and reflection. The deeper elements of history communicate valuable comprehensive understandings of how and why history happened and the results show that *EUIV* gameplay produces this type of deep learning.

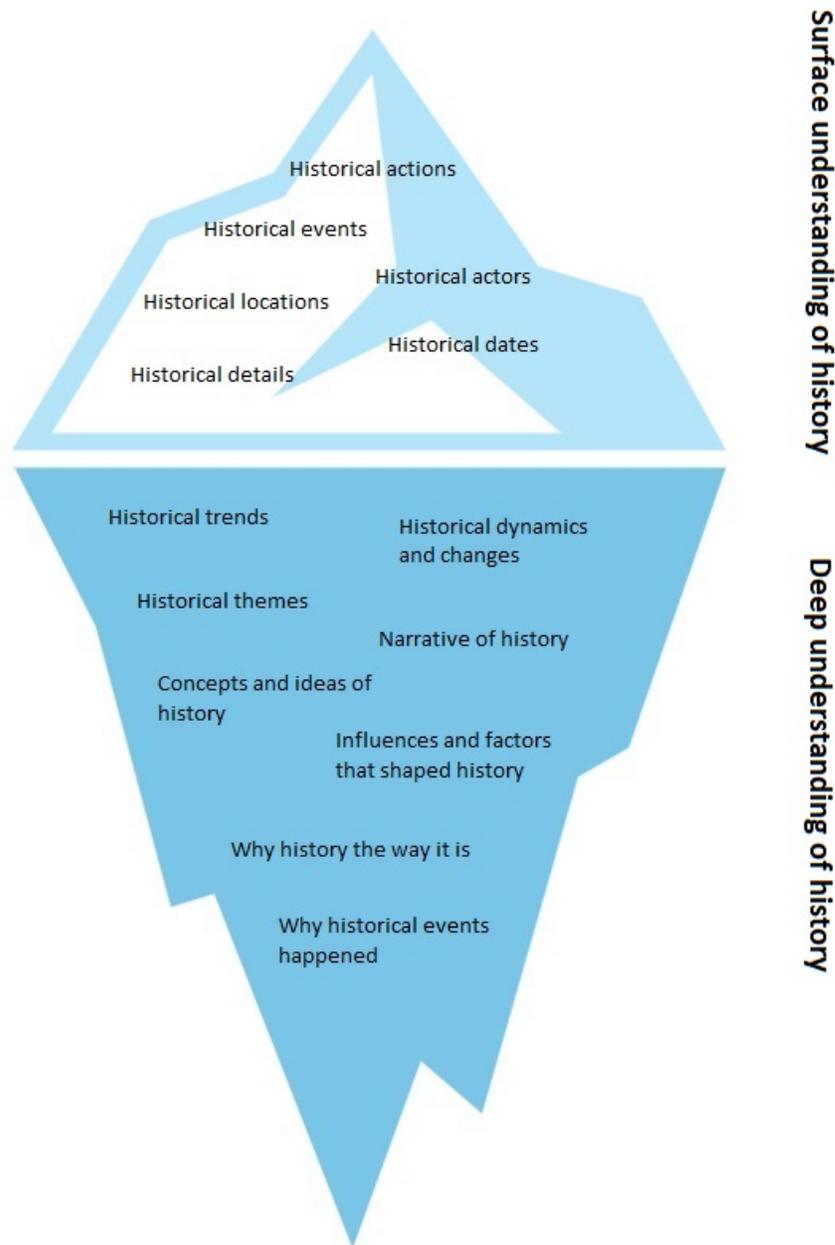


Figure 3. The analogy of the iceberg shows how different forms of historical knowledge are either on or below the surface.¹⁶ *EUIV* can help players to gain both surface and deeper understandings of history.

During *EUIV* gameplay, a player does not just absorb surface history but can also look deeper into the game's content, analysing it and linking different histories and concepts to make meaning. This process could also be compared to Hemingway's Iceberg theory (1999, p. 103), which suggests that a deeper story can be learnt from a text, even if that deeper story is not explicitly explained. Rather, the deeper story is implicit and communicated through various surface elements (Hemingway, 1999, p. 103). In a similar way, a *EUIV* player can unwittingly learn many overarching historical themes and influences even if they are not explicitly explained in the game.

Deep and surface learning manifests in *EUIV* in two ways. First, the game mechanics communicate surface and deep histories, as shown in Figure 3, with deeper forms of historical understandings being more prevalent. Second, the game affords deeper forms of learning through meaningful, playful and educational engagements with game content. Hence, while *EUIV* is limited in terms of the surface history it can communicate to players, it strongly promotes deep forms of learning and understandings of history that could be applied in a higher education context.

The survey results showed that educators could capitalise on *EUIV*'s historical content in the classroom, using it to engage learners in deeper understandings of history through the interactive elements of the game. However, the results have also identified several potential issues around the abstraction of history and the counterfactual nature of the game. Many of these issues can be addressed by treating the game as just one source of information, which, when combined with other sources, helps form a comprehensive historical platform. In this way, playing the game can convey a deeper understanding of history, as it can serve to connect and reinforce more loosely related knowledge the student may have about the history they are studying. For example, a student may know of events that occurred around the time of Australia's colonisation, but not understand why those events happened or how these events fit into wider patterns of global colonisation and trade. Gameplay may be able to give context to these events, showing how they fit into a more comprehensive picture of history. Playing the game can also reveal the gravity of specific events by illustrating the consequences of similar events, and demonstrating how wider trends in history are responsible for various historical outcomes. Through counterfactuals, the game can also show the player why certain historical themes and influences were dominant at certain times. These broader thematic understandings of specific historical periods can often be a learning outcome for higher education history units (Australian National University, 2021; Open University Australia, 2021). As such, *EUIV* has considerable educational potential, but must be used within a context that includes reference to other kinds of historical sources. The game helps this type of multi-source teaching by sparking players' interests in researching history outside of the game, which helps to validate and reinforce the player's historical understandings. It could potentially be suggested that participants might learn information through traditional teaching methods such as a lecture in a much shorter time. Yet games remain a more active and intricate form of learning for hands-on learners. Therefore, *EUIV* could help students actively meet historical knowledge and informational competencies in university history courses. However, other skills such as analysing historical evidence, constructing an historical evidence-based argument or communicating those arguments would require other practices and/or mediums, potentially even game-based learning practices such as modding (Loban, 2021a).

Conclusion

EUIV's depiction and expression of historical knowledge can be visualised using the Torres Strait Islander Cultural Tree (Loban, 2021b). In the Torres Strait Islands in the Far North of Australia, culture is viewed as a tree whose roots represent deeply embedded traditions and histories, while its growing branches represent new expressions of those traditions and histories. These branches might take the form of new interpretations of Torres Strait art, music and other modes of cultural expression handed down through the generations. These new forms are legitimate expressions of Torres Strait culture in their own right, but are given context and meaning through their connections with the past. *EUIV* could be seen in a similar light, not as an exact replica of histories

and traditions, but a new digital version that can still convey similar messages and ideas about the past. *EUIV* is an alternative learning medium in which a player is not just an observer of history, but is immersed in history, shapes history and experiences different perspectives. *EUIV* gaming practices fit into and draw from a multitude of historical sources to communicate a deeper meaning of history to the player. If educators recognise this, we may be able to acknowledge the game as a legitimate form of historical representation and engage with it as a pedagogical tool.

When players interact with *EUIV*, they both engage with a game and learn about history. While a balance between the two experiences is ideal, the scale is tipped towards engrossing and meaningful gameplay rather than historical realism and accuracy. As a result, the history within *EUIV* can be abstracted or provide a degree of misinformation. This history can be further warped by player and AI actions in the game, especially if the player engages metagame strategies. A mitigating solution to these issues is the black box approach. This approach encourages the player to focus on the game's historical content and may suit historical role-players. At the same time, players may find great value in playing counterfactuals, which may inspire them to compare and contrast these alternate realities with factual history as a means to discover new histories from a variety of perspectives. Consequently, the type of historical learning within *EUIV* gameplay is one that embraces multi-perspectives and the exploration of broad historical themes. By navigating the game's processes, the player develops an understanding of the influences that shaped historical events, the ideas that changed societies and the issues that determined the course of nations. As a result, although the surface level history within the game is often compromised by inaccuracies and abstractions, there are still valuable deep historical insights to be gained from *EUIV*'s playful experiences. In a higher education context, *EUIV* might address common historical knowledge course outcomes, deal with specific content requirements and be implemented to meet particular graduate attributes. Yet the single most significant benefit *EUIV* can provide is to promote deep and interactive forms of learning through engagement in complex historical depictions. Players can truly unlock *EUIV*'s potential if they apply a nuanced understanding of history in their gameplay and recognise what might be untrue in historical minutiae, is in fact "true" in terms of the broader story of history. As such, they are not recreating an exact history, but shaping it according to their own understandings.

English writer Gilbert K Chesterton wrote: "Fable is more historical than fact, because fact tells us about one man and fable tells us about a million men" (p. 201). In accordance, we might believe distorted history replete with misinformation to be a fable, while an accurate historical representation is a fact. In a fable, truths are stretched, details are left out and information is substituted. However, these issues are irrelevant when there is a greater moral to be drawn from the story. Therefore, while gameplay in *EUIV* may often be historically incorrect, the fables it tells and the morals it reveals may often be quite accurate, informative and valuable.

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¹ Agency is defined as "the capacity of individuals to act independently and to make their own free choices" (Houngnikpo, 2015).

² An example of this concept may be found in the book *Dark Emu* (Pascoe, 2014), in which the author discovers "new" facts in historical accounts that were, in reality, not new but suppressed, and uses these previously suppressed facts to dramatically rethink the nature of Australian history.

³ Realism, in this context, relates to how believable an object is or how plausible an action might be to occur given the context.

⁴ Gameplay is the product of actions, behaviours and strategies that emerge when playing the game.

⁵ Player enjoyment is the pleasure derived by the player from playing the game.

⁶ The practicality of reflecting history refers to the possibility and even usefulness of reflecting history in-game.

⁷ 4X games typically focus on empire building with the player using economics, technology, politics and their military to expand their empire.

⁸ Arguably, just because their focus is not on simulating history this does not mean they do not learn history.

⁹ Min-maxing is a strategy to maximise the desirable variables of the player nation; however, to do so means minimising other variables. In this process, the player creates a nation highly specialised in certain strategies. In the context of *EUIV*, the player will usually min-max variables that allow them to quickly conquer as much land as possible without incurring severe penalties.

¹⁰ Blobbing is another name of map painting where the player creates a 'blob' of their colour over the map and absorbs other nations into their 'blob'.

¹¹ Simulation games combine both simulation characteristics of simulating real world activities and roleplay with the game elements of player choice, interaction and diverging outcomes (Saunders, Percival, & Vartiainen, 1996, p. 97). Hence, a simulation game places players in a real/historical role and context with certain objectives, but allows

player agency and leeway for the scenario to diverge in various ways whether due to player choice, chance or some other intervention.

¹² A black box is a device or system that, for convenience, is described solely in terms of its inputs and outputs. In terms of black boxing, one need not understand anything about what goes on inside black boxes; rather, one simply brackets them as instruments that perform certain valuable functions (Winner, 1993, p. 365).

¹³ Counterfactual histories are sometimes also known as “alternate realities” within the gaming world.

¹⁴ One could equate *EUIV*'s thematic and conceptual learnings to that of Monopoly, which teaches players the basic dynamics of capitalism even while containing low-level counterfactuals in regards to streets, properties and game rules.

¹⁵ It is worth noting that because European colonialism and imperialism are also central to *EUIV*'s gameplay, players normally must conform to this historical Eurocentric and colonial framework in order to progress in or ‘win’ the game.

¹⁶ The illustration is based on the system's thinking process iceberg model (Gürdür Broo & Törngren, 2018).