

“I never asked for it, but I got it and now I feel that my knowledge about history is even greater!”: Play, Encounter and Research in Europa Universalis IV

Rhett Loban

Abstract

This article discusses interlinked findings that stem from the complex and dynamic ways that Grand Strategy video games, especially Europa Universalis IV (EUIV), represents history and how players engage with history outside the game. To discuss these points, the article draws upon data from a survey of 331 EUIV players and an Australian university case study involving 18 participants as well as other games studies research. The article explores how players, through their gameplay in a vast historical game world, encounter and gain some degree of familiarity with histories unknown to them. These newly encountered nations and histories confront players with new depictions about the past and may act as a catalyst for player curiosity and conducting historical research outside the game. The player then returns to the game, integrating their external historical research from outside of the game with their own historical experiences in-game, meaningfully connecting the two history mediums. The article builds on other learning models and highlights the play, encounter, and a research learning model where players learn history both inside and outside EUIV. The play, encounter, and research model places greater emphasis on the importance of player’s encountering new information inside the game and their curiosity about this new information prompting further research outside the game. This kind of in-game and external player engagement with EUIV and history can form a component of a larger whole of an informal learning of history with engagement of other gaming practices and historical sources.

Introduction

In the past, and to some extent in the present, video games have often thought to be a waste of time with no return other than enjoyment for the time invested in play. However, some video games, present new ways to learn information through what is often referred to as game-based learning (GBL).¹ Some of these games are educational by design and intended to help players learn a given topic. However, other commercial off the shelf games are not purpose-built for education, but can nonetheless help the player engage in informal learning through entertainment and play (Apperley, 2014, p. 42). Strategy games such as the *Civilization* series and the *Age of Empires* series show the development of different civilisations through the different historical ages as well as illustrate cultural heritage through different game components. The *Civilization* and *Age of Empires* series are critically acclaimed, with the *Age of Empires* series as a whole, selling 20 million copies (Dobbin, 2019) worldwide and the *Civilization* series selling more than 33 million copies (Takahashi, 2016). These games, and those like them, evidently have the power and popularity to reach a considerable audience, and may be able to facilitate awareness raising and informal modes of learning history through gameplay and other game-related practices.

This article discusses how the game *Europa Universalis IV* (*EUIV*) from the Grand Strategy genre, similar to *The Civilization and Age of Empires* series, can play an important role in helping players informally engage and learn about history. The game forms an important part of a holistic learning cycle, oscillating between the historical game world of *EUIV* and historical research. To exemplify the learning cycle, the article explores how players have used the game as a tool for discovering histories that were previously unknown to them. Given the vast historical content of *EUIV*, this game provides many opportunities to encounter various histories. Next, the article examines how these historical encounters in *EUIV* ignite the player's desire to embark upon further historical research outside the game. Following this, the article examines how players then return to the game where they interlink history between the game and external sources and in some cases this influences their strategies and gameplay. *EUIV* alone provides only one perspective of history, but as a part of a wider series of activities and resources, it is useful for drawing attention to new histories, promoting historical curiosity and further historical research, and providing gameplay opportunities for using historical research in a problem-based historical game setting. Holistically, *EUIV* promotes a meaningful learning process through play, encounter, and research that promotes player engagement with history that oscillates inside and outside of the game. Playing *EUIV* can be thought of as one learning activity in a wider practice of historical research and gaming. In this context, the article will briefly examine several learning models to discuss how these models may be built upon in relation to *EUIV* and history.

Author Biography

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Models of Learning and Games

The article will discuss *EUIV* as a part of a more holistic learning process which oscillates both inside and outside the game. Several authors have explored learning processes that centred on general learning, but also specifically on learning in relation to games. For example, Kolb (1984, p. 25) outlines a general model of learning which discusses several stages of learning including concrete experience, reflective observation, abstract conceptualisation and active experimentation. The concrete experience is an action that an individual might undertake or an experience they have. Reflective observation is an opportunity to review what has taken place and to reflect on the experience. Abstract conceptualisation is the stage in which the individual can conclude what they have learnt from the experience, while active experimentation is planning for the next actions with previous experiences informing what the individual does next (e.g. trying something new). In a gaming context, the concrete experience could be seen as the player interaction, reflective observation is the game's response, the abstract conceptualisation is the evaluation of the game's narrative from the player-game interaction, and the active experimentation is the next response from the player. Kolb's model (1984, p. 25) highlights the importance of reflection and conceptualisation which are important in this gaming context.

The Activity Centred Analysis and Design (ACAD) framework is a framework that explains how the design of complex learning environments allow students to engage in emergent learning and indirectly encourage certain learning outcomes (Goodyear & Carvalho, 2014; Goodyear et al., 2021). The ACAD framework does not explain a cycle of learning, but the model does help explain how complex learning environments promote emergent learning, where learning occurs through active-orientated processes and through 'doing'. Alterable design factors that foster desired learning outcomes include set design (tools, artifacts, virtual/physical space), epistemic design (tasks involved) and social design (working in groups, pairs, or alone). In many single-player games, social design is not as applicable, as games themselves are complex learning environments; however, in a more holistic setting they operate in the larger setting of gaming practices which players can also draw upon to inform other gaming practices (e.g. while playing a game, a player may encounter an unresolvable issue and wish to refer to a gaming wiki to obtain more information). In a gaming context, informal learning may occur both inside and outside the game where players are encouraged to achieve certain tasks in-game, but also possibly setting their own goals. The ACAD framework highlights the importance of emergent learning where players can learn through their own self-directed tasks, goals and interactions through active and experiential processes.

Other learning models focus specifically on game-based learning (GBL). The Input-Process-Outcome Game Model by Garris, Ahlers, and Driskell (2002, p. 445) is a GBL-specific model and explains learning with games occurs with user judgments of a game context, then acting out user behaviour, and then receiving feedback from the gaming system. Inputs that fundamentally shape the gaming process include the instructional content that feeds into

the learning exercise and the characteristics of the game. The collective inputs and gaming process produce the output of learning outcomes. Another GBL learning model by Plass, Homer, and Kinzer (2015, p. 262) discusses a cyclical framework of challenge, response and feedback within GBL. In this model, the game presents a challenge which the player must complete or try to complete via a response. The response by the player will then provide feedback to the player based on their response. This will create a loop where, if the players response has failed, they will need to provide a new response or, if their response was successful, the game will provide the player with a new challenge.

Collectively these models describe how players can learn through games via a series of inputs and outputs. External inputs and player choices inform the game's response which the player then responds to again, leading to a cycle. However, what is not highlighted, especially in informal gaming and learning contexts, is the role of player curiosity in the face of unknown information and the drive to seek further information that might help formulate a player input. Additionally, closer examination of the link between in-game actions and external game actions outside the game could be informative. Especially in regards to how external actions could influence player understandings of the game and its contents. The article will utilise data from a game forum survey and university case study centred around interactions with *EUIV* to discuss how the above learning models could be expanded upon.

Method and Research Design

This article draws from two collected data sources, a survey conducted on the *EUIV* game forum (n=331) and a case study carried out at a university (n=18). The *EUIV* forum survey sought to understand how players informally learnt about history through the game and game related practices via multiple choice and short response questions. Survey research and opinion polls are considered reliable and valuable instruments for accessing and understanding the views of its participants because surveys have a wide application, broad coverage to reach many people (or players in this case), anonymity, and an equal opportunity for all participants to respond (Barribeau et al., 2012; Fowler, 2013, pp. 1–2; Krosnick, 1999, pp. 538–539; Roper Centre, 2019). The forum survey was a simple, inexpensive method for quickly reaching a sizeable global online audience of players who possessed intimate knowledge of the game (Krosnick, 1999, pp. 538–539; Weerakkody, 2008, p. 131). Participants responded as individuals to the survey questions, voluntarily self-selecting to form part of the sample, and were not asked to provide any demographic details. As the survey was available via the Paradox Interactive official forum, data from *EUIV* expert players was readily available. It should be noted that the online *EUIV* gaming community may be different from the target population of adult learners; however, the survey text responses revealed many of the participants were adults, with several studying or teaching history. The age requirement to participate on the *EUIV* forum is 16 years and above unless the user has parental permission, then the age limit is 13 years and above.

The forum survey responses provided information about the level of player interest in history, and the informal learning that occurred within the context of the *EUIV* gaming community. However, the forum survey was not able to provide descriptions of the participants' use of *EUIV* that were sufficiently rich and in-depth to inform the research, nor did it provide adequate details of the participants' interactions with other players. Furthermore, the forum survey did not provide an understanding of how *EUIV* would perform as a tool for learning history in a formal learning context. Thus, the next phase of the research required a case study conducted on a university campus with participants in such a learning context. In total, 18 participants were recruited for the university case study, and were students undertaking Bachelors, Masters and PhD degrees. The participants were from a range of different disciplines including Business, History, Medicine, Media, Engineering, and Science. The participants included males (n=14) and females (n=4), and their ages ranged from 18 to 32 years. They were from several different countries, including Australia, China, Malaysia, Singapore, Philippines and New Zealand. The researcher monitored and guided the participants in the exercise, while two supervisory academics (PhD supervisors) oversaw the project externally. The university student participants were recruited using flyers that were distributed throughout the university. These identified the researcher and provided contact details and information about the study. The participants gave their consent to participate in the case study and have their data collected by signing a participant consent form.

Qualitative methods specifically involving descriptive research were employed in several different ways in the case study (Cohen et al., 2007, p. 205). These included researcher observation, demographic forms, written and visual pre/post-tests, interview questions and an examination of participants' mods. The interview data and the pre/post geographical tests will be the case study data primarily used in this article. The university case study consisted of two GBL groups. One group modded *EUIV* while the second engaged in a historical roleplay simulation using *EUIV*. The latter group will be the focus of this article. Participants self-nominated to join the study and were assigned a number according to the order in which they joined. The case study participants were provided with different exercise information, depending on the exercise they participated in. The Historical Roleplay Simulation participants were provided with documents that outlined the Historical Roleplay simulation exercise objectives, the nation they were playing as, and their nation's objectives. The researcher critically analysed (Ennis, 1993, p. 180; LeJeune, 1997) the comments, arguments and other data from the survey participants and case study participants to discuss how history was understood, represented and challenged by game developers and players. The data collection process from two data sources involving human participants (i.e. the survey and case study) were approved by the researcher's university ethics committee. Before exploring and discussing the collected data, the article will provide a brief overview of *EUIV*, its online fan community and related gaming practices to provide greater context to the article discussion.

Europa Universalis IV Overview and Community

EUIV is a real-time Grand Strategy video game where a player controls a nation and must use the nation's available resources from the economy to diplomacy to military force to achieve their nation's objectives. While not always the case, Grand Strategy video games are based on a historical time period and confrontations where the player must navigate and survive the historical world and the game's timeline. Often in these games, player intervention creates new trajectories in histories and consequently creates counterfactuals. Counterfactuals are depictions of history that result from asking "what if?" questions; in this case, the question is: "What if a particular historical event happened differently?" (Ferguson, 1997, p. 2). For example, in a counterfactual, one might ask "what if" Spain colonised Canada, and what the historical consequences of this change might be. There are those who dismiss counterfactuals as "parlour games" with little historical value (Carr, 1987, p. 97). However, even if games depict inaccurate historical events as a result of such counterfactuals, they may still immerse the player in a particular context, presenting a historical viewpoint that allows the player to understand the underlying factors that contribute to the development of historical events. The grand scale of the game and countless diverging historical trajectories means there are a vast number of more precise as well counterfactual historical outcomes.

In regard to the game's specific history, *EUIV* replicates the Early Modern period, encompassing over 350 years from 1444 to 1821, starting with the collapse of the Byzantine Empire and concluding around the time of the French and American Revolutions. See Figure 1 for a screenshot of the game's main world map view. There are several tabbed starting points the player can choose from; however, the player can start the game at any date between 11th November 1444 and 1st January 1821. The game focuses on Europe's transition from being governed by a collection of monarchies to being controlled by a number of global European empires (Paradox Development Studio, 2013). The player chooses a nation to play as, which can include a vast number of nations that existed within the game's timeframe (over 900 playable nations), with the exception of many non-Western Indigenous nations. The player must effectively manage their nation's economy, military, trade and diplomatic relations to endure the era. While the player is presented with various missions they may choose to undertake, these are not compulsory. Rather, *EUIV* is a sandbox² game in which players can set their own goals. A player may wish to expand into the Americas and become a colonial superpower, or may choose to capture wealthy trade provinces to become a trade empire, or gain power through other means, such as by becoming the Holy Roman Emperor or the Emperor of China. Choices available to players in terms of how they might play to win are highly varied and flexible. The game covers an extensive number of historical themes and events, both of which are depicted through different mechanics, game maps, and pop-up boxes with various levels of historical accuracy. *EUIV* was primarily designed as a single player game, but multiplayer mode is available and played by many. The game is usually not played in one sitting, but over hours, days, weeks or even months.

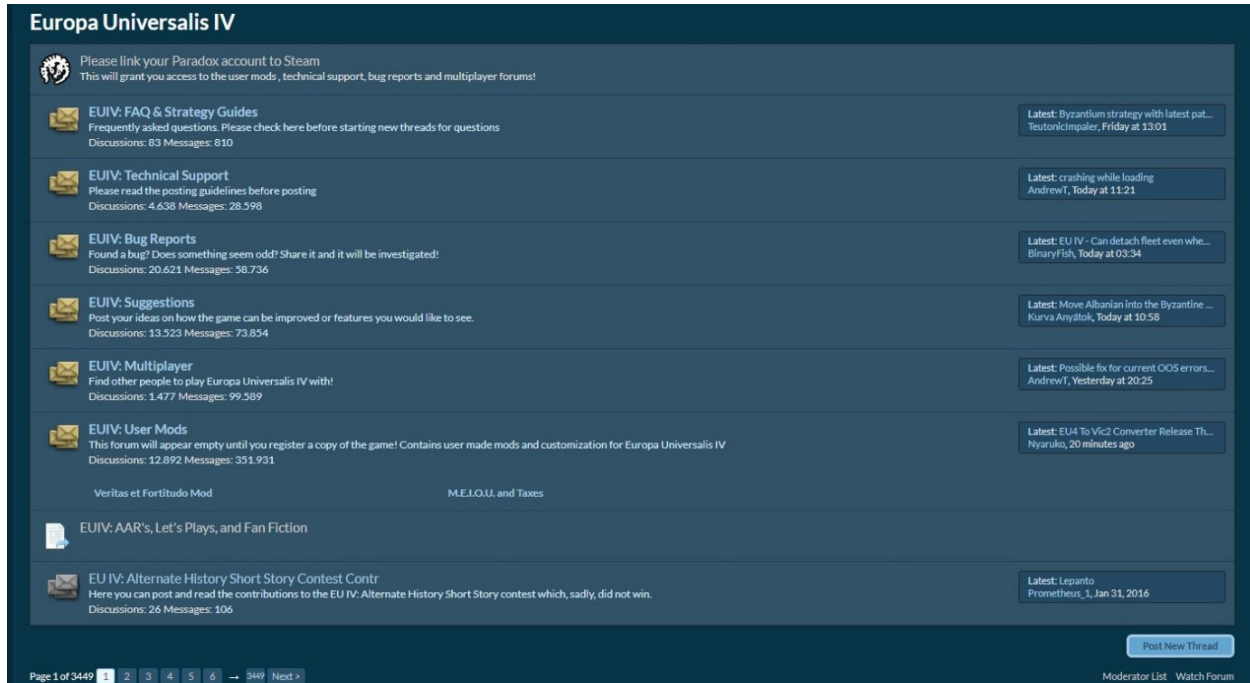
Figure 1: *EUIV*'s large-scale view of world map in 1450 with management interfaces.



EUIV has a large and active online community whose members interact in the Paradox Interactive game forums. Each Paradox Interactive game has its own forum as well as sub-forums for FAQs and strategy guides, technical support, bug reporting, game suggestions, multiplayer and user mods, After Action Reports (AARs) and fan fiction (Fig. 2). Each sub-forum contains threads and discussions initiated by Paradox Interactive's developers or forum members, and other developers and forum members can respond to these. In the main *EUIV* sub-forum, developers and forum members discuss everything from what players enjoy about the game to suggestions for improvements (Fig. 3). The *EUIV* forums form a pivotal part of the *EUIV* gaming community, where over 68,000 threads discuss the game across *EUIV* sub-forums and in four languages other than English: Spanish, German, Swedish and French (Paradox Interactive, 2021).

In addition to general discussions about *EUIV*, the forums are a place where players can share detailed stories about their previous play-throughs of *EUIV*, known as After-Action Reports (AARs). In AARs, users recall their experiences with a given game, campaign or play-through, often in a story-like format (Apperley, 2018; Mukherjee, 2017, p. 39). AARs do not have to be based on factual history, with some users creating their own fan fiction about game-based scenarios or historical events. Through AARs, players can convey to the rest of the community the details of their greatest or most interesting in-game experiences.

Figure 2: The forum list of sub-forums including technical support, FAQs and Strategies, Multiplayer, Mods and more.


















Screenshot taken 29 July 2019.

In the researcher's experience, players also use the forums to circulate mods they have developed. Discussions of these mods are integral to interactions between members of the gaming community, and the mods themselves are one of the reasons the game is so popular. The ease of modding the games means that players can create their own game content or modified versions of a game using anything from small changes in variables, which might resolve any imbalances perceived by the player, through to total conversion mods that can change the entire setting of the game to another era or context (gigau, 2019). Paradox Interactive has facilitated the creation of mods and the growth of the modding community by creating an intuitive in-house language that players can use to modify the game. This language is based on accessible scripts rather than hard or backend code. The developers also employ a full-time Usermod Coordinator to support the modding community (Captain Gars, 2014).

Alongside the players, developers also actively engage with the gaming community, interacting with community members and sharing information such as forum posts, Developer Diaries,³ Twitch and YouTube game videos, and social media content like Twitter updates. Paradox Interactive generally maintains good relations with the community by acting on player suggestions and concerns. For example, a mechanic called Estates that typically depicts the historical classes of the nobility, clergy and burghers was introduced to cater to player requests to have more control over internal governance (Paradox Interactive, 2015a).

Figure 3: The sub-forums show pinned topics about large announcements such new downloadable content and the *EUIV* wiki are located at the top.

Title	Start Date	Replies	Views	Last Message
 Europa Universalis IV: Golden Century out now! BjornB, Dec 12, 2018 ... 5 6 7	PINNED	Replies: 138 Views: 125.667		Serg1777 May 31, 2019
 Europa Universalis IV: Golden Century Game Manual (EN/FR/GER/SPA) BjornB, Dec 8, 2018 ... 2	PINNED	Replies: 22 Views: 54.227		Quackytheduck Dec 18, 2018
 Europa Universalis IV: DLC Render Pictures Archive Larshaus, May 2, 2014 ... 30 31 32	PINNED	Replies: 634 Views: 594.559		IndigoRage Jul 22, 2019
 Europa Universalis 4 Wiki Meneth, Apr 4, 2013 ... 15 16 17	PINNED	Replies: 329 Views: 256.410		Dauth Jan 2, 2019
 Changes to Playing Previous Versions of PDS Titles /How To Roll-back Your Game Version HottestRod, Sep 25, 2018	LOCKED PINNED	Replies: 0 Views: 17.025		HottestRod Sep 25, 2018
 Europa Universalis patch 1.28.3 is now LIVE! [checksum 3ba8] - Not for problem reports BjornB, Feb 4, 2019 ... 2 3	PINNED	Replies: 40 Views: 77.872		corgi911 Jun 1, 2019
 A Reminder Regarding the use of "Kebab" as a Slur Mr. Capiatlist, Oct 28, 2016	LOCKED PINNED	Replies: 2 Views: 176.195		Mr. Capiatlist Aug 29, 2018
 Is there a way to force curtail_estate_noble? bucketofsquid, Today at 10:46		Replies: 2 Views: 38		bucketofsquid Today at 11:12
 EU4 - Development Diary - 23rd of July 2019 Calligula Caesar, Tuesday at 16:00 ... 9 10 11		Replies: 211 Views: 104.392		Kurva Anyátok Today at 11:02
 Double war on Ottoman Empire at game start as Byzantium, made out with 1500 ducats and provinces Golbez01, Apr 27, 2018		Replies: 11 Views: 3.274		TeutonicImpaler Today at 11:00
 EUIV: Evangelical Majors Renders Catalack, Oct 10, 2016 ... 5 6 7		Replies: 126 Views: 69.540		Carlberg Today at 10:56
 Are Devs theseday focus too much on mission tree but forget about history events? zweihander, Saturday at 02:45 ... 2		Replies: 33 Views: 3.573		Kurva Anyátok Today at 10:55
 Is manpower pool gonna be buffed? CRONOS LXIII, Today at 08:53		Replies: 2 Views: 153		Jarvin Today at 10:54
 Tips for Diplo-Vassalizing? BrotherJonathan, Friday at 07:13 ... 2		Replies: 23 Views: 1.320		BrotherJonathan Today at 10:50
 Army comparison ledger EarlKonrad, Today at 09:51		Replies: 2 Views: 28		Jarvin Today at 10:48

Threads/discussions started by forum player members follow (Screenshot taken 29 July 2019).

The developers continue to release new downloadable content and free patches/content for *EUIV* as well as integrating new historical content into the game to meet the interests of players. As such, the game is constantly improved and expanded upon, with developers engaging in a constant dialogue with players. The online community and the various gaming practices, including AARs and discussion, that are external to the actual game often form a crucial part of the *EUIV* gaming experience.

It should also be noted that *EUIV*, and games like it, are built around empire building gameplay and *EUIV* is centred on building a global empire based on European models. This in-game activity is frequently pursued and achieved through conquest, which players often regard as the most efficient form of “progress”. Several of the survey forum participants jokingly referred to the game as a “map-painting simulator”. Nations are represented on the world map in particular colours, and when a player’s nation expands and conquerors new lands, the player covers, or “paints” the world map in the colour of their nation. The military focus and expansionist strategies required to win the game, or at least become the

most powerful or dominant nation, are thereby represented through the process of painting the map in the victor's own colours. Players appear to, consciously or/and subconsciously, understand this in-built imperialistic code as it constrains or compels their experience of play. When asked about nation governance in *EUIV*, 18 of the survey participants commented on the game's focus on war and conquest. One survey participant shared: "EUIV is still too much a 'map-painting simulator'... Most of the wars result in big chunks of territory being transferred from one country to another, whereas this wasn't the case historically". Another survey participant explained "EUIV is a good map painter simulator...It's simply too complicated to reflect all the [non-military] changes on a city/province/region throughout the course of the game". Another survey participant believed this imperialistic approach was embedded in the AI, causing the game to consistently promote war and conquest to create larger, dominant nations. The player thereby needs to compete with the AI to maintain their strategic position and win the game, as opposed to engaging in another type of journey and learning about history outside of imperialism and war.

Other scholars (LaPensée, 2008; Ford, 2016; Mukherjee, 2017; Pobłocki, 2002; Miner, 2020) identified similar forms of ideological gameplay embodied in strategy games. Pobłocki (2002) suggested the *Civilization* series staunchly represents a Western perspective of history and its progression (pp. 174–175). Pobłocki (2002) argued that while non-Western cultures are represented in the game, the technology tree, which provides in-game bonuses and a measure of progress in-game, is mostly linear for all the civilisations, and the most advantageous in-game benefits (such as those relating to democracy) are generally associated with Western progression, Western expansion, and the history of the United States (pp. 174–175). Ford (2016) pointed out, in the 4X genre, non-player nations, particularly those that are Indigenous, merely serve to be conquered and subjugated. This ideology of acquiring territory, building and expansion is paramount to the goal of becoming an empire. Ford (2016) suggested that, while all nations might become an imperial power in-game, including Native American and Asian nations, they cannot do anything else other than empire building. LaPensée (2008, p. 132) arrived at similar conclusions in her analysis of *Age of Empires III: WarChiefs* (Ensemble Studios, 2006) in which the player as a Native American nation can use a firepit to add positive modifiers to build their nation and to further their colonial and imperialist strategy. However, the in-game firepit might not necessarily simulate the spirit of dance or the real use of a firepit, or even have any genuine Native American significance. Rather, the firepit is deployed as a mechanic of war and conquest. This favours certain ideologies and historical courses of action that are comparable to those recorded about colonial European powers. Miner (2020) made similar observations with map-based games whereby varied depictions of different nations gives the appearance of being equal and objective, but the gameplay itself promotes aggressive expansionism and colonial administration of land. Mukherjee (2017, p. 96) also noted the roles of colonisers and Indigenous people can be reversed in these sorts of games; for example, the Maratha Empire (an empire that dominated the Indian Subcontinent) in *Empire: Total War* can invade and take over Europe, turning imperialism as we know it on its head. However, empire building remains the end game. In

EUIV, most central processes and structures force the player to re-enact imperial historical narratives akin to those centred on European expansion. The Eurocentric and imperialistic lens of the game drastically limits the kind of history it can teach as a single informational resource. However, *EUIV* does provide the opportunity to encounter and play a vast number of nations throughout the world and encounter unknown aspects of history, raising the awareness of histories the player may not have otherwise known about.

Encountering Unknown Histories

EUIV's vast content allows the player to encounter many histories, sometimes by chance. For example, in response to the question "How accurately does *Europa Universalis IV* reflect and simulate history?", one forum survey participant explained:

By reading the descriptions or the events, I have got to know things about Ethiopia in my current campaign. Now I know about Prester John's kingdom, the Coptic faith, the Jewish province in the African kingdom, the traditions of the Ethiopians, and a lot more. I never asked for it, but I got it and now I feel that my knowledge about history is even greater!

It is evident that *EUIV* can expose players to histories they knew little about, or even those they did not know existed. In the university case study, many participants were not aware of the existence of the Aztecs and other Central American nations. Indeed, six of the 18 case study participants commented in their interviews they had learnt about world history, geography, and the locations and nations they had not previously known.

This point is further illustrated in the case study where participants were provided with a visual pre and post-test to assess their geographical knowledge of the locations of the Spanish and Aztec nations which the participants played as in-game. The results of these visual tests are represented in Figures 4, 5, 6 and 7. Following their *EUIV* game session all participants' scores on these geographical tests improved, particularly in terms of their ability to locate the Aztec Empire on the world map. In the figures below, the Spanish state is highlighted in yellow while the Aztec state is highlighted in red, with black dots⁴ representing participants' marked nation locations. As Figure 4 shows, the majority of participants ($n=14$) were able to locate Spain on the world map in their visual pre-test. Others incorrectly placed Spain in eastern or southern Europe, or the Middle East. Following the historical roleplay simulation and modding sessions, participants were better able to locate Spain, with only two of the 18 participants placing Spain outside of its actual borders (Fig. 5).

Before their *EUIV* game sessions, many of the participants did not know of the existence and geographical location of the Aztec Empire. During the pre-test no participant was able to identify the geographical location of the Aztec Empire (Fig. 6); participants believed it was located in South America, Europe or Africa. Following the simulation and modding exercises, eight participants demonstrated considerable improvement and were able to accurately

Figure 4: Participants' marked locations of Spain (yellow) in pre-test.

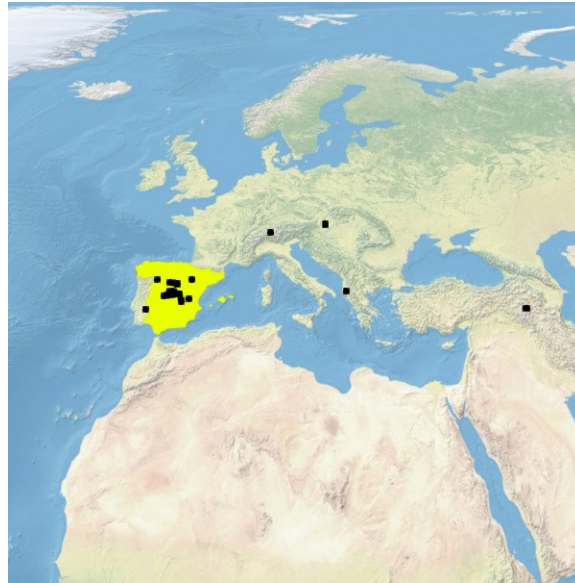
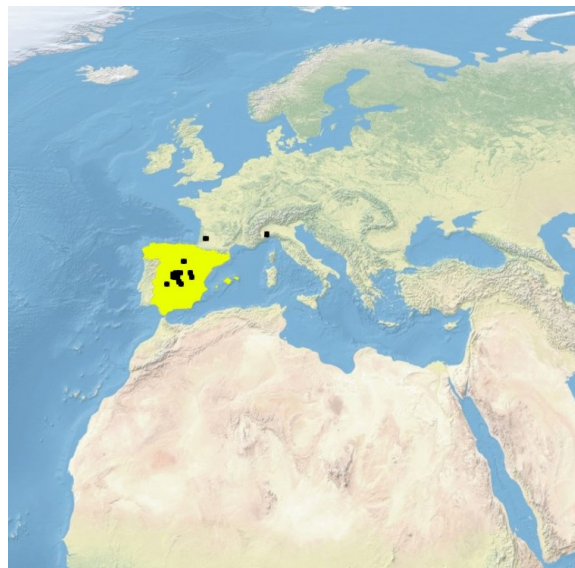


Figure 5: Participants' marked location of Spain (yellow) in post-test.



locate the Aztec Empire on the world map, as shown in Figure 7. Almost consistently, with the exception of one participant (who placed the Aztecs in South America), all other participants ($n=17$) placed the Aztecs very close to their actual location in the Central American region. The number of participants identifying Spain's location compared to the Aztecs shows a considerable contrast and may illustrate an imbalance in historical understanding and appreciation of different nations and cultures over time.

Figure 6: Participants' marked location of the Aztec Empire (Spain in yellow, Aztec Empire in red) in pre-test.

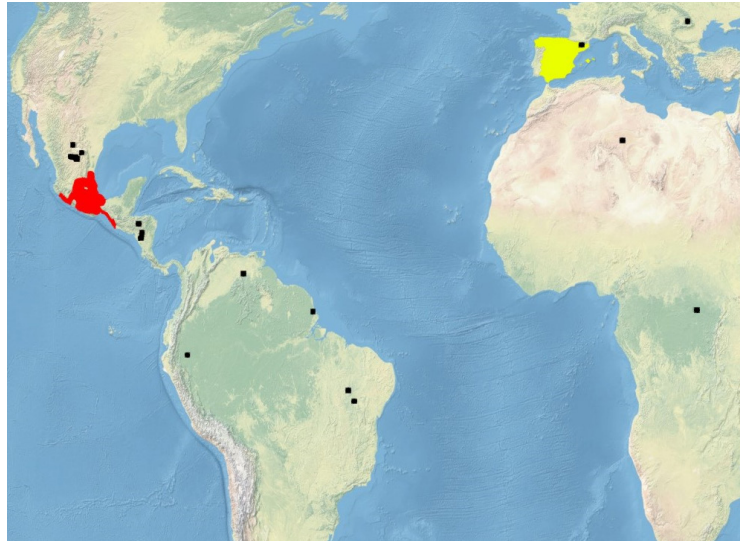
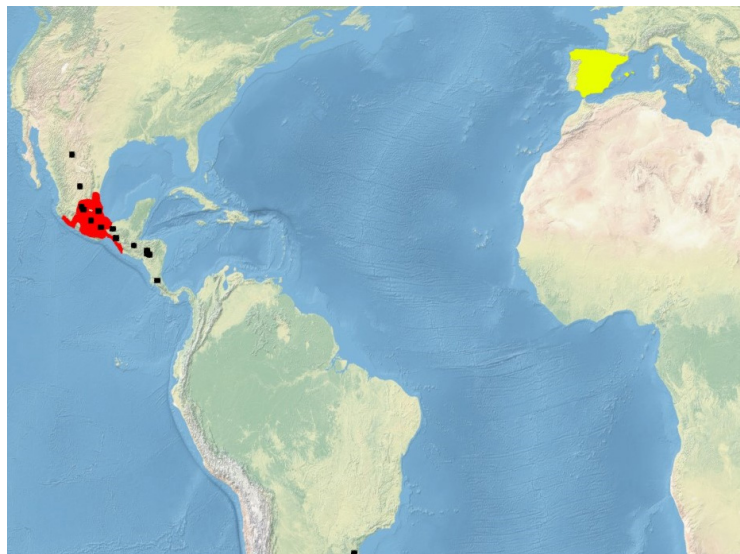


Figure 7: Participants' marked location of the Aztec Empire (Spain in yellow, Aztec Empire in red) in post-test.



The map test results indicate that nearly all participants improved in terms of their geographical understanding. In this sense, maps, especially interactive maps with demographic and political details may have helped familiarise participants with historical geography. While the extent of the participants' knowledge about the Aztecs is debateable, this visual data does illustrate a greater degree of familiarisation with a nation that they may not have known much about otherwise.

As pointed out by the survey participant who played Ethiopia, *EUIV* may go beyond merely encountering unknown nations, but also playing out history from the often lesser known perspectives such as the Ethiopian nation. As Seixas, Morton, Colyer, and Fornazzari (2013, pp. 4–6) pointed out in their six historical thinking concepts, taking historical perspectives and attempting to understand ethical dimensions are important when learning about history. The thinking involved in these two concepts can occur when a player takes on the perspective of a historical character or in this case, a nation. Players learn through perspective by taking on the role of a historical nation and players create their own history based on the game's historical context. However, players are also faced with the ethical dilemmas of whose history is being told and in what way the history is being communicated, prompting the player to further analyse the game itself. Through these frames of historical thinking (Seixas et al., 2013, pp. 4–6), we can reflect on how games such as *EUIV* can afford certain forms of historical roleplay, analysis, and engagement, especially of histories player's are unfamiliar with. However, we do have to be cautious that, although players can play these nations, they are representatives of the developers' understanding of the nation. Nonetheless, they are important in drawing attention to unknown histories and the complexities of various nations.

The historical roleplay, analysis and engagement afforded by *EUIV* are supported by the game's extensive information base. This information base allows the player to discover new areas of personal historical interest, to reconnect with previous formal and informal history learning outcomes and uncover previously unknown histories. In games, players learn through varied game processes, and processes of information discovery are highly repeatable where multiple and various actions can be performed with very different outcomes (Bogost, 2007). Vella (2015) suggests that because of the Blackbox nature of games, one player cannot ever truly gain complete knowledge or mastery of a game, which requires many play throughs to even understand a number of possible actions and outcomes. Indeed, Vella (2015) suggests that even after numerous play throughs there are still possibilities for further surprises and revelations. In the case of *EUIV*, the game's vast content, as well as the player/AI actions mean the game will always play differently, even with the same player, who is able to discover new information about history, geography and individual nations with each play through often from different perspectives. The player's awareness and knowledge of historical information in *EUIV* is illustrated in a concept called the Johari Window Model of Awareness (Courtney et al., 1997, p. 3; Luft & Ingham, 1961, p. 34). Also known simply as the Johari window, the concept is used to teach self-awareness, allowing the individual to understand the knowledge they have about themselves and the knowledge others have about them. Applied in a gaming context, Grand Strategy games like *EUIV* allow the player not just to discover and understand what the player knows exists, but also to uncover, through gameplay and discovery, what the player does not know exists. A modified Johari Window for Historical Knowledge and Awareness in *EUIV* is outlined in Figure 8.

This modified Johari Window shows the history the player is aware of and the knowledge the player has about that history. In this model, a player of *EUIV* will encounter historical knowl-

Figure 8: Modified Johari Window for Historical Knowledge in *EUIV*.

edge they have and are already aware of, which can reinforce or provide a new perspective on that knowledge. The game can also afford the three other types of historical knowledge. One, whereby the player is aware of a history, but has no intimate knowledge of it. Another where the player can rediscover history they have knowledge of, but which they had not consciously considered or had forgotten about. Lastly, *EUIV* can help the player discover histories, almost by chance, of which they had no previous awareness or knowledge.

This last form of historical learning is important because, through the player's spontaneous exploration, encounters and interactions, they can discover some of the world's often not discussed and unique histories and cultures. These discoveries of historical unknowns can challenge dominant historical perspectives and provide real opportunities for players to expand and reassess their historical understanding based on new perspectives. The Johari window also reveals the fluid nature of knowledge and how, through active exploration of

history and different historical perspectives, historical knowledge can be discovered or even seen in a different but valuable way. Hence, the game presents an opportunity to encounter histories unknown to the player through playful discovery, because it exposes the player to new histories. Although previous models of learning suggest players encounter new challenges, processes, or experiences, the data examined here suggests that variety and depth of these historical in-game encounters is also important. In cases where there is only awareness provided by the game, partial knowledge or knowledge only from one perspective, the player's historical interest and response extends beyond the game to other forms of external historical information and engagement. As a result, this type of informal learning can subsequently lead to supplementary historical research outside of the game, as will be discussed in the next section.

Catalyst for Historical Interest and Research

As discussed, *EUIV* can afford a form of playful encounter and learning which often draws the player's attention to histories previously unknown to the player. Indeed, Ryan, Rigby and Przyblski (2006) explain in their research that video games have a strong motivational pull that can be used to facilitate learning. When players discover these cultures unknown to them, they may feel inspired or motivated to conduct further research into their histories. The forum survey data (316/331 or 95.47%) shows the game acted as a catalyst for historical interest and research. This data is further supported by comments provided by four case study participants who indicated the game was a motivational trigger for them to conduct formal historical research. Additionally, three case study participants suggested the game would be an effective way to introduce history to audiences who would otherwise be uninterested in the topic. It should be noted that perhaps other populations, who are not engaging on the forums, may not research outside of the game in the same way these forum participants. As these participants are already engaging in external game related practices by virtue of accessing the forums and participating in the survey. Nonetheless, this external research could also be a result of wanting to know more about a history, to reconfirm the game's depiction or even to better understand the context of the game's history.

The player's search for more information may also stem from a distrust or scepticism of the historical depictions in-game. The survey participants had to respond to survey question "how accurately does *Europa Universalis IV* reflect and simulate history?". The question was intended to elicit participant responses about the historical accuracy of *EUIV* ranging from "very accurate" to "not accurate at all", with an "other" option for answers that did not fit into these categories. Responses showed the majority of participants (176/331 or 53.17%) believed *EUIV* "somewhat accurately" reflected and simulated history, while 75/331 or 22.66% of participants believed *EUIV* "quite accurately" reflected and simulated history. Only 0.60% or 2 participants thought *EUIV* was "very" historically accurate. There were 51/331 or 15.41% participants who considered *EUIV* to be "quite inaccurate," and 15/331 participants or 4.53% believed *EUIV* was "not accurate at all". Therefore, 253/331 or 76.40% of the forum partic-

ipants believed *EUIV* reflected and simulated a level of historical accuracy to some degree. However, it is also clear there is a tempered understanding of the history depicted *EUIV* with the majority believing the game to only somewhat historically accurate which would help explain why they may seek other sources to compare and contrast the history depicted in the game.

The forum survey asked participants to elaborate on their research processes and to describe the resources they sought during or after playing *EUIV*. A majority of participants (235/331 or 73.67%) indicated they primarily sought out additional information from digital and internet resources rather than from books or documentaries. The next largest group of participants (35/331 or 10.97%) indicated they learnt history from written sources such as books, academic articles and historical documents, while only seven participants (2.19%) said they primarily learnt from documentaries and other video sources such as YouTube. Notably, 32 participants specified, through the “other” option, that they learnt about history from all the sources listed in the survey. The data suggests the *EUIV* community is a digitally active population as they both play and research via computer. Comments from the forum survey and the case study, as well as those from participants in another similar research study (O’Neill & Feenstra, 2016) suggest their participants did not trust historical information in games, specifically *Medal of Honor* (DreamWorks Interactive, 1999), was accurate. Interestingly, the survey participants sought out information from the digital sphere in search of accuracy; however, it is possible that many internet sources and websites may be inaccurate or incomplete, including in relation to purportedly factual historical resources (Cohen, 2005; Yoshioka & Loban, 2015). Nonetheless, players can and do discover unfamiliar histories through playing the game, leading them to undertake a journey of learning by utilising multiple forms of digital media and resources.

In one example, *EUIV*’s Eurocentric focus prompted one forum survey participant to research non-European and American regions:

As a university student who studies Ancient History, I’m always more than willing to learn more about certain regions. Since I focus on European history, *EUIV*’s depiction of other areas, notably African or Asian states has led me to start to research more about those regions which I hadn’t focused on previously.

In contrast, we cannot be sure of the kinds of external sources the players engage with, as most could be less reliable websites such as Wikipedia which may not always have accurate information. On the other hand, 10% of participants engaged with books which may be more likely to be subject to stricter academic and editorial oversight, although this standard will vary depending on the source. Nonetheless, external sources sought out by the player could very well reinforce the game’s colonial logic or misconceptions about non-western histories. On the other hand, modding participants in both survey and case study were encouraged to seek out and address perceived problems in historical depictions of Indian, Chinese and Native American histories and nations in game (Loban, 2021). Nonetheless, this issue is only speculation; however, it is a concern that should be considered.

While for some players the game may serve as a catalyst for further research into unknown regions, others might be satisfied with how the game depicts history. Indeed, one case study participant explained that he was happy with the game content and did not tend to conduct further research or delve more deeply into the history of the narratives he engaged with. This comment aligned with the view of another case study participant, who accepted the game as an accurate and legitimate source of historical information. These differences of opinion show how *EUIV* might either prompt further inquiry into other knowledge sources while also acting as a source of knowledge in and of itself.

Survey participants were also asked how they became interested in *EUIV*. The majority of participants (144/331 or 43.50%) chose “history” as the main reason they were initially interested in *EUIV*. The second largest number of participants chose “video games” (124/331 or 37.46%), and “wargaming, tabletop games and board games” was selected by fewer participants (17/331 or 5.14%). Seventeen participants noted their interest in *EUIV* came from a variety of sources, specifying both “history” and “video games”. Other participants (46/331 or 13.90%) chose the “other” option and provided a short response, with five participants explaining that all three of the survey options were reasons why they started playing the game. From this data, it appears that for a majority of the participants that they already had a prior interest in history. This data would indicate that in some part, some of the players may not have needed the game to spark an interest in history as they already had a clear interest in it beforehand. This data would explain why some players were initially interested in playing the game to begin with. The data also tells us that these interests in history often overlap between historical games and other mediums. Nonetheless, the historical depictions in the game still encouraged players to explore history outside the game in the short term, even if the game did not necessarily build long term interest for some players.

In light of the survey, it is clear the game helps players discover different histories through a variety of elements of research and play. The game interaction is more of a multimedia learning journey than simply an engagement with the game itself. It is also clear that *EUIV* players approach the game’s historical depictions with a level of scepticism. In this way, other media and historical sources supplement and/or contrast with the game’s representation of history. The player, through playful experiences, thereby continues to learn about history outside of the game at their own behest. The player can then take this refined understanding of history back to the game. While *EUIV* could serve as a tool for highlighting new histories and/or as a catalyst for igniting further research into history, the game evidently allows the player to visualise history in unique and pedagogically useful ways.

Learning History through Geography and Linking Game and External History

Data collected from the forum survey and the case study demonstrated a strong connection between the visual presentation of the game and the geographic and geopolitical information precipitated from gameplay. The map component highlights the potential for Grand Strategy

games to act as tool to help visualise historical information globally. However, more importantly, players were actively linking their historical information researched outside the game with their gaming experience in-game. For some players, their historical research out of game would affect their in-game strategies and objectives.

Players themselves strongly suggested that maps and geography was one of the most useful features for exploring history. In the forum survey poll participants were asked “What do you think is the most useful game feature to learn about history in *Europa Universalis IV*?” The highest percentage of participants (146/331 or 44.11%) said pop-up text boxes were the most historically informative and valuable features. The next highest percentage (119/331 or 35.95%) reported the most useful features were the game map and the different map modes. While map modes tend to change over the course of the game, many sections of the map tend to remain the same, without player or AI intervention. Participants found the map modes were historically informative and include the terrain map mode, the goods map mode, the religious map mode, province names and more. These historical map modes are useful for presenting information on the specific details of individual provinces and representations of broader historical changes and dynamics. Several survey participants commented on the use of *EUIV* as a geographical learning tool rather than a historical one. These comments correlate with other survey participants who learnt geography through modding by researching and evaluating maps and online history sources to create custom-made events. One participant stated *EUIV* helped them to understand the significant events of the Early Modern era, including “how various states expanded or shrank ... how religions spread and reasons they were adopted”. Lammes and de Smale, (2018) also note, in their examination of *Civilization VI* (Firaxis Games, 2016), that these game maps are not static but constantly shifting and changing. The game map communicates a variety of information about diverse history, however the map is not static, rather it is a dynamic and ever changing aspect of the game.

In a similar vein, research by Hayot and Wesp (2009) on the game *Everquest* (a massive multiplayer online role-playing game) noted its use of game art to represent different places in the mythical world of Norrath. As players perform different activities in each city represented in the game they learn about the city’s specific history, culture and environment. Similarly, in *EUIV*, map modes communicate to players the spread of culture, religion, technology, development and other demographic information. One participant explained how maps helped them understand aspects of geography, more so than history:

I was helping a friend with the region and area system after they were added to the game. Although there are historical arguments for why patches of land are associated with each other, I looked more for maps and terrain to learn more.

Other forum survey participants also acknowledged the game helped improve their understanding of geography and maps. They pointed out the names and groupings of provinces into their respective regions and explained their historical significance in relation to regional cultures, religions and terrain. In game, maps also showed how the names of regions

changed to reflect the culture of the ruling nation, for example, if Constantinople changes from Byzantium to Ottoman control, its name will change to Kostantiniyye (Necipoğlu, 2010). These details underline the historical and cultural significance behind region names that players could draw on to understand more about how demographics, regions, and nations change over time. One survey participant noted they had learnt not only about the rise and decline of states, but also about the spread of religion, which transcends borders. The spread of religion is represented in *EUIV* in a variety of ways, for example colonial gameplay and nations often re-enact the Christianisation of the Americas (Benavides, 2015; Johnson et al., 2017; Vanzanten, 2016). However, the most prominent of these religions are the Protestant Reformation and the 30 Years War (Hillerbrand, 1968, pp. xi–xiii). In the game, the 30 Years War is depicted as a game mechanic and a series of events where nations convert from Catholicism to Protestantism. This shift in religion creates hostilities between Catholics and Protestants and thus simulates events that actually occurred in the war. *EUIV* also depicts some marginalised religious histories such as the Arab trade influence of the Malay Archipelago (Kersten, 2017; Ricklefs, 2008, pp. 3–4). Through this trade mechanic a Muslim nation with a large trade influence in a region can convert certain provinces to Islam. Although not depicted wholly accurately, this mechanic thereby attempts to depict the spread of Islam across Southeast Asia. Such mechanics shift the focus away from the Eurocentric nature of the game by highlighting the significance of historical dynamics in other regions. In doing so, the game presents informal learning opportunities whereby players might gain familiarity about histories and demographics through map characteristics and utilise and integrate this information in long and short-term play strategies.

As Calleja (2011, p. 92) noted, many regions and locations represented in games frequently contain resources that help the player to progress towards the game's end. Often these regions grant advantages and unique bonuses to the player; for example, in *EUIV* different provinces have valuable trade resources such as gold. Different map modes available in-game are often quite historically informative, indicating the borders of nations, the dispersal of different religions, the locations of resources and the names of regions. For example, both in-game and historically, Central America is rich in gold (Papademos, 2007, p. 593; Walton, 2002, pp. 19, 21) and cacao (Mathiowetz, 2019, pp. 287–289), and Indonesia in spices (Aritonang & Steenbrink, 2008, p. 15; Jordan, 2016; Raghavan, 2006, pp. 3, 5). Finding and using these resources then turns the game map into a tactical map, where space, locations and geography become important, and understanding the layout is not only advantageous but necessary. This is true for *EUIV* and supports the comments made by John, the Engineering PhD student, during his debriefing interview. John described how he used the map and geography-based strategies to gain a swath of territory without diplomatic repercussions by weakening his enemies and conquering profitable areas outside of Europe. These areas had valuable resources such as gold, silk, and ivory, and were held by less militarily advanced nations who were easier to conquer. John's personal game objective was to recreate historical borders and territories of those nations. In the process, he realised that his strategy goals aligned with the historical actions of many nations, such as Great Britain. John was

using historical and geographical details to inform and guide the overall historical strategy and narrative of the game, which are two forms of history pointed out by Elliot and Kappel (2013, p. 5). In addition to John historically roleplaying, a forum survey participant similarly commented that through the roleplay aspect of *EUIV* they emulated the historical actions of the nation they were playing. Both the survey and case study participants were able to meaningfully integrate geography into their strategy and use maps as canvases to recreate history. Participants connected various elements of history, geography and gameplay together, and in doing so learnt that various provinces were characterised by different cultures, religions, terrains, and other individual traits. These historical and geographic understandings of the world were integrated into their short and long-term game strategies. Such processes could be viewed as having pedagogical significance, with the historical concepts and sentiments around global map interactions and relationships presented in *EUIV* offering potentials to gain greater familiarity with history and geography.

There was a contrast between this data and data from a study by Egenfeldt-Nielsen (2005) who used an earlier game in the *Europa Universalis* series—*Europa Universalis II* (Paradox Development Studio, 2001)—to teach history to adolescents (15–19 years) in Copenhagen. Egenfeldt-Nielsen's (2005) research found that many of the study's participants failed to appreciate, explore and link gameplay with history (p. 206). Egenfeldt-Nielsen (2005) concluded that his students often failed to link their game experiences with historical concepts as they viewed the history as primarily factual, and dismissed the narrative forms of history represented in the game (pp. 209, 225–226). Compared to Egenfeldt-Nielsen's (2005) data, this article's data suggests that older participants in the university case study and participants in forums survey (whose ages were unknown) seemed to appreciate, explore and link *EUIV* gameplay with history. This result may be a consequence of older participants having a more mature and open approach to the game. On the other hand, the participants may have had more in-depth experience of the game, which is needed to fully appreciate the historical richness of the *EU* series. Alternatively, it could also be the players' interest in the game's content of history that allowed some of them to appreciate, explore and link *EUIV* with history.

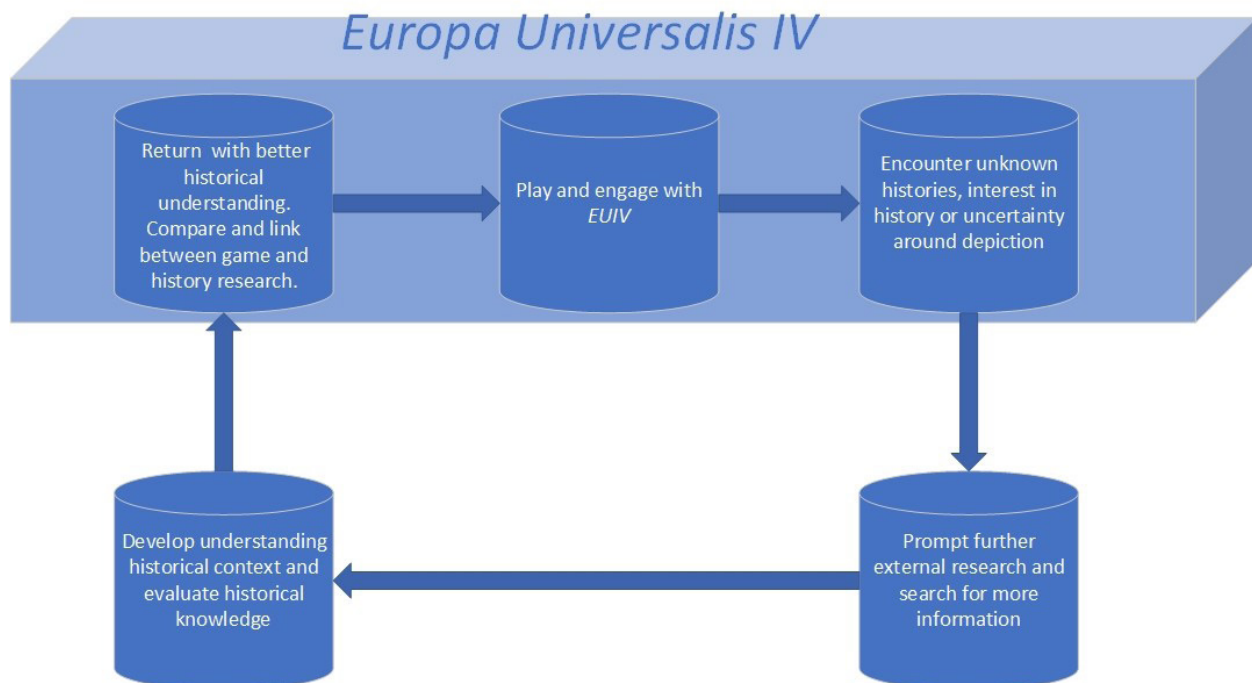
Collectively, the game affords opportunities to explore early modern history through a variety of geographical and map-based depictions. The participants' responses showed they recognised the dynamic connections between geography and history that were dependent on the expansion and decline of empires, changes in societies (e.g., the Protestant Reformation) and other global events. These historical game depictions feed into the wider learning cycle as players encounter histories known to them and are prompted to carry out further research. Some players then used their external research to make meaningful use of the map and map-modes to plan their short and long-term strategies while looking for valuable resources or isolated nations to conquer. Players also role-played to recreate the historical borders of different nations. Some of these cases illustrate that player research informed and even perpetuated colonial gameplay which is a problematic aspect. However, this data does indicate how historical research by the player outside of the game can influence actions in-

side the game. Here, history is used in a meaningful way as a means to help solve problems in-game or serve as objectives for players to recreate in-game. This practice of engaging in history oscillating in and out of the game could be seen as a learning cycle.

Play, Encounter, and Research Model in *EUIV*

The interconnected themes and perspectives discussed previously in this article are illustrated in Figure 9 which shows how a learning process develops from the interactions between play, encounter, and research. The diagram illustrates how players engage with *EUIV* and encounter new histories, nations and cultures. These encounters spark interest in the encountered history and prompt further historical research outside of the game. After the players have developed a better understanding of history from both the game and external sources, they can then return to the game to further engage with, compare and link the history presented in *EUIV* to what they know and have learnt outside of play. In some cases, players might integrate these in-game and outside learnings into their game strategies and modes of engagement. Thus, *EUIV* acts as a platform to encounter new histories and as a catalyst for further research outside of the game.

Figure 9: The play, encounter, and research model in *EUIV*.



While this article focused primarily on *EUIV*, the learning process of the play, encounter, and research could be applied across other similar historical strategy games. The play, encounter, and research model builds on and slightly differs from other models of experiential and game-based learning (GBL) models because the play, encounter, and research model

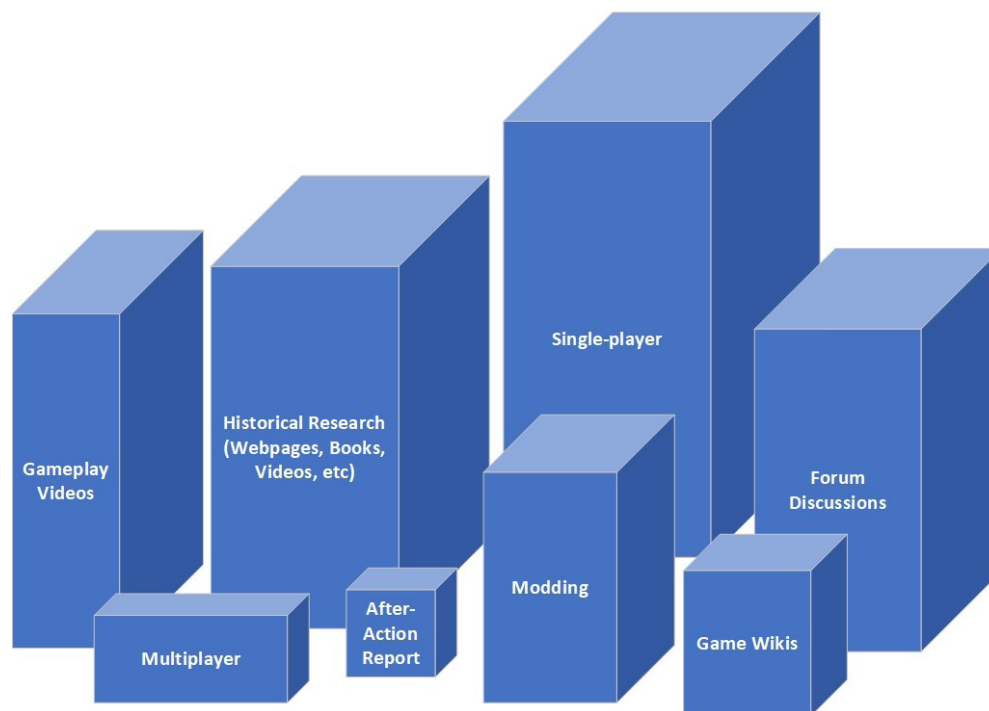
highlights the importance of historical encounters, player curiosity, and external research in the learning process. Compared to Kolb's (1984, p. 25) learning model, the play, encounter, and research model has specificity applying to GBL contexts and the added process of promoting external inquiry outside the activity to further add to and reconfirm one's knowledge. Similarly, the Input-Process-Outcome Game Model by Garris, Ahlers, and Driskell (2002, p. 445), a GBL specific model, also does not appear to highlight the importance and role of player curiosity and external research activity. Furthermore, Plass, Homer, and Kinzer (2015, p. 262) discuss a cyclical framework of challenge, response and feedback within GBL. While the 'challenge' might often come from the game, the play, encounter, and research model indicates that the player response can transcend outside the game, as the player seeks further information and consolidates their knowledge. This external research then tends to develop a better informed 'response' inside the game and consequently more favourable outcome or 'feedback' in-game. The ACAD framework helps explain how emergent learning can occur through the player's own self-directed and active practices of exploring the historical world, encountering unfamiliar histories, and through the subsequent external research of these encountered histories of their own volition (Goodyear and Carvalho, 2014; Goodyear et al., 2021). Thus, the play, encounter, and research model builds on other models by highlighting the importance of player exploration and encountering unknown histories, player curiosity and self-directed external research. The model exemplifies that GBL, especially in informal settings, does not operate as solely gameplay but rather as a collection of different gaming practices and informal learning experiences.

GBL and *EUIV* as a Connected City

As discussed in the *EUIV* overview, mods were another avenue which players further explored, researched and contested history (Loban, 2021). Furthermore, Apperley (2013) discussed how players of *Europa Universalis II* wrote AARs, which were often shared with others in the gaming community. As previously highlighted, mods and AARs are typically posted on gaming forums where a variety of other discussions about history in the game, suggested improvements and other dialogue about game also take place. Collectively, the informal GBL that occurs through gameplay, historical research, and other associated activities in *EUIV* may be depicted as a connected city where each place visited by the gamer contributes to its holistic functioning, as shown in *Figure 10*. One building represents a single player; another building represents historical research; another represents modding, and so on. A player may spend a majority of their time in one part of the city, but will still visit other places within the city to work (e.g., conduct historical research), to socialise (e.g., engage in multiplayer or forum discussions), or to undertake personally meaningful activities (e.g., modding). In other parts of the city, the player will spend very little or no time (e.g., writing AARs); however, each of these places still features on their individualised city map which they can discover later. The construction of each connected city differs depending on the player, and some players might frequent places others do not even know about. In some parts of the city the player is a consumer (e.g., single-player; conducting historical

research); in other places the player is productive (e.g., modding); and in specific places the player may engage in mutual exchanges with other players (e.g., forum discussion). Collectively, each place contributes to the player's overall gaming experience; this promotes a deep, multisourced and multi-method approach to GBL of history through playing *EUIV*. As this conceptualisation reveals, *EUIV* is best understood within a wider context of game related activities used for informal learning. Thus, when reproducing informal GBL into a formal learning setting, we must reimagine the pedagogical use of games as more than just the game itself, rather it is a bustling metropolis of various playful educational engagements with historical engagement both inside and outside the game.

Figure 10: Informal GBL in *EUIV* can be visualised as a city where players visit different places that together shape their gaming and learning experience.



Conclusion

The article explored how participants in both the survey and case study encountered nations, cultures, religions and histories that were previously unknown to them through the game. The vast historical visual game content available to players allows the player to potentially frequently encounter nations, cultures and histories they do not know about or have little knowledge. These sorts of in-game encounters promote the players' appetite for history, and inspired many players to undertake further research into history through other traditional external mediums. Players gain further historical information outside of the game and can compare and contrast their external historical research with their gaming experience to develop an overall analysis of a given history or nation. In-game players gain familiarity with

historical maps, locations and changing demographics, but most importantly, some players adopted sophisticated practices of integrating their out of game research with their in-game strategy such as locating resource rich lands or recreating historical empires albeit within the game's problematic colonial framework. Nonetheless, collectively, the GBL experience of playing *EUIV* allows the player to carry out a cycle of play, encounter, and research throughout gameplay, while consulting other historical sources. Players then compare, contrast and link these elements, reevaluating their own understanding of history before returning to the game with a greater understanding of the gamified historical context. This facilitates a deeper engagement with the *EUIV* world and its historical content. The learning cycle can then start afresh with each game, and with each step in this interactive play cycle further reinforcing historical learnings.

The article examined data from an informal learning context in the form of a survey from *EUIV* forums, and a more formal learning setting in the form of the university case study. The research shows the potential for this way of informal learning to be redeployed into more formal learning settings with potential to be applied in even more formal university units and structured classroom settings. However, in an informal learning gaming context, the play, encounter, and research practice can be seen as a part of a much larger holistic collection of gaming practices of modding, AARs, forum discussions and more. This collection of informal learning and gaming experiences creates an active multimodal play-based way of learning that naturally exists within the gaming community. It is important for educators to recognise these complex informal gaming practices in order to capitalise on the possible gaming interest of students and utilise them in educational contexts. Yet equally so, it is important to acknowledge that these informal self-driven learning practices have their own educational merits within the informal *EUIV* gaming context and player communities where these practices strongly exist and are ritually performed by players.

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Endnotes

1. GBL is typically defined as “a type of game play with defined learning outcomes” (Plass et al., 2015).
2. A “sandbox” game is one with open goals and forms of play as opposed to a highly structured and guided game.
3. Developer Diaries are posts where developers explain the game’s development and new features.
4. Some of the dots marked by participants were very close together or superimposed on top of another participant’s marked location, thus causing the appearance of black clumps or fewer dots than participants.

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