Whether to Play or Preserve the Past?: Creating The Forgotten Worker Quest

Brian Greenspan
Hypertext and Hypermedia Lab
Carleton University
Ottawa, Canada
brian_greenspan@carleton.ca

Jennifer R. Whitson
Technoculture, Arts and Games Research Centre
Concordia University
Montreal, Canada
j.whitson@concordia.ca

ABSTRACT
In this paper, we describe some of the challenges associated with creating a locative game based on historical content. The Forgotten Worker Quest presents the history of the Rideau Canal as the winning of space while aligned with an avatar; however, the web exhibit from which the game draws its assets does not exhibit the same ludic qualities, which presented serious design challenges. The lack of compelling, navigable, and playable spaces in the web exhibit came back to haunt us in the game design stage as we tried to harvest any relevant, potentially playable content from the site. All too often, mundane artifacts ended up standing in for more dramatic gameplay elements. Ultimately, the inherent difficulties of accurately reconstructing the past encouraged us to take a more postmodern historical approach to our game development, by developing algorithms of play that allegorize the process of archival research, and foreground the roles that selection and narrativization play in historiography.

Categories and Subject Descriptors
K.3 [**Computers and Education]**: *Computer Uses in Education.*

K.8 [**Personal Computing**]: *Games*

General Terms
Management, Design, Theory.

Keywords
Heritage Passages, Locative Games, Virtual Museum Exhibits, Software Postmortem.

1. INTRODUCTION
Written in the form of a software postmortem, this article recounts our experiences creating the Forgotten Worker Quest, part of a larger heritage conservation project, detailing what went wrong along the way as well as what went right. In the Forgotten Worker Quest, the user takes on the role of a down-on-his-luck Irish labourer in a "choose-your-own" adventure with branching narrative paths. We incorporated game-like aspects such as scavenger hunts and challenges to encourage young visitors to fully explore the farthest reaches of the canal site. Ultimately, one of our greatest challenges was creating a "playable past," and encountering resistance to the idea that archival content can--and should--be fun to access.

While we were successful in terms of delivering a product that fulfilled our contract and exceeded the expectations of our clients, we left the project disappointed. We failed to meet our own personal expectations of bringing history alive and making it playful. Following Gaver et al.[3], we believe that there is something to be learned from our experiences, especially for serious game designers who share similar constraints, such as working with government clients and collaborating with other stakeholders. This paper provides an anatomy of our perceived failure, focusing on the issues that arise from clients and collaborators who may be unfamiliar with game design processes and technologies, and thus uncomfortable with the idea of playing with history.

2. BACKGROUND
2.1 The Heritage Passages Project
Heritage Passages is a virtual museum exhibit designed for the Virtual Museum of Canada (VMC). It presents an architectural history of the Rideau Canal and early Ottawa, once known as Bytown, from the arrival of Lt. Col. John By in 1826 to the incorporation of the city of Ottawa in 1855. The exhibit is coupled with a web-based app for GPS-enabled smartphones that lets the user experience the rich history of early Bytown from the banks of the Rideau Canal itself, a UNESCO designated World Heritage Site. Link to the app, and the canal's Entrance Valley becomes an open-air museum, providing on-site access to the stories and archival materials included in our web exhibit directly from significant locations along the canal. The site also includes a locative game, the Forgotten Worker Quest, in which you choose your own adventure to find secret locations and unlock important museum artifacts hidden around the canal.

Heritage Passages was developed in partnership with three research centres at Carleton University: the Carleton Immersive Media Studio (CIMS), Archives and Research Collections (ARC), and our lab, the Hypertext and Hypermedia Lab (Hyperlab). The project received financial support from the Canadian Heritage Information Network (CHIN).

One of our best decisions was hiring a local web development and design team, which allowed our teams to focus on the content for our site, designing the broad strokes of how it would look, but leaving it up to our contractors to build the wireframes and fine tune the layout and design. They also were in charge of navigation and user interaction, as well the technical strategies for importing

our assets into the site, and for ensuring that the website meets VMC's technical standards. Most importantly, our web developers had worked with CHIN and VMC on previous projects, and were able to leverage their personal networks and knowledge of technical specifications to ensure that our site passed CHIN's approval process.

The initial expectations were that the ARC team would provide content for the website, including both visual artifacts and historical narratives, while CIMS would use historical data to build 3D models of Bytown, and also help with the proper imaging of artifacts (clothing, paintings, tools, etc.) that ARC unearthed from archives in Canada and Scotland. Our role would be to help with the website narratives and design, as well as to create at least one location-based app that worked at the physical Canal site.

2.2 The Platform

The Forgotten Worker Quest and the Live Museum locative app were both designed using the Hyperlab's proprietary StoryTrek locative authorware (**Figure 1**). StoryTrek allows authors with just a few minutes of training to layer text, images, and audio-visual files onto Google maps, creating extensive and connected spatial stories in HTML that respond in real time to the vector of the user's physical movement and ever-changing geospatial context.

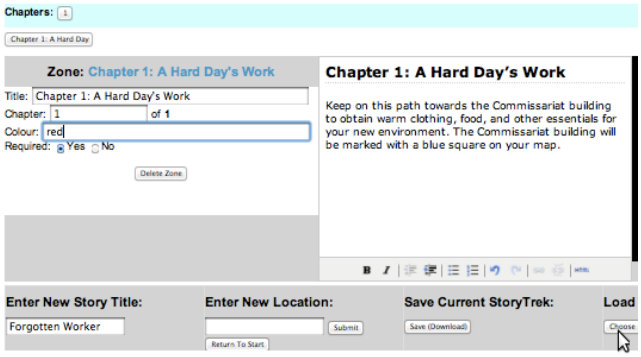

Figure 1. Partial View of the StoryTrek Locative Authorware

Users experience a StoryTrek narrative simply by walking through an urban or natural environment with a GPS-enabled mobile device in hand, while the story follows along, tacking and turning in response to the reader's unstructured motion.

The authorware, originally designed in Flash, was recently recoded in HTML5 to maximize cross-platform compatibility. Since both the Forgotten Worker Quest and the locative Live Museum app function entirely in-browser, a visitor accessing the Heritage Passages web exhibit from almost any recent GPS-enabled smartphone can play the Forgotten Worker Quest simply by clicking a link. In addition, we are planning to post a QR code linking directly to both the Quest and the Live Museum at the Bytown Museum, located at the historic canal site.

2.3 The Locative Apps

Because the locative apps were built exclusively by the Hyperlab team, and not in collaboration with CIMS and ARC, we had a bit more freedom to experiment iteratively with the actual design of the apps, abandoning some elements along the way and adding others.

Creating mobile locative apps allowed us to take the Virtual Museum exhibit off the website and onto the Canal site. Starting on Wellington Street overlooking the canal, you are offered two apps to help navigate the site. The Live Museum app provides location specific content (historical photos, explanations, and 3D models) as you explore the area freely. The second app, the Forgotten Worker Quest, is the more playful option.

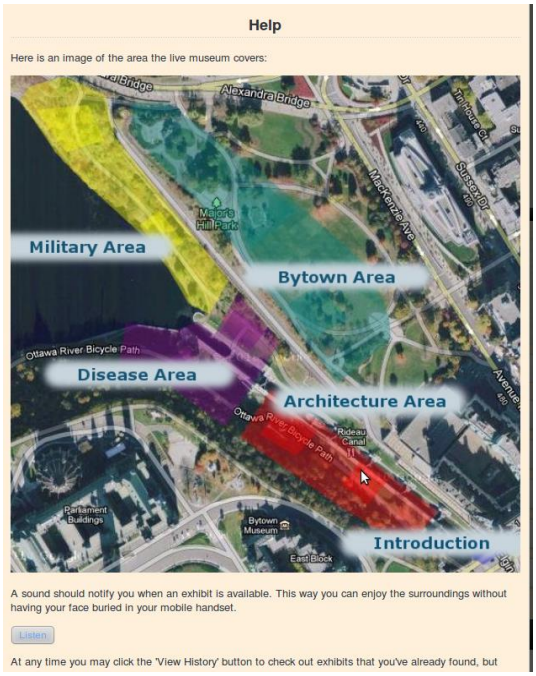

Figure 2. Interface screenshot:

Thematic "wings" in the Live Museum App

The Live Museum app turns the physical area around parliament into a museum that you can explore in an hour or less. As you walk around, you enter different areas or museum "wings," each corresponding to a different theme of the canal's construction, such as building techniques (Architecture Area), political life (Bytown Area), or working conditions (Introduction and Disease Areas) (**Figure 2**). For example, when you stand at the mouth of the canal, you are sent a flash video of a 3D rendering of the same perspective in 1820, showing what the site might have looked like before construction began. All assets and narratives are drawn from the main Heritage Passages web exhibit.

3. THE FORGOTTEN WORKER QUEST

The second app is the Forgotten Worker Quest, in which you play a nameless labourer trying to survive the perils of building the canal. Created by Jessica Aldred and Jennifer Whitson, the game mechanics follow a locative "choose-your-own-adventure" model interspersed with virtual scavenger hunts and challenges. Designed primarily for users aged 8-12, it takes about an hour to play.

Starting out at the Wellington Street Bridge, with Parliament Hill on the West and the historic Chateau Fairmont Hotel on the East, players are greeted with a scenic vista, looking down upon the canal locks and beyond that to the Ottawa River. The Quest begins with a splash page and tutorial instructions explaining how

the GPS elements of the Quest work. A map is highlighted with an icon of boots showing players where they are (**Figure 3**). Players are told that as they traverse the physical site of the canal, they will unlock challenges and content. When this happens, their mobile device will chime to notify them, thus ensuring that they are attuned to the physical canal space, rather than focusing on the screens of their smartphones. Then the quest begins.

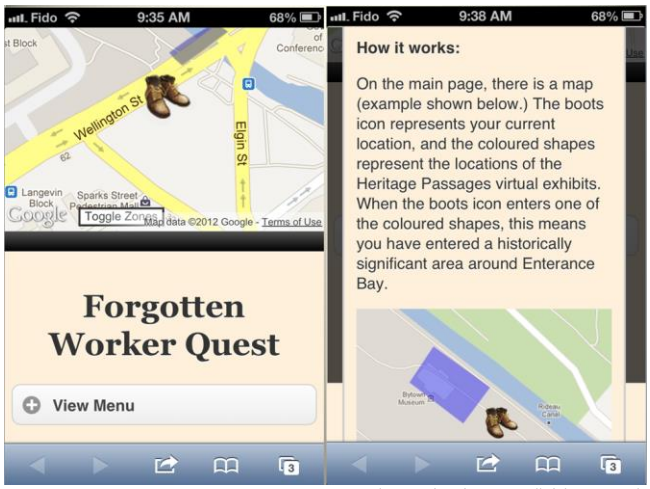

Figure 3. Two interface screenshots:

Forgotten Worker splash and tutorial screens

The Forgotten Worker uses visuals to set the scene: the player is presented with newspaper images and headlines that recount the hardships of countless labourers immigrating to Canada. Squalid shipboard conditions, overcrowded berths, cholera, and death characterized these sea voyages. The player is cast in the role of a newly disembarked Irish labourer who discovers himself at the very bottom of Bytown's social and economic ladder. Hungry and shivering in a shirt and hose, the player is tasked with the first mission: search for the Commissariat building to sign a work contract and purchase supplies. Upon finding the Commissariat, a series of new missions is unlocked, such as a scavenger hunt for tools and a series of weighty decisions about employment, brawling, and life in Bytown.

At different stages of the Quest, the map re-appears. Parts of the map are highlighted to cue players as to where the boundaries of the game are, thus preventing them from wandering into areas that do not have any associated content. The map also serves a pathfinding function, highlighting certain areas where clues might be hiding.

The actual landscape of the site plays a large role in the game's design. For example, players who happen to make a "wrong" decision face considerable punishment, such as running down a hill to "find help" (and thus triggering the next point of interest, or POI), before climbing back up to resume their quest. At other points, the narrative revolves around physical landmarks, such as an especially evocative funerary monument erected at the site to commemorate the hundreds of deaths that occurred during the construction of the Canal.

Our decision to go with the linear, yet occasionally branching, narrative format (**Figure 4**) was largely a function of design constraints rooted in the dictate that we must draw our app content directly from the web site, as detailed below. However, we found that the nostalgic appeal of the choose-your-own adventure story resonates well with much older participants than the 8-12 years we were targeting, especially those in their twenties and thirties.

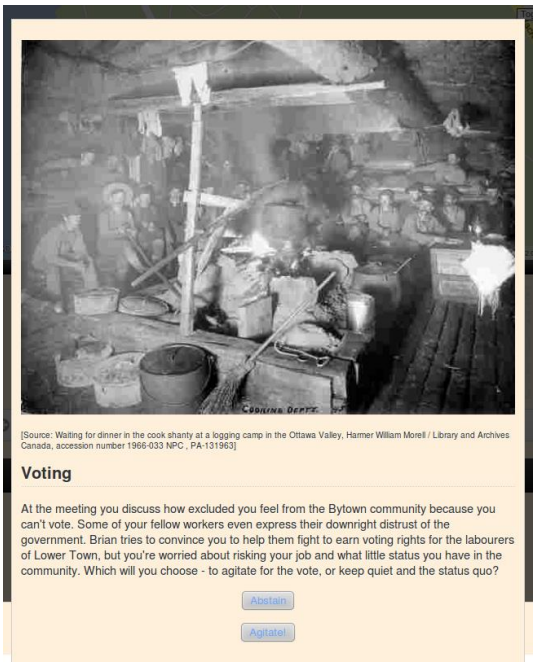

Figure 4. Adventures in Voting

4. GAMING HISTORY

According to Clyde et al. [2], digital games are capable of constructing justifiable, scholarly historical arguments through procedural rhetoric [1], although most commercial games and historical simulations fail to do so. They argue that the "gamic mode of history" can be achieved providing that a game "creates a reasonably justified truth maintaining the epistemologies of the written textual modes, such as the monograph and the scholarly article," by clearly connecting their truth claims to historical evidence, including connections "to libraries, archives, collections, and other repositories of historical evidence" [2]. The Forgotten Worker does precisely that, linking the evidence preserved in our multimedia archive to the user's embodied experience of her immediate geographical context.

It also links those same artifacts to the experiences of a fictional avatar, the eponymous Forgotten Worker. Clyde et al. distinguish a written history, which "allows the reader to observe the meaning of someone else doing something," from the gamic mode, which lets its player carry out meaningful, albeit counter-factual, actions that support the game's "constructed argument" about history [2]. By asking its players to carry out physically demanding tasks, the Forgotten Worker engages a complex mode of avatarial address that enables identification with the physical risks and hardships of a nineteenth-century canal labourer. Its procedural rhetoric advances the proposition that even the most glorious landmarks of Canadian heritage bear traces of exploitation and conflict.

The game allows the player to shape the identity of the Forgotten Worker in various ways. You can decide whether or not to join

agitating voting movements and, in doing so, address broader structural equalities between British and Scottish immigrants who were landed and therefore allowed to vote, and the Irish who were denied land ownership and thus denied political representation as well as legitimate means to accumulate wealth. In this way, the game's procedural rhetoric forces an awareness of the player's choices as political acts with collective consequences.

5. USER TESTS

In order to test the efficacy of both of our app designs, as well as the GPS tolerances around the canal site, we ran a focus group. The evaluation was formatted as a group tour of the canal site while using individual mobile smartphones (an iPhone4S, a Blackberry Bold, and an Android). Once taken to the exhibit starting point on the Wellington Street bridge, testers were allowed to wander the area on their own, commenting on the apps' content, design, technology, and overall experience, while we recorded their initial feedback by hand and audio recorder. At the conclusion of the test, participants had the opportunity to provide us with any further comments or suggestions they had for improving the site, focusing on the concept, user interface design, and ease of navigation, content, and overall experience of the apps.

The study participants grasped the general principle of the outdoor virtual museum exhibit immediately. They all understood that walking around the canal site will activate POIs and present area-specific information automatically (**Figure 5**), and that exhibit zones would appear on the map once "activated". All participants highly enjoyed the self-directed nature of the exhibit, which allowed them to make their own discoveries and connections, and all insisted that the final version of the app retain this emphasis on self-guidance and discovery. Although none had ever used a locative app before, most were quick to compare the app to other media and genres they had enjoyed in the past, including physical museums, websites, hypertext narratives, and videogames.

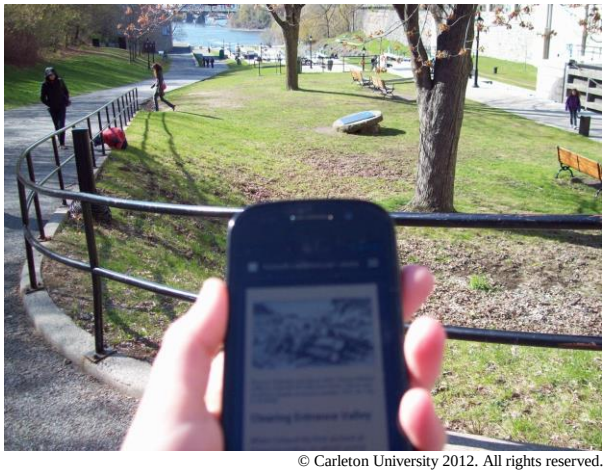

Figure 5. Testing at the Canal Site

Even the Live Museum app put users into a gaming mindset. One asked excitedly at the very start of the user test if the exhibit was like a "choose-your-own-adventure," likening the app's interactivity and navigational freedom to the earlier genre of interactive novel. One participant liked what he described as the "game" element in experiencing the canal site as an immigrant labourer, and compared it favourably to some of his prior experiences with the Nintendo DS personal gaming platform. Another user suggested that we include "hidden" POIs not signaled on the map, or "Easter eggs," that would pop up to reward intrepid explorers. The same user also suggested that the experience could be "gamified" by keeping a "scorecard" of the areas of the exhibit users have visited or completed, and allowing them to share their "score" with other users. Interestingly, this person was not a gamer, but was very interested in social media, and suggested that we include a link to "like" the app on Facebook or Twitter. She also felt that the POIs appeared too closely together, preventing her from discussing the content with the other participants. As she put it, "You do want to allow for a social element, so people can talk about these things, look at these things, ..." These comments all suggest that the participants approached the apps in a spirit of communal fun and discovery. Even details of the widespread malaria, cholera, and accidental deaths among historical canal labourers were interpreted as "fun facts" that added to the tour of the canal site.

While the user tests indicate that we ultimately succeeded in gamifying history, we failed to make it as playful as we had intended. A playful history must be selective and sometimes even deformative, writing speculative conclusions into the margins of the history books (or websites), while allowing users to draw their own interpretations. Although our test users were generally very impressed by the overall experience, their positive responses arguably had much to do with the novelty of the locative medium itself, and the opportunity to use their mobile phones in a new, ostensibly playful and social, way.

6. THE DESIGN PROCESS

The positive tone of the focus group notwithstanding, the actual process of creating the apps and the website from which they drew was riddled with negative experiences, including periods of crunch, lost work due to miscommunication, and disagreements over the design direction between ARC, CIMS, and the Hyperlab.

Two intertwined factors contributed to most of these issues. The first is accrued debt from earlier decisions. What we mean by this is that decisions early in the process (most taken to avoid conflict with other teams) ended up re-appearing and snowballing throughout the project. The second issue was more difficult to address: namely, the perceived conflict between playing with the past and preserving it. This is, at heart, a conflict between the database and the archive. Lev Manovich has described the archive and database as "natural enemies" from a formal perspective [5]. We experienced this enmity as an operational clash between the disparate cultures of the archive and the database, each with its own technologies, protocols, practices, and material constraints. The following account of our development process will help to tease out these two issues.

6.1 Contracts and Constraints

The technical parameters of the entire project caused contractual delays from the very start. As this project represented the VMC's first foray into supported mobile content, we had a multitude of accessibility issues to address, but no design guidelines to follow.

The boilerplate CHIN contract insisted that the exhibit be built in HTML1.0 strict, which would have conflicted with the technical specifications of the StoryTrek authorware used to produce the associated locative apps. Although developed to ensure maximum

compatibility, the CHIN guidelines had not been updated to include HTML5 standards, which we saw as the best way to ensure broad compatibility for locative apps. Negotiating contractual exceptions to the contract for the locative apps (though not the web exhibit) caused delays in the release of project funds, and in the start of our research and development, which was already on a tight, ten-month schedule. More importantly for the context of the Forgotten Worker Quest, our agreement dictated that locative apps would be restricted to presenting content pre-approved for the standard web exhibit. This meant that any game content needed to be drawn directly from the website. Accordingly, our team now had an increased stake in determining how the website was designed, and what content was included.

6.2 Content

In proposing the project, we had relied on the belief that our content would develop iteratively, keeping pace with the site and mobile app design. But in order to meet the funding milestones dictated by our contract, as well as the milestones requested by our web developers, the ARC team had to rush to find content for the site. Instead of adding content iteratively, it needed to be completely assembled within the first few months of our ten-month timeline. Our help was needed to develop, edit, and finalize the narrative copy through several weeks of content "crunch". This frenzied schedule contrasted with the slow pace of careful archival research.

We began the project hoping to discover rich veins of materials across several public and private archives that would inspire the imaginations of general audiences, and provide new material for the very dedicated group of Rideau Canal historians and enthusiasts. In actuality, the process was painstakingly slow, with many promising leads dead-ended due to lost or stolen material, as well as high fees for reproducing the work on our website. The novel material we did find predominantly comprised maps and correspondence, most of which was too dry and decontextualized for a general audience. We had hoped to find more content on the role of First Nations people and women in the construction of the Canal, as well as American perspectives on the Canal project and its role as a military defence route, but came up largely empty-handed.

In adapting the primary web exhibit for the Forgotten Worker Quest, we ran into considerable difficulty. While this game presented our best opportunity to "play" the past, we were constrained by the lack of particularly "secret" or surprising material about the Canal: a nearly illegible letter from Colonel By, or a photograph of a pick-axe or hammer, hardly make the most compelling game assets (**Figure 6**).

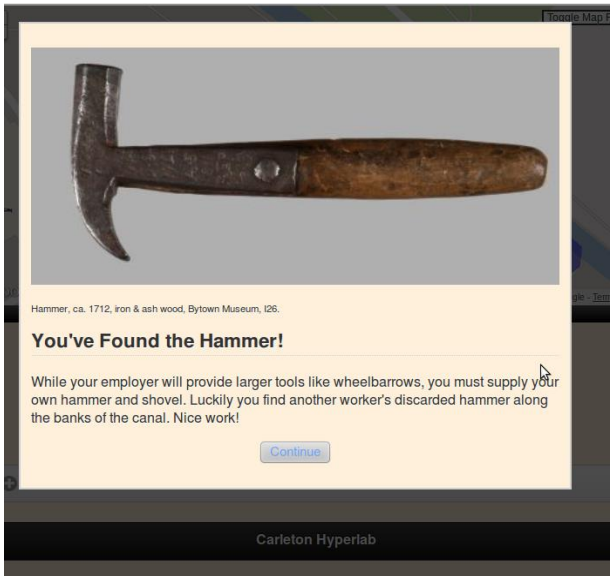

Figure 6. A dearth of exciting visual content

Due to the cost of additional translations and our prior agreement with CHIN, we limited the content of both the Live Museum and Forgotten Worker Quest to the text and assets of the web exhibit. Accordingly, we had to use the specific affordances of the locative medium to bring the existing content to life. As archival research had failed to turn up any "hidden history" to significantly challenge the Canal's official history, we focused instead on leveraging the capabilities of locative media to provide our on-site users with a sense of both the vastness of the achievement of the Canal's construction, and how the physical site has changed over time.

Luckily for us, the ARC team located blueprints and plans for most of the original buildings on the site of Rideau Lock #1. These plans were exacting, stipulating the type of building material to be used, right down to the dimensions of fences that once encircled each yard. The CIMS team took these plans, along with plans for the Locks themselves, and painstakingly created a navigable, historically accurate, 3D model of the entire site. They modeled how the site changed over time, from an untouched cedar forest in the early 1820's to the excavation of canal in 1826, right through to the incorporation of the City of Ottawa in 1855. Not content to focus on the Canal alone, they also built models of Upper Town and Barracks hill (where the Parliament buildings are today) and Lower Town (now the Byward Market). This model was used to create still images that became landing pages for the different sections of the website, as well as explanatory animations that allow visitors to move through the streets of Ottawa nearly 200 years ago. These animations proved extremely effective when combined with the Forgotten Worker Quest, which is designed to cue animations when visitors to the Canal site stand at particular spots, inviting them to compare the site from 1829 to its appearance today. While a hammer is always a hammer and thus somewhat lackluster, ARC's discovery of the blueprints and the work of CIMS in bringing them alive allowed those of us on the Hyperlab team to turn our game players into partial time-travelers.

To summarize, seemingly small issues in our contract snowballed into much larger issues. Contract delays meant a slow start, eating

into the already limited time that ARC had to find interesting content. The fact that this content had to be finalized much earlier than expected only exacerbated stress levels, which were already high, given the lack of "novel" historical discoveries. Crunch only added to the difficulties.

On our part, we could not start creating the game until the website content had been finalized. This constraint meant that in-between the deadlines for content and the deadlines for user testing, the Hyperlab team only had a few weeks to design both apps. While the StoryTrek platform made this relatively easy, it also meant that our team could not employ iterative design, and our first attempt at game design was what the focus group saw.

This compressed development timeline also meant that instead of acting as game designers, our team took on a different role than expected, assuming a much larger hand in designing the website and populating it with content. On one hand, this was a boon, as we could help ARC with their workload, but it also raised an entirely new issue: the cultural collide between digital scholars and archivists. The first indication of this problem took the form of collaborative tools.

6.3 Collaborative Tools

It took months to find sufficient tools for content sharing, communication, and scheduling. We used Huddle early in the project, and later on Basecamp, which was ideal for coordinating with our contracted web developers. We shared hundreds of assets, such as .jpgs of maps, blueprints and artifacts, via DropBox. Later, we purpose-built an online database to store these items, along with robust metadata indicating properties related to each artifact's provenance, location, material properties, and where it would fit on the final site.

CIMS and Hyperlab team members specialize in new cultural hardware and software, but the ARC team faced a steep learning curve that was complicated by regulations restricting them from installing updated software on their outdated hardware. They persevered admirably, and mastered a number of work-arounds. Our assets pipeline was hampered by the different levels of technologies among the different production teams. For example, ARC was responsible for digitizing the physical artifacts they found in Ontario and Quebec museums, the Library and Archives Canada and National Gallery of Canada, and a number of UK archives, and was also responsible for populating the web-based database with their findings. However, as their computers were many years out-of-date, uploading even a single image to the database often took 10-20 minutes. The simplest technology (USB and DropBox) were often the default choice for transferring assets, though this meant sacrificing the metadata, searchability, and version control otherwise guaranteed by the database.

The Archive team resisted using the database, in part because of technical limitations, and in part due to a reluctance to trust the integrity of the online database, preferring to retain all data and records on their personal laptops. While this approach enabled their own archival work and ensured the integrity of archival assets, it prevented the other teams from accessing these assets in a timely fashion.

6.4 "Remix Culture" vs. "To Preserve and Protect"

Perhaps the largest challenge was in establishing consensus over the audience and tone for the project. From the outset, the project was trying to please two masters: it sought to create engaging narratives that would appeal to a general audience with a grade eight reading level, while providing archived content for both educated Canal historians and university students wanting to learn how to do archival research.

This dual objective coincided with a clear pedagogical divide between our digital humanities group and that of the archive team. At heart, we operated with different underlying assumptions about whether to organize our digitized content according to archival principles designed to "Preserve and Protect" the content and its provenance, or following the example of popular interactive narratives and games that provide more user options for selecting and remixing content. The archivists were focused on preservation, seeing the primary purpose of the exhibit to be that of providing a digital repository for scans of archival documents. They explicitly wanted to please the Friends of the Rideau Canal enthusiast society by providing access to a large amount of new primary research materials, along with in-depth academic commentaries.

This assumption reflected the tendency of library websites to present information that is primarily textual, as Riley-Huff [6] points out in her study of the differences between library and museum websites: "Academic library Web sites tend to be more text based, since this reflects the role of the library as a primarily textual information organization." She also notes that "the academic librarians' well-known caution and suspicion regarding the Internet, uncontrolled online resources, user created content, and 'tagging' efforts" tends to govern the character and tone of academic library websites, which all too often present an avalanche of text-based information presented in what Peter Walsh has called "the Unassailable Voice":

'It is a tone and attitude that pervades museum labels, brochures, exhibitions, catalogues, the guided tour, audio-visual presentations and now Web sites. For the most part, it is both impersonal and disembodied: it is usually not a true human voice, connected to a real identity and personality, but a bureaucratic composite, in some ways closer to an IRS form than a living art historian or scientist. . . . Thus the Unassailable Voice has the flattened, vaguely evasive tone of a text created by committee. The voice itself often doesn't even believe or understand what it says. [6]

The Hyperlab team tried to keep the tone of the web exhibit fun, speculative, and accessible to the general public, drawing users in with playful content and narratives while avoiding authoritative statements about historical fact. We followed design guidelines for virtual museum exhibits, which predicted that the vast majority of visitors would not be academics, and would on average spend only 8-11 minutes on the site, according to our web developers. In their discussion of virtual museums, Styliani et al. [7] argue for the importance of achieving a "good balance between learning and leisure" in a museum site by providing "relaxing and short tasks," and ensuring there are "no text-heavy pages to interfere with the learning experience."

These differing assumptions about the exhibit's basic goals and audience created a lengthy editorial tug-of-war over its primary

content. ARC resisted our Hyperlab narratives, seeing them as taking liberties with archival content, omitting fine-grained details, and lacking seriousness of tone. In turn, we saw the documentation drafted by the ARC as oriented toward a highly specialized audience, overly detailed, and lacking in narrative interest.

After weeks of back-and-forth, we reached a compromise: the main web exhibit would provide narrative streams catering to the general public, while more in-depth content would be provided through a supplementary Archival section and downloadable whitepaper. In exchange, our team removed most of the hypertext and interlinking narratives from the main exhibit in order to create a more linear, curated experience, limiting all advanced forms of interactivity and content remixing to the mobile apps. This divided approach was less than ideal; yet, because we were limited to repurposing content from the main web exhibit in designing our apps, it provided a clear demonstration of how the very same archival and historical content can produce widely different user experiences depending on its deployment, as we explore below.

7. DISCUSSION

The differing experiences produced from the presentation of archival artifacts in the web exhibit and Forgotten Worker Quest respectively present different attitudes toward historical representation. In a discussion of digital games for learning, Kee distinguishes between different approaches to conveying historical understanding:

Recent scholarly research has focused on the necessity of supplementing 'first-order knowledge of history' (content) with 'second-order knowledge,' which moves beyond the names and dates of history to an understanding of the skills of historical practice--generating, corroborating, representing, and assessing interpretations of the past. This kind of history teaching gives attention to the concepts, methods, and vocabulary required to do history and underscores to students the challenge of knowing the past. [4]

While both the web exhibit and Forgotten Worker Quest aimed to convey both a first- and a second-order knowledge of the Canal's history, each installation approaches the challenge differently. The web exhibit provides a detailed history of the Canal's construction with in-line images of archival artifacts, which in turn are linked to a more detailed, searchable catalogue of artifacts. Students can learn how the narratives were built from the artifacts by following a supplemental self-study lesson plan that guides them through basic issues in and approaches to archival research, thereby combining first- and second-order knowledges of history.

The Forgotten Worker Quest achieves this fusion in a less rigorous, but arguably more experiential and engaging, fashion, through gameplay mechanics that create a tension between archival and narrative information. Overall, the Heritage Passages project's careful archival investigations only reinforced dominant conceptions of the Canal's early history. We did not turn up any previously unknown historical actors, or unearth much evidence to support either new understandings of the Canal's construction, or new micro-histories of the women, immigrants, and other civilians whose contribution to the Canal are generally acknowledged, but under-represented.

The Forgotten Worker Quest allowed us to present the kind of historical reconstructions we had all agreed to exclude from the web exhibit, and to explore propositions that could not easily be advanced in either the web exhibit or the Live Museum app without tainting their objectivity and evidentiary function. Clyde et al. mention the importance of narrative in the gamic mode of history [2]. By narrativizing the archive, we created a persuasive argument about the life, identity, and experiences of a representative Canal worker.

In addition, by narrativizing the archive, we made a secondary argument about the writing of history. We have already described how our fellow team's efforts to make the online archive as inclusive as possible within the time constraints of the project was often at odds with our team's efforts to tell stories about the materials and artifacts they turned up. Clyde et al. complain that the developers of most historical games "understand a history's ability to create knowledge about the past to be a function of the amassment of facts. . . . Games such as these ignore this important fact-evidence relationship and instead assume all data or information about the past is valuable to telling the real story" [2]. The Forgotten Worker Quest compelled us to approach the archive for a specific purpose, selecting only those artifacts that could readily be gamified, and arranging them into spatially challenging tasks and levels that conveyed a consistent and engaging story about a representative avatar.

Moreover, the procedural rhetoric of the game itself reproduces that same process of exploring a historic site or topic, selecting particular pieces of evidence from the archive, and making them cohere in a convincing story. In other words, the game's algorithms encourage identification not only with the immigrant labourer who fights to survive, but also with that other forgotten worker, the historian who keeps the past--and your avatar--alive. By linking the archival evidence to a fictional, but representative, character, the Forgotten Worker Quest makes a procedural argument about the process of writing history.

Whereas the web exhibit is based in principles of archival fidelity associated with historical simulation games, then, the Forgotten Worker Quest operates in "the postmodern mode," which emphasizes the aesthetics and politics of narrativizing history:

History simulation games may give the player the impression that he or she has an accurate portrait of the past, in all of its complexity. 'Postmodern History,' in contrast, highlights our distance from the past and the difficulty of reconstructing an 'accurate' picture of what has gone on before. [4]

True to the postmodern mode, the Forgotten Worker allows the user to "witness firsthand the potential and the limitations of the archives" [4] for historiography.

8. CONCLUSION

Because archival materials are quotidian and mundane by nature, they are of limited use within games, web exhibits, and other interactive digital artifacts that attempt to engage a broad and general public. Yet, the tension between the archive and database as cultural forms can itself provide the basis for meaningful and engaging interactions. In sharp contrast to the "Unassailable Voice" of the conventional historical exhibit, the Forgotten Worker Quest allows a player to interpret the historical archive through a highly assailable avatar with a limited perspective and degree of social power, who is at constant risk of injury, disease,

or death. Far from trivializing history, gamifying the archival record in this way foregrounds the life-or-death significance of even seemingly trivial artifacts, while demonstrating the central role of selection and interpretation in constructing a historical narrative from raw evidence. In future work, we will consider how other points of tension between traditional analog archives and digital databases might likewise be leveraged to produce historical games with engaging narratives and interactivity.

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