Balancing Education and Engagement: A Suggested Co-design Process for Historical Game Development

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Historical game development is a still-emerging area of Digital Humanities theory and praxis that crosses and challenges many disciplinary borders. Requiring strong humanities expertise in historical research and educational theory, as well as many artistic and technical skills from the fields of computer science, digital art, and game design, such projects foster strong multi-disciplinary teams. This paper discusses the co-authors' ongoing collaboration to develop an educational historical game called *The Migrants' Chronicles*, which seeks to balance pedagogical goals with engaging gameplay in order to create a game that is equally fun and educational. After providing an overview of the project origins, a detailed discussion of the pedagogical concepts driving the game, and the practical methodologies used to translate historical knowledge into game play, the paper concludes by suggesting a series of best practices for a collaborative co-design process for historical game development.

Keywords: History, Game Studies, Game Design and Development, Migration, Digital Pedagogy, Education, Mapping, Spatial Humanities

1 Introduction

In the past several decades, history-based video games have become increasingly popular, sophisticated and economically successful. Games from leading commercial studios like the *Assassin's Creed* series, *Age of Empires*, and Sid Meier's *Civilization* are eagerly played by millions, and public interest in their historicity is high. *History Respawned* and similar YouTube channels feature playthroughs with running commentary by professional historians that garner thousands of views, while sites like *Play the Past* host essays that dissect the intersection of cultural heritage and games for a public audience (Roy and Christiansen, 2024; Whitaker, 2013).

Figure 1: The logo for the first installment of *The Migrants' Chronicles*.

Academics and educators have taken notice. There is a large and growing body of literature that tackles the challenges of teaching history with and through commercial video games, where historical accuracy has often been sacrificed for the sake of entertainment (Burgess and Jones, 2022; Kee, 2014; Kee et al., 2009). Game designers are also acutely aware of the challenge of balancing authenticity and playability in historical games, and much has been written on this topic from the point of view of game developers as well (Lelièvre, 2019; Lux et al., 2021). Most educators and game designers would agree that the best path to develop quality historical games would be to balance pedagogical goals with engaging gameplay in order to create games that are equally fun and educational. Yet very little scholarship has been devoted to outlining practical methodologies for creating such balanced games.

This paper discusses the co-authors' ongoing collaboration to develop a balanced educational historical game, called *The Migrants' Chronicles*. Historical game creation is a still emerging area of Digital Humanities theory and praxis that crosses and challenges many disciplinary borders. Requiring strong humanities expertise in historical research and educational theory, as well as many artistic and technical skills from the fields of computer science, digital art, and game design, such projects foster strong multi-disciplinary teams. Our particular project concerns migrations across national and linguistic borders that force a consideration of multilingualism both historically (in the language barriers our migrants encounter in-game) and procedurally (in the need to work with numerous languages for team communication and product localization for multiple publics). After providing an overview of the project origins and a detailed discussion of the pedagogical concepts driving the game and the methods used to translate historical knowledge into game play, the paper concludes by suggesting a series of best practices for a collaborative co-design process for historical game development. The central question is how the insights of historical research can be translated into game principles without overly unbalancing the playability or the educational content of the game.

2 Overview: The Migrants' Chronicles 1892

The Migrants' Chronicles is a digital history game aimed at middle grade students (11-14 years old) in which players actively learn about migration history through a simulated migration experience. Like the classic text-based game *The Oregon Trail*, *The Migrants' Chronicles* allows players to confront the difficult choices historical migrants had to
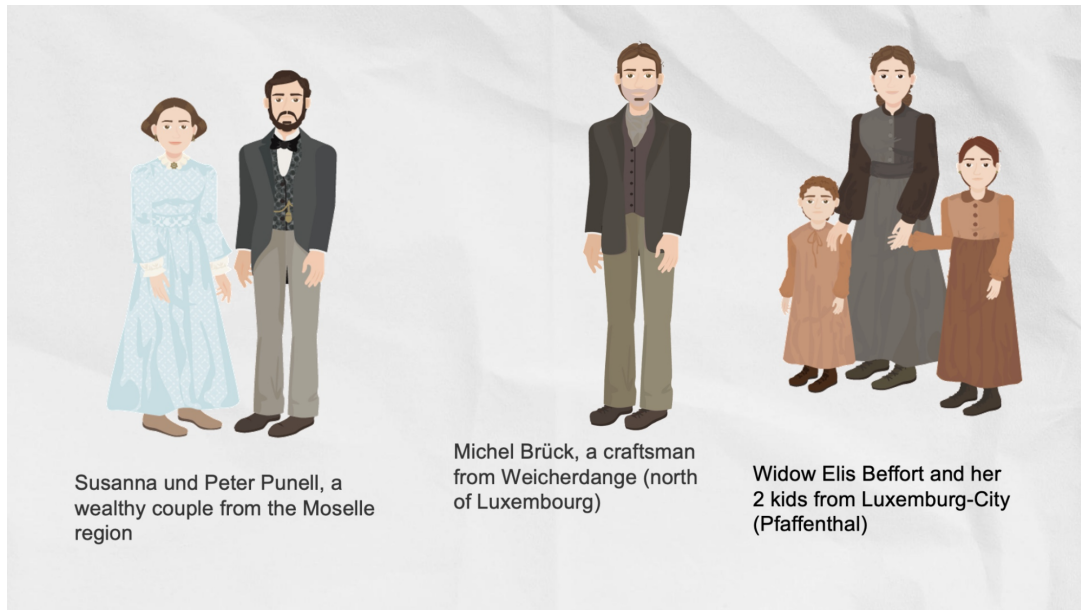
Figure 2: The playable character choice screen at the start of the game.

navigate in order to successfully leave their homes, travel long distances, and arrive safely in a new country, but updated to reflect the latest advances in technology, game design, and pedagogical strategies. The pilot episode traces the historical migrations of Luxembourgers to the United States in the late nineteenth-century.

This first instalment is set in 1892, when the US opened Ellis Island as an immigration station, and just before the first Chicago World's Fair, which employed many Luxembourg tradespeople. Students choose one of three playable characters: a widow with young children, a wealthy couple with a family vineyard, or a young craftsman from the rural north of the country (Figure 2). As they race against the clock to get to the US, they make critical decisions along the way - such as what to pack or which port to leave from - each with its own set of consequences.

While the journey itself is presented on a world map that can be scrolled and zoomed (Figure 3), the main interactions take place at the central stations of the journey, i.e. in cities such as Luxembourg, Brussels, Paris and Hamburg, on the passenger ship crossing the Atlantic, or on Ellis Island. All of these locations offer opportunities for interaction, which may be necessary to organize the journey, but can also open up side quests and provide historical information. Another central game mechanic involves the management of finite resources: money, time, possessions, nutrition, and mental and physical health, which are tracked on in-game character sheets. An auto-generated diary translates the events of the game into a story formulated from the point of view of the character being played.

2.1 The Migrants' Chronicles Consortium

The game is being developed by an international and multilingual consortium of academics, game developers and students. The *Faculty of Humanities, Education and Social Sciences of the University of Luxembourg* contributes competencies in historical research, historical pedagogy and, through its Department of Behavioural and Cognitive Sciences, also qualifications in psychological evaluation to the project. The *Cologne*
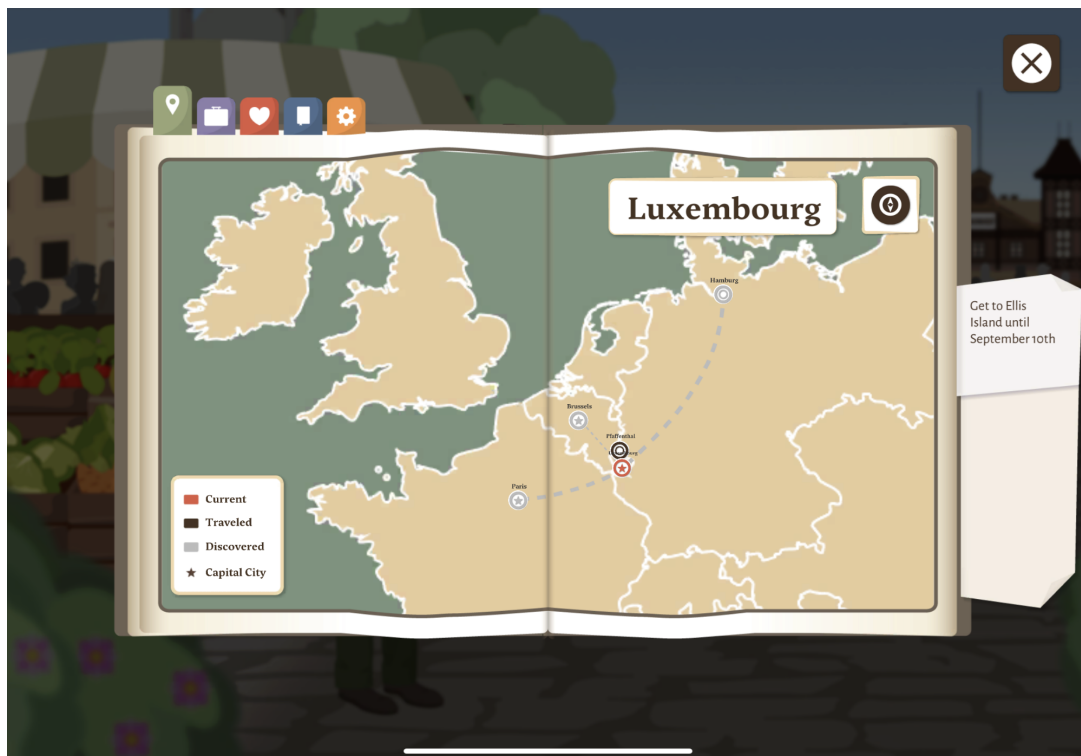
Figure 3: The in-game map showing routes traveled and discovered through game play.

Game Lab of the University of Applied Sciences Cologne brings expertise in digital art, programming and game design theory, while the *Digital Arts & Humanities program at Carleton College (USA)* brings a record of innovation and experimentation in Digital Humanities and History pedagogy to the collaboration. The core team consists of Marie-Paule Jungblut and Johannes Pause, a public history expert and a media scientist from the University of Luxembourg, a group of game designers and developers from the Cologne Game Lab led by Prof. Emmanuel Guardiola and Franziska Funken, and Austin Mason, a historian and digital humanities expert at Carleton College. Undergraduate and graduate students at all three institutions are also key members of the team, who contribute vital learning perspectives and research skills to the project.

The multidisciplinary nature of our game development team is intentional and designed with educational goals at all stages. The collaboration is not hierarchical, but consortial: an interdisciplinary working group proposes concepts for the implementation of historical material in the game, which are critiqued, refined and implemented by the entire team in regular meetings. By working collaboratively in this way, humanities scholars learn to see digital games as tools that add value to knowledge transfer, while game developers learn to interact with humanities scholars as providers of meaningful content, and undergraduate and graduate students in multiple fields gain valuable experience in team-based digital humanities research and development.

2.2 Development History

The initial concept phase of the project began in early 2020 through shared interests between the project leads and pre-existing connections between the three primary institutions. With a total budget of roughly €500,000, the initiative received funding

Figure 4: Concept art tested with students from the target age group in the pre-production phase to inform player-centred educational game design choices.

from the Oeuvre Nationale de Secours Grand-Duchesse Charlotte, the Service de Coordination de la Recherche et de l'Innovation pédagogiques et technologiques (SCRIPT) of the Ministry of Education and Digital Luxembourg, along with financial and in-kind contributions from the project team's home institutions: the University of Luxembourg, TH Köln, and Carleton College. A timeline was established with a pre-production phase to start in 2020, a production phase in 2021 and a target initial release in 2023, although that timeline was pushed back to early 2024 due to complications of covid pandemic working conditions and bureaucratic challenges of transferring funds to partners across international borders.

The pre-production phase proceeded throughout 2020, with research on both sides of the Atlantic establishing the necessary historical reference material in many different forms: images, maps, and GIS datasets all served as an essential complement and corrective to traditional textual sources (Marti-Henneberg et al., 2021, e.g.). Luxembourgish emigration to the USA is well documented in the Luxembourg National Archives, the Library of Congress in the USA, and in many smaller museums and archives like the Red Star Line Museum in Antwerp, Belgium and the Luxembourg American Cultural Center Museum in Belgium, Wisconsin. Documentary sources, particularly surviving diaries and letters of historical migrants, were used to establish a draft narrative arc for the game, while visual sources informed several concept art prototypes that were tested with students of the target 11-14 year old age group in June 2021. While the adult members of the design team preferred the collage aspects of several designs that incorporated historical photos and hand drawn line art, the overwhelming response of student testers was in favor of the more familiar digital art style in the top right image of Figure 4. Following player-centred educational game design principles (Guardiola et al., 2019), we respected the target audience participation in the creative process and chose that design style for the game art.

After initial interviews were conducted with teachers at Luxembourg schools to refine the educational goals of the project, the production phase of development started

in July 2022 and the team delivered a beta version targeted to Android tablets to make a pilot educational impact evaluation in April 2023. This version was then tested in two school classes for its usability and motivational potential (Mayer, 2019). The usability tests yielded many insights that were incorporated into the development of the game and helped to improve its playability - for example, by shortening the dialogues, by improving the menus, or by better integrating individual events into the main narrative of the game. Students also confirmed that the game was motivating and contributed to a greater personal ownership of the topic of migration, though this has not yet been systematically evaluated.

Following the initial release of the game in early 2024 on the Apple App Store and Google Play Store (for use on iOS and Android mobile devices and ChromeOS Chromebooks), a more rigorous impact evaluation is planned to assess the educational potential of the game. While the beta tests focused primarily on discrete features of gameplay, such as comparing a time-based approach with a turn-based approach (see Section 5.2), the impact evaluation will assess the value of the game as an educational tool. We plan to investigate the success of our game design choices on educational outcomes using approaches from various models of serious games analysis like the Learning Mechanics-Game Mechanics and Activity Theory-based Model of Serious Games frameworks (Arnab et al., 2015; Carvalho et al., 2015). However, the pilot test results already indicate that *The Migrants' Chronicles* can serve as a template that can accept a variety of content of other historical and contemporary migratory waves. Future episodes could look at different immigrant experiences, such as modern emigration from the Middle East to Europe, or climate migration, for example. We will open source the code so that developers can freely develop their own variants to pursue whatever migration stories they wish to tell.

2.3 Potential Impact

The Migrants' Chronicles 1892 is primarily intended for middle-grade students (11-14 years old) for use in formal educational environments and in museums. Developed in English and translated into Luxembourgish, the bilingual game is targeted for use in Luxembourg and the USA, but will be accessible to any English-speaking players. Educators may include the game in school curriculum units on migration and in museum educational programs in a number of ways (see Section 3). Teaching educators how to use the game will also be an essential part of the next phase of the project. In Luxembourg, this will occur as part of the continuing education of teachers and training sessions for museum educators. In the US, the project team will collaborate with specific museums and middle schools in Luxembourgish communities and seek to introduce its pedagogical potential during teacher professional development sessions in Minnesota.

The historical scenario also allows for a general discussion of migration; by fostering empathy for historical emigrants, the game implicitly raises the question of how to deal with issues of immigration today. As Luxembourg is currently known primarily as a destination for immigrants, the game addresses an issue (net *emi*gration) that is rarely discussed in public in Luxembourg. In 2020, the Luxembourg National Institute of Statistics and Economic Studies described Luxembourg explicitly as a "land of immigration" (STATEC, 2020). Indeed, in 2019, Luxembourg's immigration rate was 16.3 per thousand, compared to 2.6 per thousand in the EU. On the one hand, immigration is based on the country's prosperous economy, with a GDP per capita of $136,701 in 2022 (Ivanov et al., 2022). On the other hand, Luxembourg is a signatory

to the 1951 Geneva Refugee Convention. In May 2023 alone, 219 people from countries such as Syria, Eritrea, Algeria, Turkey, Ukraine, Afghanistan, Morocco, Albania, Tunisia and Guinea-Conakry applied for international refugee protection (Le Gouvernement du Grand-duché de Luxembourg). Against this backdrop, it is all too easy to forget that in the nineteenth century the country was a land of emigration due to poor harvests, high taxes and unemployment. *The Migrants' Chronicles: 1892* commemorates the emigration of Luxembourgers to the US, thus offering young players an opportunity for increased understanding of the complex issues surrounding migration, both historical and contemporary.

3 Pedagogical Concept

The Migrants' Chronicles can be categorized as a "serious game" because it has "an explicit and carefully thought-out educational purpose and [is] not intended to be played primarily for amusement" (Abt, 1987). Research on serious games has shown that learning success depends greatly on how well such games are embedded in appropriate classroom activities (Bellotti et al., 2010). In our case, *The Migrants' Chronicles* will serve as an interactive component of a broader teaching unit on the topic of migration. The game itself should take less than an hour to play, but should motivate students to play it several times. Depending on how it is embedded, it can be played as a preparation for a lesson at home, or as a prelude or conclusion to a series of sessions on migration.

The overall learning objectives of the lesson include enabling students to 1) identify reasons for emigration at specific points in space and time (e.g. Luxembourg 1892), 2) describe the migration process as an intercultural experience, and 3) compare historical and contemporary migration movements. Aims of the game are not only to increase the motivation of the pupils and to provide material for class discussion, but above all to contribute to an embodiment of knowledge (Coltrain and Ramsay, 2019): By playing an individual migration experience, it becomes possible to make comparisons with the pupils' own migration experiences or with current migration movements discussed in the media. In this way, the game encourages people to explore history from the perspective of the present, with reference to their own experiences and to current issues. Additionally, the game provides insight into the everyday culture of the late nineteenth-century, as well as the political power structures of the time and their impact on individuals. To achieve these ends, we have incorporated into our design process several pedagogical approaches and theoretical frameworks from educational and game studies.

3.1 Science of Learning and Game Studies Theories

When used in schools, *The Migrants' Chronicles* aims in the first instance to foster empathy for those who had to emigrate in the past by allowing students to wrestle with the often-difficult choices faced by historical migrants. Similar to the classic 1970s serious game *The Oregon Trail*, the game relies on travel as a narrative structure and employs problem-based game mechanics (McCall, 2012) that make existential hardships, such as disease or hunger, tangible. The game thus draws on the challenges of organizing a journey, which students can relate to from their own lives, but at the same time highlights the historical differences between traveling in 1892 and 2023. This approach follows the concept of *generative learning* – "the process of constructing

Figure 5: "Stealth learning" possibilities in *The Migrants' Chronicles* include meeting famous historical figures, like the painter Claude Monet.

meaning through generating relationships and associations between stimuli and existing knowledge, beliefs, and experiences" (Hanke, 2012) –, by placing learners in a specific historical situation that builds upon their everyday knowledge but requires them to adapt and transform this knowledge.

The game's basic structure is scenario-based, containing various migration scenarios that can be compared. In each episode, students can play different characters who emigrate for different reasons, encounter different challenges, and settle in different locations. Future possible episodes that explore more recent migration events (for example, where refugees from Ukraine or Syria travel to Luxembourg), might allow players to identify similarities and differences between distinct waves of migration. Besides learning *about* history, the game thus also seeks to enable learning *from* history. The game scenarios generate *procedural knowledge* that is situational and perspective-based (Rooney, 2012). During class discussion or other follow-up activities, this knowledge can later be transformed into *declarative knowledge* (e.g. more abstract knowledge about the transformation of Luxembourgish/US-American society through migration).

Alongside the problem-based mechanics of the core gameplay, there is also a more exploratory dynamic within the game that takes advantage of a game-based learning strategy called "stealth learning" (Gee, 2003). A *stealth learning* approach seeks to "hide" the serious content within a fun game, so that players may notice only after playing that they have learned something useful (Dörner et al., 2016). During journey's within *The Migrants' Chronicles*, players encounter situations that extend beyond the game's main tasks and offer the opportunity for exploratory discovery. For instance, characters in the game may interact with famous individuals of that time like Claude

Monet (Figure 5); discover contemporary novels, culturally distinctive foods, historical media technologies, or location-specific souvenirs; or encounter norms and cultural conventions that might be shocking or surprising from a modern perspective, such as historical attitudes about gender roles or discrimination. While the core problem-based game mechanics align with *cognitivist theories of learning*, the game here thus also seeks to facilitate a *constructivist type of learning* (Hwang and Kim, 2016; Wu et al., 2012). Through play, students combine information from different contexts to form a comprehensive understanding of the time, which they will be asked to reexamine and articulate upon completing the game.

This stealth learning pedagogical aim depends upon players experiencing a certain level of immersion within the game. Janet Murray (Murray, 2017, pp.98-99) describes immersion as the feeling of being surrounded by a completely different reality that engages our entire attention, our entire perceptual apparatus. *The Migrants' Chronicles* does not aim for perceptually realistic immersion as in 3D simulations, but rather for imaginative and challenge-based immersion mechanisms (Ermi and Mäyrä, 2011, p.103) that arise from the flow of the game's perspective-taking experience. The game's representation of the historical world remains deliberately stylized, following a "conceptual simulation style" that is "concerned with exploring the systems and processes behind history" (Copplestone, 2017, p.419). As such, the game focuses on key information that players must interpret and mentally assemble into a coherent picture of the period (Barton and Maharg, 2006, p.117).

4 Balancing Veracity, Empathy, and Playability

Attempting to teach history through interactive gameplay naturally raises questions about historical fidelity, and the appropriate balance between historical veracity, historical empathy, and playability. Here, we use Lisa Gilbert's (Gilbert, 2019) definition of historical empathy in video games as comprising both elements of *perspective recognition* (a sense of otherness/shared normalcy, and contextualization of past and present) and *caring* (*about* history, *for* historical actors, *that* it mattered, and *to* apply lessons learned to the present). To what extent then does a game need to reconstruct historical facts accurately to be pedagogically valuable? Can 'errors' within a game be used for educational purposes, for example? And how is it possible to mediate between different concepts of historical accuracy (Copplestone, 2017)? For a serious game on a historical topic, we have taken the view that authenticity (recreating plausible conditions encountered by historical actors) is more crucial than absolute accuracy (meticulously capturing every historically attested detail) (McCall, 2019; McCall and Chapman, 2017, 2018).

4.1 Historical Veracity

We have conducted extensive research on historical characters, important events, and places to ground the game in concrete facts of late nineteenth-century Europe and America. This does not mean, however, that a serious game should become a mere historical reconstruction, plotting a historically attested personal biography from point A to Z. In order to play a game, as opposed to a virtual simulation, a player must be able to make non-trivial decisions with unsure outcomes; if the outcome is completely predictable, it is no longer a game. To remain motivated, therefore, players must feel free to make their own decisions. But while commercial games often give their players

the freedom to change the historical circumstances over the long term, serious games usually aim for a game design that only allows for actions that are historically possible. The question of what can be considered 'historically possible' is not always easy to answer. In the case of the often-documented fates of emigrants, however, it seems obvious to classify as 'possible' those game paths for which correspondences can be found in historical sources. *The Migrants' Chronicles: 1892* has constructed all of our scenarios from details researched in surviving letters, diaries, and other relevant historical sources, but crafted a choice of narratives that are more akin to historical fiction than absolute fact.

Commercial games with historical settings also tend to combine historical sources with other literary, artistic and popular culture references, which would be problematic in a serious game. For example, the *Assassin's Creed* series is known for its detailed historical reconstructions, and *Assassin's Creed: Odyssey* (2018), which is set in ancient Greece, even has a discovery mode in which players can freely explore the reconstructed historical world and learn about history, religion, architecture, everyday life and other areas of knowledge (Chapman, 2018, p.38). However, the game mixes its reconstruction of history with a pop-cultural mashup logic, bringing popular myths and popular cultural adaptations into the game. *Assassin's Creed: Odyssey* quotes Herodotus as well as Zack Snyder's highly stylised comic book adaptation *300* (USA 2006); it allows you to climb the meticulously reconstructed lighthouse of Alexandria as well as fight the mythological Nemean Lion (Cole, 2022). This mashup strategy, characteristic of many games, makes it clear that history games – whether commercial or educational – always presuppose a certain state of memory culture (Caselli, 2021). However, it is incumbent on educational game creators to critically question popular historical misconceptions, and encourage players to do so as well (Boom et al., 2020).

The mediation between historical accuracy and playability can be seen as a central challenge in the design of serious history games, and has become a major area of research in game studies. Matthew Kapell and Andrew Elliott consider the "veracity of games that engage with history [to be] less about their ability to represent an accurate past and more about their ability to present what 'feels' like an authentic one" (Kapell and Elliott, 2013, p.361). Such a feeling is created, for example, by conveying the game world through the perspective of a historical actor that could have been involved in the processes depicted. Verisimilitude does not mean that all actions, possessions and utterances of the game character have to be accurately documented, but that they are credible and consistent within the historical scenario. According to Adam Chapman (Chapman, 2018, p.272), the translation of historical sources into playable stories that correspond to historically possible courses of action already represents an interpretation of history. By influencing these courses of action and choosing between different options, the players can experimentally test the ideas they have about a historical epoch and playfully create new interpretations.

4.2 Historical Empathy

For this reason, educational games that seek to bring their players closer to a specific historical period tend to rely on the empathy effect created by the playful experience of a personal history. Some games achieve this effect using a graphic first-person perspective, such as *Walden, a game* (USC Games, USA 2017) or *Blackhaven* (Historiated Games, USA 2021), while others choose a more abstract representation of reality inside the game world, in which the individual experience is conveyed more strongly through game mechanics, narration and text (Bai et al., 2023). In both approaches, the empathy

Figure 6: Decisions in the game are turned into first-person diary entries at the end of each day, increasing players' historical empathy for the playable characters.

that players develop with the historical protagonists whose fates they relive leads to a better understanding of their actions. The difference to other narrative media such as film or the historical novel lies precisely in the experience of variable plot designs (Böhme et al., 2014, p.7): games focus less on what historical actors actually did and more on how their scope for decision-making was structured, i.e. what alternatives were available to them and under what constraints and hardships they had to act. They are therefore suitable for a form of historical study that seeks contemporary references: In this understanding, historical consciousness includes an interpretation of the past that provides a framework of orientation for the present (Hintermann, 2007, p.483).

In line with these considerations, *The Migrant's Chronicles* focuses on the individual experiences of well-developed game characters, who are not taken directly from historical sources and are therefore not historical figures, but in which various experiences of historical migrants are brought together in a condensed form. The *1892* game begins with an explanation of the decision to emigrate, which also sets the boundaries for the decisions that can be made during the game: some of the characters have to reach the USA in a certain amount of time, others have money problems, and so on. Accordingly, the options during the journey are different for each player. Also, the diary and the dialogue system in *The Migrant's Chronicles* reinforce a strong element of perspective-taking on the historical events depicted: In the diary, events are narrated from the first-person perspective of the game character and are thus integrated into a historical point of view for which the player takes more responsibility with each game decision (Figure 6). In the dialogues, players can choose between different possible answers, each within the framework of what the historical game character might actually have thought. Certain answers that the players would give from today's perspective are

excluded in this way. Again, through their choices, the players become more familiar with certain historical perspectives by taking charge of them directly.

5 Translating Knowledge to Game Design

While the selection of a date and elaboration of the possible characters was the starting point of our game development, many of the central game mechanics were only created during the design process in a continual dialogue between the historians, media scholars, and game developers on the production team. As in many Digital Humanities collaborations, *The Migrants' Chronicles* project team is deliberately multi-disciplinary, and from the beginning we adopted an iterative process that involves continual co-design at all stages of the project.

Although common in DH, such an open approach is, in fact, in stark contrast to the usual development process for historical video games, where either 1) a game development studio has an idea for a project and hires historical advisors as consultants, or 2) a historian or educator has an idea and hires a game studio to build an educational game to their specifications. Research has shown that historical video games are thereby usually created by an industry whose modes of production tend to support hegemonic interpretations of history as well as other existing power structures (Hammar, 2019). A successfully balanced historical game, on the other hand, is according to our experience best created by an interdisciplinary team paying attention to and respecting the expertise that different members bring to the table and holding regular meetings to iteratively refine the balance of different perspectives. Moreover, such collaboration allows students from different disciplines (history, game design, DH) to get directly involved in the interdisciplinary development of the game. In this way, not only the finished product but also the production process itself generates educational benefits.

In the following sections, we discuss three examples of problems we encountered during development of *The Migrants' Chronicles*, where this continual co-design process led to concrete solutions that better balanced authenticity and playability and increased both the educational and ludic impact of the project: bridging the past and present through strategies to generate historical empathy (Section 5.1); representing the passage of time in game (Section 5.2); and helping teachers turn students' individual game play experiences into collective classroom learning (Section 5.3).

5.1 Building Historical Empathy for Luxembourg Migration

Although some historians believe that as many as 25% of Luxembourgers left their homeland between 1841 and 1891, the history of emigration is still underrepresented in the collective memory of the established population. As a result, the Luxembourg-American cultural heritage has not yet been recognised as part of Luxembourg's cultural heritage. The fact that emigration is not part of Luxembourg's official policy of remembrance makes it virtually impossible for the population that has immigrated to Luxembourg to relate to it (Wiegmann). *The Migrants' Chronicles 1892* therefore faces a double challenge: on the one hand, it wants to initiate a process of historical learning that will lead young people with and without an immigrant background to recognise the material and immaterial evidence of Luxembourg's emigration history as Luxembourg's cultural heritage. On the other hand, it wants to contribute to young people recognising the testimonies of the cultural heritage of different immigrant
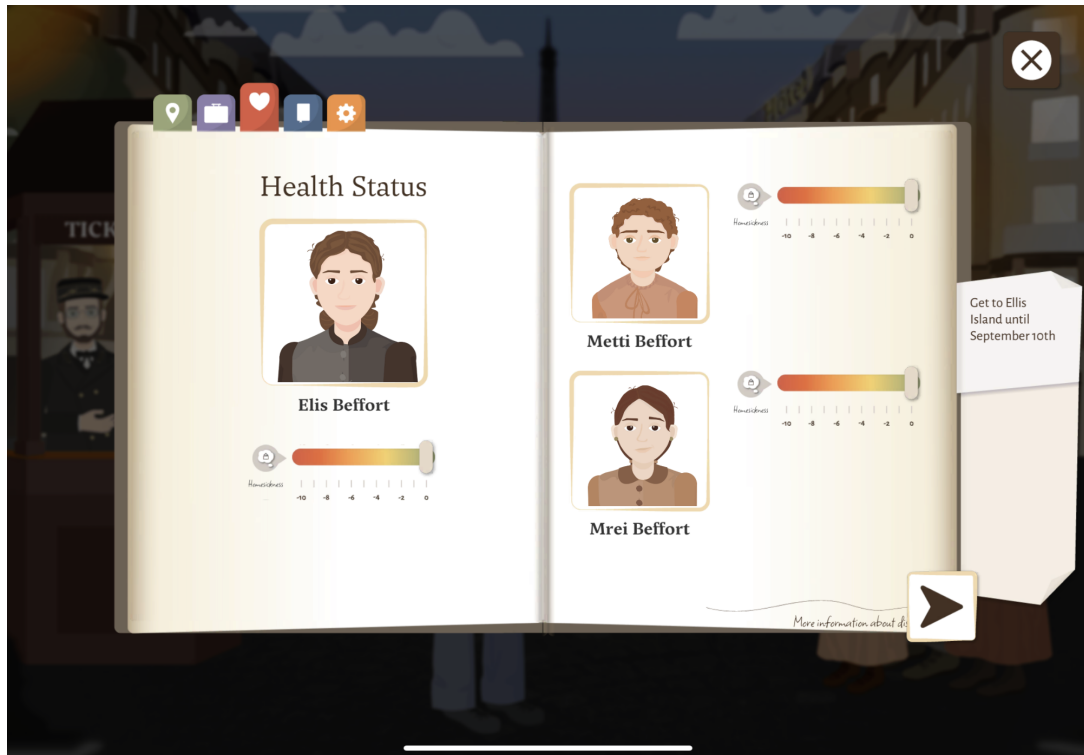
Figure 7: The physical and emotional health of playable characters *and their dependents* are tracked in-game, where afflictions from homesickness to cholera can affect the outcomes.

groups as cultural assets, even if they do not accept them as relevant to themselves.

But how can students be persuaded to build empathy with characters with whom they think they have nothing in common? As mentioned above, the game takes two basic strategies from the prototypes on which it is based: the educational game classic *The Oregon Trail* (1974), which was used in US schools as early as in the 1970s, and the more recent migration game *Bury Me, My Love* (2017). The former focuses on the organization of a pioneer trek to new settlement areas in Oregon in the mid-nineteenth century, and is primarily based on the management of resources that keep the settlers alive. The latter develops its plot in the form of a dialogue between a woman who has fled Homs, Syria, and her family who remain in their homeland, which takes place via Whatsapp. These two mechanisms - the management of resources and the narrative that unfolds through dialogue - are also central for the 'empathy strategy' of *The Migrants' Chronicles: 1892*.

Empathy for the playable characters is created in the game primarily by placing existential hardships such as illness, hunger or economic constraints at the center of the plot. The story is then retold in the diary from the characters' perspective. As already mentioned, the diary entries summarize the decisions made by the players and supplement this information with descriptions of the characters' emotional states and health, as well as other events to which the players must react. The homesickness of a child the character must care for, for example, can thus have a significant impact on the game (Figure 7). Like in *The Oregon Trail*, the main topic of the game is the organization of a journey, which allows an immediate understanding of the task and the difficulties to be overcome. The organization of the journey defines a "problem space" (McCall, 2012) that is already known to the students, but which has to be

mastered in a new situation. The problem allows for a number of different solutions, but at the same time clearly limits the field of possible actions. For example, there are a number of destinations to choose from that are not necessarily close by, such as Bremen and London, so detours can lead to delays and create new problems. Historical and random events, such as the outbreak of a cholera epidemic, on the other hand, can influence the decisions of the players, so that the feeling of freedom of choice is repeatedly confronted with the hardships that existed in the real historical situation.

Although the players cannot change the general historical or biographical conditions in which the characters act, the choices offered by the game do go beyond those available to historical travelers. In fact, most emigrants in the nineteenth century had their journeys organized by agencies, so they hardly made any decisions themselves beyond the initial one of contracting with an agent. To make this discrepancy apparent within the game, it was decided to implement two different game modes: After successfully completing the 'adventure mode', which simulates the unusual case of a self-organized journey, players can also experience a pre-organised journey in which they have only few options for intervention. The experience of passivity contradicts the medium of the game and thus also allows a reflection on the medial character of historical representations, which can also be extended to other media, such as books and films in popular culture. By juxtaposing an adventure mode with an authenticity mode, the game thus aims to reflect on the player's relationship to the historical characters and to the medium of games as such.

5.2 The Representation of Time

It is a commonplace to say that the past seems distant and disconnected from our current experiences. Young people might show resistance to acquiring knowledge about a subject that appears to have no contemporary relevance. The challenge of any history game is to make players understand people and events that no longer hold any presence in the present. This is especially true for travel experiences that were very different in the nineteenth century before the advent of planes and automobiles. A crucial aspect of this is time: journeys in the past simply took much longer than they do today. However, *The Migrants Chronicles* is designed to be played in a short time: less than an hour for a typical school lesson. The questions that arise: How to condense a 17-day journey into a game that needs to be played within a school class period of approximately 50 minutes? How to make the users experience and appreciate the passage of time during the journey?

The representation of time is crucial to the game's concept, as time is one of the three resources that players have to manage, along with money and health, which are in constant conflict (Figure 8, left). For example, an illness can force the player to stay in one place for a longer period of time, while the decision to use faster means of transport usually costs more money. In consideration of the balance between historical accuracy and playability, the team's first strategy was time-based, meaning that the passage of time would be represented by time itself. A timer would run in the background that would automatically end a "day" after an arbitrary amount of minutes, forcing players to distribute their food and rest overnight.

The development team implemented this approach to support the speed at which players move through the game, and to transfer in-game timeframes, such as an 8-hour train journey, into the game world. However, through playtesting the team realized that this mechanic was confusing, frustrating and too complex for the scope of the game, since night would often fall arbitrarily in the middle of a conversation or day-
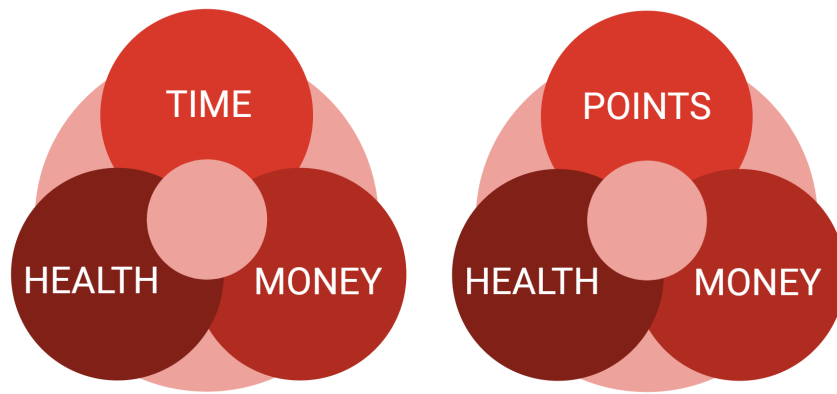
Figure 8: To represent time, the most challenging of the three resources players must manage, the game controller uses activity points, each converted to a number of hours for the player in order to balance game logic demands with historical understanding.

time action. It was decided to iterate the game design to make it more fit for purpose and drop the time approach to work with activity points instead (Figure 8, right).

Activity points would be earned by completing actions (dialogues, purchases, travel legs, etc.), with a low cap on the number of points available in a single in-game day. This had the benefit of preventing awkward disruptions for night time, but raised its own concerns. For the educational goals of *The Migrants' Chronicles*, it was crucial that players remain aware of the passage of time so that they get a sense of the slower rate and longer duration of all forms of travel in the nineteenth century. The final decision was to retain points within the game controller logic, but to assign each a number of hours when displayed to the user: two activity points represent one day. This means that the player has to think carefully about how to use the limited hours of daylight. Sometimes, however, an activity point must be spent 'doing nothing', representing the passing of time: for example, when waiting for a train. This approach reinforces the learning goal of planning the journey with care and attention in order to successfully complete it, but it also gives players agency to engage with the content in their own time frame. The game can be played in a condensed way, by flying through all activities in perhaps half an hour, or slowed down to last for several hours of leisurely gameplay. The choices different players make can therefore impact both how much of the game they encounter and how deliberately they reflect on those experiences for their own learning.

5.3 The Facilitation of Teaching

Since the game is intended to be played in a formal educational setting, a major development goal was to facilitate the ability of teachers to incorporate the game into their classrooms. During initial interviews with teachers at Luxembourg schools and throughout the development of the game, a number of "instructional tools" (Carvalho et al., 2015, p.174) were designed and refined to enable the teacher to address the learning success of the game. They include a debriefing feature for teachers and a tool that allows students to download game data, including the map, diary entries and transport information from their individual journeys. Both are valuable tools for educators, which are to be used in different ways:

- Individual player analysis: The debriefing feature allows teachers to access a

detailed breakdown of each player's decisions during the game. This includes decisions made, resources used and progress made. This information can help teachers identify individual strengths and areas for improvement.

- Comparative analysis: Teachers can compare the decisions and outcomes of different players. This feature is valuable for class discussions, as it allows students to learn from each other's strategies and see the consequences of different choices.

- Discussion guides: Within the debriefing feature, it is possible to provide discussion guides or prompts that teachers can use to facilitate meaningful post-game discussions. These prompts could encourage critical thinking, analysis of consequences and exploration of alternative strategies.

- Alignment with learning objectives: It is essential that the debriefing function is aligned with the specific learning objectives of the game. Teachers should be able to see how each player's decisions relate to the desired educational outcomes.

To facilitate both individual journeys and classroom comparisons, the development team included the ability to download a first-person perspective "travelogue" PDF, and a GeoJSON file of the route taken from point of emigration to final destination.

- Game Data PDF: The Game Data PDF will contain comprehensive information about the game session. This can include a summary of the scenario, key decision points, a timeline of events and a breakdown of each player's actions.

- Diary entries: Automatically generated journal entries from the players' in-game journeys will capture their thought processes and the challenges they faced. The teacher can discuss the reasoning behind the decisions with the students.

- Transportation data: The PDF shows the summary statistics as well as the means of transport used by each player between cities. This information can be useful for discussions about resource management and efficiency

- GeoJSON integration: The GeoJSON file allows teachers and students to visualize the routes taken by different players on a map. They can be used to track the routes that the different players took and combine them to a map, which can help students better understand the spatial aspects of the game and the consequences of their decisions.

The GeoJSON file has to be user-friendly, which means that it needs to be easily manipulated by both teachers and students. This means that the development team needs to consider including features such as layering, switching between player routes, and highlighting key locations or events on the map. Part of the teacher training, which also contains a set of guidelines for guiding the students during playing, will be to show them how to integrate the game data into subsequent lessons. They can use the information to illustrate real-world applications of the concepts covered in the game and to encourage discussion about decision making in complex scenarios.

It is therefore important that the features are user-friendly for both teachers and students. The team will seek feedback from educators during the development process and after initial release to ensure that the debriefing and data analysis tools effectively meet their needs. The debriefing and data download features are key to supporting the interaction between the in-game experiences and the desired knowledge transfer and ensuring the success of the pedagogical goals of the project.

6 Conclusion

The open development process used to produce *The Migrants' Chronicles* has contributed to a number of decisions being made that were not envisaged by any of the team members before the collaboration began. Section 5 has shown that these are often rather minor refinements to the mechanics of the game, but can potentially make a big educational difference. While this paper has largely focused on the descriptions of these game mechanics and their impacts, we will conclude by attempting to characterize in more detail the mode of tri-national collaboration between historians, DH specialists, media scholars, educators, and game developers in Germany, Luxembourg and the USA that made these decisions possible.

Based on our experiences collaborating to develop *The Migrants' Chronicles* as a balanced educational historical game, we have identified a number of emergent principles and practices, which we think would benefit others as a model co-design process for historical game development, with implications for creating other historical digital humanities projects that cross languages, borders and disciplinary boundaries.

1. **Continuous Collaborative Co-Design**
   A successful balanced historical game must be developed through an iterative process of true collaboration that involves continual co-design at all stages of the project. No one on the team should be merely a consultant or implementer of other's ideas. A successful balanced historical game is best created by an interdisciplinary team paying attention to and respecting the expertise that different members bring to the table and holding regular meetings to iteratively refine the balance of different perspectives. As the example of the treatment of time has shown, such an approach is suitable for creating workable compromises between the different pedagogical and technical demands placed on an educational game. At the same time, such collaboration not only results in a superior finished product, but also allows students from different disciplines to learn from the interdisciplinary development process throughout the production of the game.

2. **Design with Purpose**
   The desired impact of a balanced historical game on the end user needs to be clearly defined, centered consistently in the development process, and used to drive the work of all team members. Since the goal of educational games is not to sell x number of copies or merely to entertain, decisions about what to include or how to structure engaging game play must always foreground the intended purpose of the project. In historical games, players should usually gain a deeper understanding of historical processes and an increased empathy for playable characters' experiences. These considerations must guide decisions about the allocation of limited development resources; the scope and timing of deliverables; and the flexibility to refine initial parameters of the project at regular intervals, e.g. after testing an alpha prototype. From the outset, the development of *The Migrants' Chronicles: 1892* took place in exchange with teachers and institutions from both the Luxembourgish and American school systems, whose feedback led to much time being spent on developing debriefing and analysis tools for classroom use.

3. **Aim for your Audience**
   The intended audience and ideal use cases of balanced historical games must be identified at the outset and guide decisions about the appropriateness of both game mechanics and content. Our project is intended for middle grade students in Luxembourg and

the USA and designed with classroom use in mind, which has informed many decisions about the shape of the project, including:

- An inclusive, player-centered development process in which early versions of the game were tested by pupils and teachers, whose feedback was continuously taken into account in the further development of the game.

- An active learning approach to serious games, in which students should gain increased motivation for their own learning goals, while teachers have several choices to refine the use of the game in the classroom to maximize their specific instructional objectives.

- Localization and language translation, both as relates to communicating playable characters experiences, like crossing borders and grappling with unfamiliar languages, and the choice of in-game localization being keyed to target audiences (e.g. Luxembourgish or English).

4. **Authenticity over Accuracy**
   A successful balanced historical game should embrace authenticity (recreating conditions that historical actors would plausibly have encountered) over one hundred percent accuracy (exactly capturing every attested historical detail). An effective historical game is more similar to a Period Piece film set in the framework of a certain historical and material culture or a Period Room in a museum, in which things have been brought together which might have been collected in a single place at a given time, rather than a documentary film or historical monograph that hews as closely as possible to the historical record. Since the agency of the individual is important for both good history and good game design, it is sometimes necessary to change aspects of the documented historical record in order to teach a more humane history through the game. A loss in terms of accuracy can often be a win in terms of both playability and learning outcomes.

7 Acknowledgements

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