Empirical Research on the Impact of *Morgan's Raid*

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Abstract: We present an empirical evaluation of Morgan's Raid, an educational video game about Civil War history in Indiana. The game was designed for integration with Indiana fourth grade curriculum on state history. We conducted a qualitative study with six elementary school students, and the body of data included field notes and pre- and post-intervention interviews. Three major findings emerged regarding these students: after playing the game, they exhibited increased knowledge and understanding of the historical context and geography; playing the game increased the students' empathy for both soldiers and civilians in the 1860s; and the constructive nature of learning led to unexpected interpretations of the game. These findings have implications for the design of serious games as well as future research.

Introduction

Games are powerful tools for education. A well-designed educational game can engage students with challenging contexts, rapid feedback, and opportunity for practice. However, it is important to remember that no matter how carefully designed the learning intervention, student learning is constructive. Each player will approach an educational game with a different set of background knowledge, skills, and experience. Given that games teach experientially and that learning is constructive and subjective, formal evaluation of educational games is critical to the scholarly approach (Glassick et al., 1997).

Morgan's Raid is a turn-based strategy game designed to teach Indiana's Civil War History to elementary school students (3:15 Studio, 2011). The game meets state standards for Indiana's fourth grade curriculum, incorporating aspects of social studies, geography, and mathematics. Our study is motivated by a deceivingly simple question: what does a player actually learn by playing? This question reflects the constructive and subjective nature of game-based learning, and it is most appropriately approached via qualitative research methods (Stake, 2010). We proceed by providing some background on the game and its historical basis. We then describe our research design and discuss what was found in the data. The subsequent discussion section frames our data within the broader educational context.

Background

The American Civil War was pivotal in U.S. History. The country was divided: disagreements concerning the role of slavery led several states to secede from the Union. The major events of the Civil War are well-known: the Battle at Fort Sumter, the Battle of Gettysburg, and the signing of the Emancipation Proclamation to name a few. Less widely known are the exploits of Confederate Brigadier General John Hunt Morgan (Thomas, 1985; Ramage, 1995; Horwitz, 2001). From June 11 through July 26, 1863, General Morgan led over 2,000 Confederate cavalry on a raid of civilian towns in Tennessee, Kentucky, Indiana, and Ohio in what would become known as "Morgan's Raid." Morgan disobeyed orders to stay in Tennessee and Kentucky when he brought his men over the Ohio River into Indiana. He moved from town to town, taking supplies and horses, frightening residents, and evading Union forces. In order to escape his pursuers, Morgan's troops destroyed dozens of bridges, railroads, and government buildings across Union territory. He engaged Union forces and local militias on several occasions, most famously at the Battle of Corydon (Indiana), which would be one of two Civil War battles fought in a free state. Morgan's forces tore a path through southern Indiana and much of Ohio before their defeat and surrender at the Battle of Salineville in northeast Ohio. Morgan left no evidence of his motivation for the raid, making it an excellent topic for the discussion of what "history" is and how it is done.

Morgan's historical raid represents Indiana's most direct involvement in the Civil War. Although Indiana's state curriculum requires fourth grade social studies teachers to cover the historical raid, the state-approved textbooks offer just a single page on the subject. This is a missed opportunity to give context to the Civil War. Without a sense of context, the Civil War seems to students to be an event that happened a long time ago to people who lived far away from here; in order to gain an appreciation for the significance of the Civil War, students must not only learn what happened, but what life was like for people during that time (Gestwicki and Morris, 2012) . A simple recounting of major events and battles in a textbook is not sufficient: teachers must utilize alternative teaching methods to impart the importance and complexity of these events to their students. Was General Morgan a petty thief, a courageous leader fighting for his cause, or even a war criminal or terrorist? Issues of this complexity require deeper

immersion in the subject matter—the kind of immersion afforded by video games.

Figure 1: The player allocates orders to Morgan's raiders at each town.

The video game *Morgan's Raid* was released in Summer 2011 and is free to download and play. The player controls General Morgan, and the goal of the game is to maximize Morgan's score while raiding towns in southern Indiana, avoiding Union soldiers, and escaping into Ohio. It is a turn-based strategy game, and each turn consists of two parts. First, the player is presented with a map of the immediate area and chooses an adjacent town as the new destination. Then, upon arrival, the player chooses how to Morgan should distribute orders to his men (see Figure 1). The options include Militia, Horses, Supplies, Scout, Railroad, Impede, and Chaos, with the specific options available depending on the town. An explanation of each choice is provided within the game by Basil Duke, who was Morgan's brother-in-law and second-in-command (Duke 1867). The player allocates orders to these targets, and this allocation affects the game state. For example, Impede slows down the Union pursuers while Scout provides Morgan with more orders in the next town. After assigning orders, a brief animation shows the town burning, accompanied by the sound of horses running, people screaming, and gunshots (see Figure 2). Score is tracked as "Reputation," which represents both Morgan's positive reputation in the Confederacy and his negative reputation in the Union. The more chaos the player causes, the more Reputation is earned. *Morgan's Raid* is a single-player game, and Reputation provides an incentive for replay.

The game uses scripted narratives in the introduction and ending of the game. The introductory scene explains the context of the Civil War and tells Morgan's story up to the Raid. There are two possible endings to the game: either Morgan escapes to Ohio to continue his raid or, counter to historical fact, he is captured by the Union in Indiana; each has its own cinematic sequence. Regardless of the ending, an epilogue follows that explains the actual history of Morgan, including a comparison of the player's path to the path of the historical raid (see Figure 3).

Gestwicki and Morris (2012) explain how the original educational goals of Morgan's Raid include learning about important historical figures from the period, what communication and transportation was like at the time, strategic time management, the fact that Morgan's Raid was a chase, and the behaviors of both Morgan and his Union pursuers during the raid. However, they also describe how the design of the game changed significantly through the prototyping and development process. Such changes are expected during software development, particularly when following an iterative and incremental development methodology (Keith, 2010). This presents a motivation for this study, in which we investigate the actual impact of Morgan's Raid on elementary school players.

Figure 2: An animation is played while the player raids.

Research Methods

This study is designed to identify how playing *Morgan's Raid* affects students' perceptions of the Civil War and Morgan's historical raid. We desired to develop a deep understanding of how specific players interact with the game as well as the shape of their discourse before and after, and so we adopted a qualitative research approach (Stake, 2010). In particular, we used a semi-structured interview protocol before and after play (see Table 1), along with observed think-aloud gameplay. Interview and observation data were transcribed and iteratively coded following Saldaña (2009). By focusing on the specific details of a small group of players, we are able to construct a detailed description of their gameplay experience. That is, we seek to understand what these students really learned, which may or may not align with the game's intended goals—an understanding that would not be possible with a quantitative study. This approach was partially inspired by the qualitative studies reported by Ito et al. (2009), who use ethnographic methods to describe how youth interact with digital media and networks.

The study was conducted at a private elementary school in Indiana. Ten interviews were conducted, and in data reduction, six of these were selected for analysis to achieve gender balance. Although *Morgan's Raid* is designed to be integrated into the fourth grade classroom, it was not feasible to conduct the study precisely as students were learning Civil War History. Hence, we selected fifth graders, all of whom had ostensibly learned about the Civil War and Morgan's Raid in the previous academic year. None of the participants had previously played the game.

Findings

The coding process and subsequent analysis revealed three major themes in how playing Morgan's Raid affected the students' knowledge and perceptions of the historical raid and the Civil War as a whole. The first of these is that, after playing the game, the students exhibited increased knowledge and understanding of the historical context of the raid, including geography. The second is that playing the game improved students' empathy for people living in 1863, both of civilians and of Morgan in particular. Third, the constructive nature of learning led students to conclusions that were not always aligned with the designers' intent. Each of these is explained in more detail below.

Historical Context

The pre-intervention questions revealed the students had only the most basic knowledge of the historical raid prior to playing the game. All but one of the students had heard of the raid, yet when prompted to explain its significance, the students could gave only the simplest overview. "General Morgan went to a couple towns and took food and supplies that he needed" was a typical response. Two of the students believed the raid was only a single battle.

The game succeeded in dispelling this misinformation. When asked to explain the significance of the raid after playing the game, the students universally gave a more detailed and correct explanation of events. They correctly stated that John Morgan was a Confederate General raiding towns in Union territory. Most students gave a more specific geographic description of where the raid took place: beginning in Kentucky, moving through Indiana, and
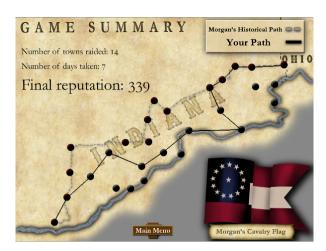
ending in Ohio.

Figure 3**: The ending narrative compares the player's path with Morgan's historical path.**

Many of the post-intervention responses involved more fine-grained geographical knowledge the students gained from playing the game. The majority of the students correctly recognized that the player's in-game starting location was in southern Indiana. The game explicitly instructs the player to travel to Ohio, but relies on the player's knowledge of geography to determine that they must travel east from the starting location to reach Ohio. One student also indicated he learned more about the populations of towns during that time period; this information is shown on placards for each town (see Figure 1).

In addition to a greater knowledge of geography and a more detailed summary of events, the students also exhibited an improved understanding of General Morgan, including his personal history and motivation. Several students indicated they learned that Morgan was a businessman as well as a slave owner. The majority of students stated that General Morgan was trying to escape to Ohio while being pursued by Union soldiers, and that he took supplies and horses from towns in the process. When students were asked why they chose particular actions, the subjects demonstrated sound rationale—for example, "[I picked] supplies because one of your soldiers might get hurt and you would need supplies to fix that." and "I picked impede so I could block the Union and escape town and go to the next one."

Empathy

After playing the game, students exhibited a greater sense of empathy for the people who lived during that time, as well as for General Morgan. Initially, several students expressed surprise that they would be playing the role of a Confederate General rather than a Northerner. One student even stated he was thought it was cool that he would be playing as the "bad guys." Another student, when asked why he chose not to destroy the local railroad to slow down the Union pursuers, responded, "I didn't want to destroy the railroad because destroying the RR would hurt us." Although he was playing the role of General Morgan, the student said destroying the railroad would hurt "us", meaning the Northerners. These responses show that the students viewed the events of the Civil War from a distinctly Northern perspective. This is not an unexpected finding considering that they were all from Indiana. However, when asked in the post-intervention, "What do you think about what General Morgan did?" many responses were sympathetic towards General Morgan. One student responded that taking supplies and horses from civilians in order to continue raiding was a smart move for General Morgan. Another student said she believed General Morgan took supplies because he had to, and that General Morgan did not want to break any laws. Three of the six students stated they believed General Morgan was "following his beliefs."

The students also displayed greater empathy for civilians living in Indiana during the Civil War. When asked about life in the 1860s before playing the game, most students mentioned the lack of technology that we enjoy today. Some students mentioned the hardships resulting from rationed food, and one mentioned that children would play outside more often. The same question was asked after having played the game, and the responses were much more focused on the impact of the raid. The students commented on how afraid the townspeople in Indiana would have been when General Morgan was raiding towns in the area. Two students expressed anger at the thought of Morgan raiding their town. One student described how he would feel if he was living in a town Morgan was raiding: "I would feel frightened and would want to hide behind something because he destroyed everything in sight." An-

other student said, "I would be afraid they would take someone from my family or hurt them." When asked what she thought of the raiding sound clip and animation (see Figure 2), one student said, "I think it is realistic. If something like that was happening, people would be scared and terrified that something might happen to their children or their houses." These responses indicate an emotional connection to the people living during the 1860s in Indiana that was not evident before playing the game.

This empathy extended to the development of counterfactual personal narratives. When asked what kind of person she believed General Morgan was, one student responded, "He was a person who wanted to have what he wanted to be okay, not to be against the law." This was an unexpected response, as General Morgan had no qualms about breaking laws in the North. Furthermore, no formal or dramatic elements in the game suggest otherwise. Background information about General Morgan is given through a scripted narrative at the introduction and conclusion of the game, however the player determines the actions of the in-game representation of General Morgan. By placing the player in the role of General Morgan, some players seemed to project their own value system onto the protagonist.

Constructive Learning

Learning is a constructive process—a learner's background knowledge having an important impact on what mental models are built from an experience (Ambrose et al., 2010). Our data showed many cases where the students interpreted elements of the game differently from the designers' intent, and these can be traced to their understandings of these words or ideas outside the game context. In a previous quotation, we saw that a student assumes "supplies" means "medical supplies" despite the absence of such a connection in the game's formal or dramatic elements. In another case, a student claimed that "Scouting will let us look ahead for an ambush." While it's true that scouting, in general, might be used to find an ambush, Basil Duke's expository text tells the player that scouting grants more orders. Here, the player has chosen an option for a good reason, and in fact had a good gameplay experience because of the choice, even though the rationale was not correctly tied to the game mechanics.

The non-game connotations of words had a strong impact on the players' planning and interpretation. One player avoided the Chaos option, stating, "Not as much chaos, might want to keep it on the down low." This is counter to historical Morgan, but the player saw "chaos" as a negative thing to be avoided. Another student stated, "Chaos raises reputation, I don't think reputation is good." The student must understand "reputation" only in the negative sense, even though it represents the score of the game—a score in which higher is better. Such interpretations may explain why the students focused their attention on the immediate goal of escaping the Union and getting to Ohio, contrary to the designers' intent that the players would attempt to maximize reputation in the process.

Discussion

The students exhibited positive learning outcomes from both dramatic and formal elements of the game. Recall of historical facts was more tightly bound to the dramatic elements; we saw this particularly with the introductory and concluding cinematics. This mode of student learning and assessment is very conventional, instructional videos being an established complement to other classroom activities. On the other hand, empathy was built by the player's actions, particularly shown students' reflections on raiding. Whereas pre-intervention interviews showed a self-centered focus on technological absence in the past, post-intervention interviews showed that students felt hope and fear for civilians in the 1860s. The students' understanding of historic geography blends across the cinematics and gameplay.

The game design intentionally obfuscates the immediate impact of a raid. Basil Duke provides "feed forward" about what certain orders *will* do, but the only feedback about what they did do—with respect to the game's state—is in a reputation change. Even here, it is not clear how much reputation was gained or how it related to the numerous decisions made in assigning orders. As a result, the students become frustrated as they try and fail to build a mental model of the rules. The lack of feedback also contributes to students' developing potentially-counterfactual personal narratives. Players build mental models based on what they do and the feedback they receive—a common theme in game design books and game formalisms (Cook, 2007; Koster, 2012). This building of mental models *is* learning, and so it marks the primary affordance a designer has to align player learning with specific learning objectives. This study demonstrates how, in the absence of immediate feedback, players may build mental models that are inconsistent with a serious game's learning objectives.

The findings show how the constructive nature of learning can lead different players to build different personal narratives from the gameplay experience. In a formal school setting, it may be necessary to scaffold the play-based learning in order to mitigate any counterfactual historical ideas a player may have developed. For example, a discussion of Morgan's intention may help a player reinterpret "chaos" as it was intended by the designers.

This study was over a very short time and conducted separately from normal social studies lessons. The curriculum provided for *Morgan's Raid* describes how discussions and activities can be used in a social studies class following the playing of the game, and some of these are clearly designed to target the kinds of counterfactual learning outcomes that we observed. Our subject pool was small and localized, although they were representative of many elementary school communities; future studies can build upon these findings to investigate long-term and generalized impacts of the game.

Conclusions

We have shown that these players met the intended learning objectives of *Morgan's Raid* with respect to historical and geographical facts as well as decision-making. The players also developed more nuanced empathy for people of the 1860s. This shows that *Morgan's Raid* has met its learning objectives as originally designed despite various changes having been made during the iterative prototyping and development processes. Our data also show how each student's learning was unique, as predicted by constructivist learning theory: the students' interpretations of the game were strongly influenced by their background knowledge. A player's pre-existing connotation for terms such as "chaos" or "reputation" directly affected how the player planned their moves and interpreted the feedback, regardless of the in-game use of these terms. This suggests that more rigorous playtesting with the intended audience, and the adoption of qualitative research methods into this process, can help reduce unintended consequences of game design decisions.

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