

Revolutionizing History Education: Using Augmented Reality Games to Teach *Histories*

By

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**B.A. Psychology
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ABSTRACT

In an ever-changing present of multiple truths and reconfigured histories, people need to be critical thinkers. Research has suggested the potential for using augmented reality (AR) games—location-based games that use wireless handheld devices to provide virtual game information in a physical environment—as educational tools. I designed “Reliving the Revolution” as a model for using AR games to teach historic inquiry, decision-making, and critical thinking skills.

“Reliving the Revolution” takes place in Lexington, MA, the site of the Battle of Lexington (American Revolution) and simulates the activities of a historian, such as evidence collection and interpretation. Participants interact with virtual historic figures and gather virtual testimonials and evidence on the Battle, each triggered by GPS to appear on the handheld devices depending on one’s specific location on or around the Lexington Common. The participants collect differing evidence based on their historic role in the game (Minuteman soldier, loyalist, African American/Minuteman soldier, or British soldier) and then collaboratively evaluate who fired the first shot to start the Battle of Lexington. I envision “Reliving the Revolution” not as a standalone educational solution, but as an activity integrated into a broader history curriculum that teaches students how to approach and evaluate complex social problems.

This thesis provides a detailed rationale for each of my design choices, as well as an assessment of each choice based on the results of iterative game testing. In my analysis of the game’s design, I focus specifically on four game elements: (1) collaborative, (2) role-playing, (3) storytelling or narrative elements; and (4) kinesthetic and mobility.

Results of trials of the game suggest that “Reliving the Revolution” and similar AR games can enhance the learning of: (1) historical name, places, and themes; (2) historical methodology and the limits to representations of the past; and (3) alternative perspectives and challenges to “master” historical interpretations. The game motivated participants to gather, evaluate, and interpret historical information, devise hypotheses and counter-arguments, and draw informed conclusions. My trials also suggested that AR games such as “Reliving the Revolution” can enhance learning because it can:

1. Create an authentic “practice field” for solving problems and using real-world contexts and tools.

2. Increase the potential for collaboration among participants, and enhance opportunities for reflection.
3. Enable participants to take on and express new identities through role-playing.
4. Encourage participants to explore more deeply a physical site and to consider interactions between the real and virtual worlds.

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BIOGRAPHICAL NOTE

Karen Schrier graduated from Amherst College with a B.A. in psychology. Since then, she has worked as a marketing consultant, an educational media producer, and an editor at an educational publishing company. She has written, edited, and produced numerous published educational materials for K-12 and college students.

While at MIT's Comparative Media Studies program, Karen worked on two documentaries; one on amateur film in a 1960s classroom, and another on roadside and commercial media in South Carolina. She worked as a researcher for MIT's new media literacy project and a producer for MIT's Metamedia project. She also led workshops at MIT and local community centers on diverse topics such as mobile storytelling, video editing, scientific experiments, and architectural design. She is co-authoring a chapter related to her thesis research for a forthcoming book on ubiquitous computing and knowledge and learning management.

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CHAPTER ONE

A NEW PARADIGM FOR HISTORY EDUCATION

WHAT IS *REALLY* HAPPENING IN HISTORY?

“I, Elijah Sanderson, above named, do further testify and declare, that I ... saw a large body of regular troops advancing towards Lexington company, many of whom were dispersing, I heard one of the regulars, whom I took to be an officer, say “damn them—we will have them,” and immediately the regulars shouted aloud, run and fired on the Lexington company, which did not fire a gun before the regulars discharged on them...”

—Elijah Sanderson, Lexington company (Minuteman) soldier¹

“Some of the villains [Lexington Minutemen] ... got over the hedge, fired at us, and it was then and not before that the soldiers [of King George III’s troops] fired.”

—Lieutenant William Sutherland, 38th Foot (King’s troops)²

“At the little village of Lexington, Captain John Parker and some seventy Minutemen (militiamen trained to respond at a moment’s notice) awaited the British on the village green. As the British approached, a British officer shouted at the Minutemen to lay down their arms and disperse. The Minutemen did not lay down their arms but did turn to file off the green. A shot was fired, and then the British opened fire and charged. Eight Americans were killed and several others wounded, most shot in the back.”

—*United States History* (High School Review Book)³

Who fired the first shot at the Battle of Lexington? This seems like a simple question. Yet, one can interpret the evidence above in at least three different ways. How do we decide which one is the truth? Which is the most compelling interpretation?

First, let’s evaluate our sources. Perhaps we might judge the textbook version as more authoritative because we feel it offers a more objective, macroscopic view of the Battle of Lexington. Or, perhaps we might argue that Elijah Sanderson and William Sutherland are more trustworthy since they were eyewitnesses to the event. Maybe we would privilege William

¹ Quoted from testimony by Elijah Sanderson in “Part 2: Excursion of the King’s Troops” in *The Nineteenth of April, 1775; a collection of first hand accounts including Paul Revere’s ride, Battle of Lexington, the Concord fight, March of the British, being the depositions & narratives of persons who participated* (Lincoln, Mass.: Sawtells of Somerset, 1968).

² Quoted in David Hackett Fischer. *Paul Revere’s Ride*. (New York: Oxford University Press, 1994). Originally from narrative letter to General Clinton, April 26, 1775, published in *Late News of the Excursion and Ravages of the King’s Troops on the Nineteenth of April, 1775*, ed. Harold Murdock (Boston, 1927).

³ Jerome McDuffie, Gary Piggrem, and Steven E. Woodworth, *United States History*, (Piscataway, NJ: Research and Education Association, 1993).

Sutherland's evidence because he was a Lieutenant or Elijah Sanderson's testimony because he was more detailed.

Historian David Hackett Fischer posits that no one at the Battle of Lexington was necessarily lying about what happened; instead, there were multiple, concurrent truths. Each person at the Battle spoke a truth—their truth—because they explained who fired the first shot “as they saw it”⁴ or as their individual perspective allowed. As Fischer notes, “few were able to see the entire field”⁵; instead, they each could offer one blade in a field of alternative historical interpretations.

The accounts I provided are only three of many other possible stories (or blades) of what happened on early morning, April 19, 1775. Even if we could time-travel back to that moment, our current-day perspective might lead us to a different story of who fired the first shot than someone from that time period might develop based on the same evidence. If there are many possible historical interpretations, what gets written into the history books? How do we understand the past and negotiate among multiple, individual “truths” to create a convincing history?

History is an interpretation of what happened, not the past itself. When historians create a history, they critically evaluate and arbitrate among differing sources, evidence, and views of the past, determining what they think is the most appropriate representation. They do this while also considering their own role as an interpreter,⁶ and often reflect on how this influences their readings of the past.⁷

⁴ David Hackett Fischer. *Paul Revere's Ride*. (New York: Oxford University Press, 1994), p. 194.

⁵ Fischer, p. 194. Fischer writes, “we shall never know who fired first at Lexington, or why.”

⁶ Every individual has their own personal, cultural, and socioeconomic lens through which they judge the past, present, and future. From Masato Ogawa, “Building Multiple Historical Perspectives: An Investigation of How Middle School Students are Influenced by Different Perspectives,” paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001).

⁷ Such a reflective history is more characteristic of deconstructionist historians, such as Hayden White and Alun Munslow. I will discuss the different approaches to historiography in more detail in “Who's History?”

In contrast, K-12 students typically learn one master narrative of the past, but not the skills involved in creating and assessing histories.⁸ This type of history pedagogy is problematic because students are not learning the interpretive and decision-making skills necessary for historical inquiry,⁹ and also because they are not learning the skills for evaluating the world as an engaged citizen.¹⁰ To actively participate as a citizen in a democracy, people must be able to question sources, seek out and manage differing viewpoints, pursuing their own interpretations of the information they receive. As the National History Center explains, in their description of the national history standards,

Without history, a society shares no common memory of where it has been, what its core values are, or what decisions of the past account for present circumstances. Without history, we cannot undertake any sensible inquiry into the political, social, or moral issues in society. And without historical knowledge and inquiry, we cannot achieve the informed, discriminating citizenship essential to effective participation in the democratic processes of governance and the fulfillment for all our citizens of the nation's democratic ideals.¹¹

In this thesis, I propose using emerging media, such as location-based,¹² mobile, and augmented reality (AR)¹³ games¹⁴ to help teach historic inquiry, decision-making, and critical thinking¹⁵

⁸ For example, Kurt Squire and Sasha Barab, "Replaying History: Engaging Urban Underserved Students in Learning World History Through Computer Simulation Games," (accessed at <http://labweb.education.wisc.edu/room130/PDFs/squire01.pdf> on June 10, 2005) and Richard J. Paxton, "A Deafening Silence: History Textbooks and the Students Who Read Them," *Review of Educational Research*. 69(3): 315-339, 1999.

⁹ Quoted in John Hoge. "Teaching History for Citizenship in the Elementary School." *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003). Hoge cites Barton who argues that "Elementary-grade-level students typically know very little about the methods used by historians in the creation of their narratives and, perhaps as a result, uncritically accept printed historical accounts as the truth." (Keith C. Barton "History—It Can be Elementary: An Overview of Elementary Students' Understanding of History," *Social Education*, 61: 13-16.)

¹⁰ According to John Hoge. "Teaching History for Citizenship in the Elementary School." *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003). Butts and Freeman have discussed the "importance of powerfully taught history as an essential subject in the schools of any nation that wishes to be called and to remain a democracy." (Butts, Freeman R. and Paul Gagnon, "The Morality of Democratic Citizenship: Goals for Civic Education in the Republic's Third Century." (Calabasas, Ca: Center for Civic Education, 1988)).

¹¹ Quoted from the National Center for History in the School's "Significance of History for the Educated Citizen," *National Standards for History, Grades 5-12*, 1996. (accessed at <http://nchs.ucla.edu/standards/dev-5-12a.html> on June 7, 2005).

¹² Mobile devices that are wireless and GPS-enabled are location-aware. Games that use a particular geographic location as a "game board" are considered location-based games.

¹³ Throughout the thesis, I will refer to augmented reality as AR.

¹⁴ Briefly, augmented reality (AR) or location-based games, refer to games that integrate the physical environment with virtual information. In other words, the virtual world is placed on top to augment the physical world. The result is an experience where participants receive information from both the environment and from an object that can access the virtual world (such as a PDA or personal digital assistant). I will provide more information about AR and examples in later sections, such as "Augmenting Learning."

skills. I explore how we can use mobile technologies such as handheld PDAs (personal digital assistants) in mediated learning experiences to convey a historic moment from multiple perspectives, while also teaching about a historic place and time. How can we use mobile media and AR to encourage people to become evaluators of evidence, interpreters of information, or decision-makers about what happened in the past? How can we help people to reflect on their own socio-cultural and historical context and their individual roles as interpreters?

What better way to prepare students for skills essential to democratic engagement than by using the historic moment of the American Revolution—when such values were being questioned? To study the potential for AR, mobile, and location-aware media in developing historic inquiry and critical thinking skills, I designed a novel AR game called “Reliving the Revolution.” In brief, I designed “Reliving the Revolution” to enrich students’ understanding of the Battle of Lexington and the historic site of Lexington, MA; to enhance their decision-making, problem-solving, and collaborative skills; and to teach them to seek and consider multiple perspectives on past and current moments. In this location-based learning experience, participants encounter the Battle of Lexington from diverse and reflective perspectives, and “relive” this moment from the American Revolution. Simultaneously, participants simulate the activities of a historian; they gather, critique, manage, and synthesize historic evidence and multiple views of the Battle. I conceive “Reliving the Revolution” *not* as a stand-alone educational solution, but as one piece of broader social studies curricula that incorporate historic inquiry and interpretive thinking skills.

To play “Reliving the Revolution,” a group of eight¹⁶ participants walk around present-day Lexington, Massachusetts equipped with a mobile handheld computer or PDA (personal digital assistant)¹⁷ that conveys location-based “virtual” information¹⁸ on social, historical, economic,

¹⁵ According to *Critical Thinking: An Introduction*, critical thinking is the “ability to interpret, analyse and evaluate ideas and arguments.” Basic areas include recognizing problems, interpreting data, appraising and evaluating evidence, testing out hypotheses and theories, applying judgements, understanding underlying assumptions and intentions, drawing inferences and conclusions, reflecting on decisions, clarifying ideas, and producing compelling explanations and arguments. (Alec Fisher, *Critical Thinking: An Introduction*. (Cambridge, UK: Cambridge University Press, 2001)).

¹⁶ The number of student is somewhat flexible, although I decided that eight was an ideal number for the game, as I will explain later. The game can also be played with a multiple of eight (16, 24, 32) for accommodate large classes.

¹⁷ More specifically, a PocketPC by Dell.

geographic, and political processes surrounding the Battle of Lexington and the American Revolution. The wireless handheld computers use GPS to trigger this information, depending on where the participant is standing on or around Lexington's Common. The participants' primary goal as they gather evidence is to figure out who fired the first shot that initiated the April 19, 1775 battle on Lexington's Common. The participants work in pairs, and each pair is assigned to play the entire game as one of four different historic figures: Prince Estabrook (African-American slave/Minuteman soldier); John Robbins (free/Minuteman soldier); Ann Hulton (Loyalist/townsperson); Philip Howe (Regular (British) soldier).¹⁹

Thus, participants discover and gather "virtual" historic evidence, while simultaneously experiencing the physical site where the Battle took place, all from the perspective of one of four specific historic roles. The PDA provides access to the virtual evidence, because it is triggered by locations or "hot spots" throughout and around Lexington Common. This evidence takes the form of testimonials and/or documents from "virtual" historic figures (such as Captain John Parker, Paul Revere, or Major John Pitcairn) of real and virtual items (such as Buckman Tavern or a musket, respectively). These "virtual" historic figures, which I refer to as Non-Playing Characters (NPCs), provide different information depending on the participant's role in the game. For example, Captain John Parker, the leader of the Minutemen, may provide very different information to a fellow Minuteman soldier, than a female townsperson or a British soldier.

The game has two time periods: **Time 1** in the game simulates the moment before the Battle has begun, just as the British (Regular) troops are about to arrive in Lexington. **Time 2** simulates the moment immediately after the Battle ends and the British King's troops begin to head toward Concord. The NPCs provide different information in Time 1 and Time 2. In between the two time periods, the participants can take a short break and begin to exchange information and determine trustworthy sources. At the end of Time 2, all the participants (all four roles) gather

¹⁸ This information is triggered by a GPS or global positioning system device in specific locations around the Lexington Common in Lexington, MA.

¹⁹ Please see "Role-Playing Elements" and "What are the Games' Roles?" for more details on the roles, and/or see Appendix X for a detailed character sheet for each role.

together to collaboratively compare and evaluate evidence, share their perspectives, and debate who they think fired the first shot. (See Appendix I for a schematic diagram of the game).

I created “Reliving the Revolution” as both a proof of concept and as a means of experimenting with the use of media to teach historic inquiry and critical thinking. Media such as mobile games do not necessarily support learning, collaboration, imagination, or interest. How do we design educational AR games that are deeply engaging and motivating, while also incorporating specific historical pedagogy? What are the limits and benefits to teaching the critical thinking of history using AR games? What are the ways that we can better support distributed learning experiences, such as learning over distance and time with mobile media? In this thesis, I use my design and assessment of “Reliving the Revolution” as a lens by which to approach these questions.

This thesis is organized as follows. The first part is a theoretical framework for the design of “Reliving the Revolution,” including a discussion of history pedagogical practices, games in education, and AR. The second part of my thesis includes detailed analyses and assessments of my design choices for “Reliving the Revolution.” In my evaluation of “Reliving the Revolution,” I incorporate results from three trials of the game. In the third part of the thesis, I focus specifically on four game elements: (1) collaborative, (2) role-playing, (3) storytelling or narrative elements; and (4) kinesthetic and mobile to consider how to alter and refine my game design to better meet my pedagogical goals and to provide an engaging, meaningful experience for the participants.

IN TEXTBOOKS WE TRUST?

“Good historical thinkers are tolerant of differing perspectives because these perspectives help them make sense of the past...they are informed, educated, thoughtful, critical readers, who appreciate investigative enterprises, know good arguments when they hear them, and who engage their world with a host of strategies for understanding it.”

—Bruce A. VanSledright²⁰

²⁰ Bruce A. VanSledright, “What Does it Mean to Think Historically ... and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

To design a game that simulates historic inquiry, I first identified what historians actually do and compared that to how history is taught in the K-12 classroom. According to VanSledright, historians investigate sources and critically evaluate remnants of the past to reconstruct what happened. They assess these sources and documents based on what VanSledright calls “interrelated and interconnected cognitive acts—identification, attribution, perspective judgment, and reliability assessment.”²¹ This includes defining and judging historic evidence on measures such as: the type of source and other similar sources, its physical characteristics, its author(s), the author’s purpose and position, the author’s socio-cultural and political context, and its relative reliability. Similarly, Squire explains, “[Academics, curators, journalists, and social activists] consider research topics of theoretical and/or practical importance, consult original sources, produce arguments, interpret data in dialogue with existing theory, and negotiate findings within social contexts.”²² Historians interact with evidence and sources in an “interpretative, constructive, analytic, and dialogic process,”²³ consulting and managing multiple perspectives on a historic moment, while also reflecting on their own perspective on the past. When historians critically investigate this evidence, they understand that there may be missing information: “what does remain is organized from someone’s perspective”²⁴ and is read through their own interpretive lens.

K-12 teachers, however, often provide history and social studies students with a litany of facts, events, and names, along with a master narrative that authoritatively explains what happened in the past.²⁵ The assumption underlying this educational model is that there is one correct narrative

²¹ In Bruce A. VanSledright, “What Does it Mean to Think Historically...and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

²² Kurt Squire and Sasha Barab, “Replaying History: Engaging Urban Underserved Students in Learning World History Through Computer Simulation Games,” (accessed at <http://labweb.education.wisc.edu/room130/PDFs/squire01.pdf> on June 10, 2005).

²³ Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

²⁴ Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

²⁵ In Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003. Wolk argues that “official curricula, such as textbook or a standardized test, which are highly politicized and sanctioned official knowledge, are seen as the correct answers and right knowledge that children need to have.”

that students should learn, and no other possible interpretations.²⁶ In the K-12 classroom, the most prevalent pedagogical tool for U.S. history content is the textbook (“the textbook is the most common historical text”²⁷). Researchers criticize the classroom’s reliance on textbooks, arguing that “social studies and history textbooks are biased, superficial, or poorly written and present history from a single perspective with few conflicting ideas,”²⁸ let alone invite students to attend to other historic voices or develop empathy for multiple points of view.

Not surprisingly, students view historical texts such as textbooks as objectively written and devoid of authorial intent, agency, context, or their human creation.²⁹ Those voices of dissension, which might be different from the master narrative, are silenced; and the narrative (and the ideology behind the narrative) remains unquestioned. As a result, students may equate history with the past.³⁰ According to VanSledright these “practices actually retard the development of historical thinking because they foster the naïve conception that the past and history are one and the same, fixed and stable forever...that the words in textbooks and lectures map directly and without distortion onto the past.”³¹

²⁶ “History is presented as received, uncontentious truth, free from social context and beyond debate. K. D. Squire (draft) *Civ III as a Geographical Simulation for World History Education*. Accessed on June 30, 2005 at labweb.education.wisc.edu/ room130/PDFs/civ3-education-chapter.doc. Similarly, in Philip Molebash, “Web Historical Inquiry Projects,” in *Social Education*. 68(3): 226-229, 2004, Molebash writes, “students and teachers often view history as static and not open for debate.”

²⁷ Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

²⁸ Masato Ogawa, “Building Multiple Historical Perspectives: An Investigation of How Middle School Students are Influenced by Different Perspectives,” paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001), citing Tunnell, M.O. and R. Ammon (1996). “The Story of Ourselves: Fostering Multiple Historical Perspectives,” *Social Education*. 60(4): 212-215 and Wade, R. C. (1993). “Content Analysis of Social studies Textbooks: A Review of Ten Years Research. Theory and Research,” *Social Education*, 21(3): 232-56.

²⁹ Paxton expands on the argument that there is a “silence that reigns between those who write history textbooks and the K-12 students who read them.” He concludes that as a result, “With only muted thought about the authors of historical texts, these students tend to regard historical documents as evidentiary equals, making few judgments about their biases, trustworthiness, historical context or perspectives” (Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999).

³⁰ Even though, as I mentioned previously, history is an interpretation of the past, not the past itself.

³¹ Bruce A. VanSledright, “What Does it Mean to Think Historically...and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

Such pedagogical practices also undermine and distort students' understanding of historic discourse and discipline. Seixas argues that what is being taught is not history at all—but myth creation,³² which in turn unnecessarily obfuscates historic inquiry in lieu of learning rote, uncontextualized facts and figures.³³ K-12 students tend to conceive of history as a highly-detailed “parade of facts”³⁴ or “collection of facts to be archived in the process of reading and then cut-and-pasted together in the process of writing,”³⁵ instead of as a dialogic process of evaluation, interpretation, and decision-making on the most appropriate reconstruction of the past. Likewise, Wilson argues that history has become impenetrable for students, “resulting in little intellectual engagement, a dominance of teachers and textbooks, and minimal problem solving or critical thinking”³⁶—it is no wonder that history is consistently ranked as one of the most boring subjects in school.³⁷

Who's “History?”

“Could a greater miracle take place than for us to look through each other's eyes for an instant? We should live in all the ages of the world in an hour; ay, in all the worlds of the ages. History, Poetry, Mythology! – I know of no reading of another's experience so startling and informing as this would be.”
—Henry David Thoreau³⁸

³² Seixas, P. (2000). “Schweigen! die Kinder! Or, Does postmodern history have a place in the schools?” In Stearns, P.N. Seixas, P., & Wineburg, S. (Eds.), *Knowing teaching & learning history: National and international Perspectives*. New York: New York University Press., as referenced in K. D. Squire (draft) “Civ III as a Geographical Simulation for World History Education.” Accessed on June 30, 2005 at labweb.education.wisc.edu/room130/PDFs/civ3-education-chapter.doc.

³³ K. D. Squire (draft) “Civ III as a Geographical Simulation for World History Education.” Accessed on June 30, 2005 at labweb.education.wisc.edu/room130/PDFs/civ3-education-chapter.doc.

³⁴ Donald B. Crawford and Douglas Carnine, “Comparing the Effects of Textbooks in Eighth-Grade U.S. History: Does Conceptual Organization Help?” *Education & Treatment of Children*. (23):4, 387-413, 2000, citing Parker, W. (1989). “How to Help Students Learn History and Geography,” *Educational Leadership*, 47(3): 39-43.

³⁵ Richard J. Paxton, (1999). “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

³⁶ Suzanne M. Wilson, “Research on History Teaching.” In Virginia Richardson, Ed. *The Handbook of Research on Teaching*. Washington, D.C.: Educational Research Association, 527-544, 2001. Quoted in John Hoge, “Teaching History for Citizenship in the Elementary School.” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003).

³⁷ In Kurt Squire and Sasha Barab, “Replaying History: Engaging Urban Underserved Students in Learning World History Through Computer Simulation Games,” (accessed at <http://labweb.education.wisc.edu/room130/PDFs/squire01.pdf> on June 10, 2005), Kurt Squire and Sasha Barab write, “...history is consistently listed as the least favorite subject among students and that marginalized students frequently reject the study of history altogether, citing J.W. Loewen, “Lies my teacher told me: Everything your American history textbook got wrong,” (New York: Simon & Schuster, 1995).

³⁸ Henry David Thoreau, *Walden*, as quoted in Robert S. Nelson, “Descartes's Cow and Other Domestications of the Visual,” in *Visuality Before and Beyond the Renaissance: Seeing as Others Saw*, (New York: Cambridge University Press, 2000).

The controversy surrounding the teaching of history underscores a relevant debate in historiography—the method by which historians piece together what happened and write the past. The chosen paradigm for teaching history education stems, at least philosophically, from a teacher’s approach to historiography.

Alun Munslow, in *Deconstructing History*, outlines three main approaches to how historians understand and represent the past. On the one hand, Reconstructionist historians seek objective facts through empiricism. Finding historical truth is akin to testing scientific principles: through the careful collection of evidence and objective analysis, the historian will uncover what really happened.³⁹

In contrast, the Constructionist historian employs social frameworks to explain historical phenomena. This historian considers the experience of his/her own present—believing that, when we represent the past, our current sociocultural lens, personal beliefs, and status all affect our investigations.⁴⁰ As a third perspective, the Deconstructionist historian takes an approach defined less by empiricism and more by the way the sources and content are interpreted. Historic evidence—whether it be diaries, films, documents, photographs, or transcripts—are all texts, and a “representation of the past rather than the objective access to the reality of the past.”⁴¹

Deconstructionist historians such as Hayden White argue that we can never know what really

³⁹ For more information on the changing notions of objectivity, particularly in terms of history, look at reconstructionist Peter Novick’s *That Noble Dream* and Thomas Kuhn’s “Objectivity, Value Judgment, and Theory Choice” and *The Structure of Scientific Revolution*.

⁴⁰ For good overviews of the major shifts in historiography, look at Gene Wise’s *American Historical Explanations* and Igger’s *Historiography in the Twentieth Century: From Scientific Objectivity to the Postmodern Challenge*. Hayden White and Dominick LaCapra’s works look at history as a text and subject to “literary conventions and linguistic determinations” (T.V. Reed, “Theory and Method in American Cultural Studies,” 2001). Russell Jacoby and Keith Windschuttle are critics of White and LaCapra. Michel Foucault and Hayden White specifically address the issues of history as text and the cultural context of historical discourse. Foucault questions historical truth and questions the relationship between historian and historical interpretation. White sees history as a literary creation, and that a historian should “impose a meaning through the organization of the data as narrative” (Alun Munslow). See, for instance, Hayden White, *The Content of the Form: Narrative Discourse and Historical Representation* (Baltimore: The Johns Hopkins University Press, 1987).

⁴¹ Alun Munslow, “The Past in a Changing Present,” *Deconstructing History*. (New York: Routledge, 1997) pages 17-35, 1997.

happened because all evidence, sources, and texts about an event are also mediated by individuals.

The Deconstructionist historian seeks to put the “people” back into history. According to the Deconstructionist approach, the historian does not empirically discover historical truth; rather, s/he can produce a possible interpretation, text, or narrative of the past. Understandings of the past are based on our individual perspectives, and the meanings that we inscribe to it are all relative. Our writing and rewriting of history, like literature, is embedded in cultural and social structures and expresses relationships in the past and present. How we evaluate the past is affected by our viewpoint on the current horizon; history is a “constituted narrative discourse written by the historian in the here and now.”⁴² Moreover, the historian must not only be aware that there are multiple possibilities in how we represent the past, but s/he must also consider his/her role in creating history.

What implications does Deconstructionist historiography have for the classroom? Teachers who agree with this approach to historiography often do not incorporate this model into their classroom pedagogy.⁴³ How do we teach students to think historically and to do “Deconstructionist” history?

EXPERIMENTING WITH HISTORY EDUCATION

“At the outset I invite you to think of American history in a quite new way: not as a series of ‘lessons’ with dates and names and events to be memorized and ‘recited’ upon, but as a story of the past which will help you to understand the world in which you are living.”

—David Muzzey⁴⁴

“History is the only laboratory we have in which to test the consequences of thought.”

—Etienne Gilson⁴⁵

⁴² Alun Munslow, “The Past in a Changing Present,” *Deconstructing History*. (New York: Routledge, 1997) pp. 17-35.

⁴³ John Hoge. “Teaching History for Citizenship in the Elementary School.” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003), and Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

⁴⁴ The first sentence from David Muzzey’s 1955 history textbook, as quoted in Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

“Teach skepticism.”

—Walter Cronkite⁴⁶

As a result of convention K-12 history pedagogical practices, students develop neither the “critical, interpretive, and synthetic thinking abilities required for cultivating historical understanding,”⁴⁷ nor the reflective and evaluative skills to observe their own and others’ biases. Brush and Saye argue that social problems, which are often “ill-structured, multilogical, and controversial,”⁴⁸ require complex reasoning skills, such as the ability to actively evaluate and weigh multidimensional perspectives and solutions, apply previously learned knowledge, and employ conceptual organizational schemes and rubrics.⁴⁹ “Learners must be able to engage in critical discourse aimed at clarifying understanding about an issue and apply evaluative criteria to develop defensible decisions about a social problem.”⁵⁰ Yet high school students usually view social problems superficially, and do not try to unravel their complexity.⁵¹

The critical literacy⁵² of social studies is important because, as Stephen Wolk explains, “it is about how we see and interact with the world: it is about having, as a regular part of one’s life, the skills and desire to evaluate society and the world.”⁵³ The ability to think through social problems can also be applied across other academic disciplines, and is necessary for democratic

⁴⁵ As quoted in the National Center for History in the Schools, “Significance of History for the Educated Citizen,” <http://nchs.ucla.edu/standards/dev-5-12a.html>, accessed on June 30, 2005.

⁴⁶ Robert Kubey, “Media Literacy and the Teaching of Civics and Social Studies at the Dawn of the 21st Century,” *American Behavioral Scientist*, Vol. 48, No. 1, September 2004, 69-77.

⁴⁷ John Hoge, “Teaching History for Citizenship in the Elementary School.” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003).

⁴⁸ Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005.

⁴⁹ Ibid.

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² I argue that critical literacy is similar to critical inquiry in history; but it is even broader in scope. Wolk refers to social science concepts, not just history, which is an integral part of social studies. (Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003.)

⁵³ Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003. Similarly, Wolk quotes Kretovics, who offers that critical literacy provides students with “the conceptual tools necessary to critique and engage society along with its inequalities and injustices” (J. R. Kretovics, “Critical Literacy: Challenging the Assumptions of Mainstream Educational Theory.” *Journal of Education*. 167(2): 50-62, 1985).

and civic engagement.⁵⁴ Critical thinking skills are “a very close relative to active, thoughtful, critical participation in text- and image-rich democratic cultures...good historical thinkers are informed, educated, thoughtful, critical readers, who appreciate investigative enterprises, know good arguments when they hear them, and who engage their world with a host of strategies for understanding it.”⁵⁵ Not only do students become better historians, but also they become better thinkers, analyzers, critics, and decision makers—necessary skills for citizens in a healthy, diverse democracy. Writes Ernest Boyer, “Our children must learn how to spot a stereotype, isolate a social cliché, and distinguish facts from propaganda, analysis from banter, and important news from coverage.”⁵⁶ Critical literacy provides students with the conceptual tools and breadth of perspective to engage in the dialogue and inquiry necessary to create a stronger world.⁵⁷ How do we teach students to consider both the holistic and microscopic, to negotiate multiple viewpoints, evaluate diverse opinions, and, more broadly, to be more democratically engaged?⁵⁸ How do we help them learn to evaluate their own, newly-open, prismatic critical eye?

⁵⁴ In John J. Patrick, “Teaching Democracy,” *Educational Resources Information Center Digest*, (Bloomington, IN: ERIC Digest, 2003). Patrick explains that a democracy is characterized by “electoral democracy in concert with such core concepts as representational government, constitutionalism, human rights, citizenship, civil society, and market economy,” citing Dahl, Robert Alan, (1998). *On Democracy*, New Haven, CT: Yale University Press. Patrick defines four qualities of a civic education for a democratic nation: “(1) civic knowledge, (2) cognitive civic skills, (3) participatory civic skills, and (4) civic depositions,” citing Patrick, John J. (1999) “Concepts at the Core of Education for Democratic Citizenship.” In Charles F. Bahmueller and John J. Patrick, Eds. *Principles and Practices of Education for Democratic Citizenship: International Perspectives and Projects*. Bloomington, In: ERIC Clearinghouse for Social Studies/Social Science Education. Patrick argues that students taught these skills and knowledge will more likely exhibit those qualities of participating in a healthy democracy, such as tolerance for others and high voting behavior.

⁵⁵ Bruce A. VanSledright, “What Does it Mean to Think Historically ... and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

⁵⁶ From Boyer’s “Turning Points: Preparing Youth for the 21st Century,” cited by Robert Kubey, “Media Literacy and the Teaching of Civics and Social Studies at the Dawn of the 21st Century,” *American Behavioral Scientist*, Vol. 48, No. 1, September 2004, 69-77.

⁵⁷ Wolk writes that “Being critically literate should be an integral part of good citizenship and a strong democracy...“The purpose of critical literacy is not to tell students what to think but to empower them with multiple perspectives and questioning habits of mind and encourage them to think and take action on their decisions through inquiry, dialogue, activism, and their daily decisions about how to live so that they can help make a better world.” (Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003.)

⁵⁸ Or, as Squire writes, “the processes of seeking out and engaging with multiple histories, practicing introspection, and exploring one’s own (multiple) identities.” (K. D. Squire (draft) “Civ III as a Geographical Simulation for World History Education.” Accessed on June 30, 2005 at labweb.education.wisc.edu/room130/PDFs/civ3-education-chapter.doc.)

Teaching students how to incorporate and navigate among multiple perspectives is not easy⁵⁹— in many ways, this type of history instruction is a huge “epistemological shift,”⁶⁰ because students learn that there is an inherently biased author behind the so-called facts. William Uricchio, in “Historicizing Media in Transition,” uses the example of Herodotus, known as the “father of history,” and Book Two of his *The Histories* to expose the “epistemological vertigo”⁶¹ that occurs when assumptions, reference points, and truths are overturned. In Book Two, Herodotus has such “vertigo” after visiting Egypt and realizing that his Greek culture is a lens through which he perceives the rest of the world. In creating his histories, Herodotus offers multiple possibilities and interpretations for how things happened; in this way, his process of writing history is akin to the Deconstructionist historian. Herodotus expressed that there was not one clear truth, but many different partial and sometimes contradictory truths.

In the K-12 classroom, to create this “vertigo,” history needs to be thought of as a process, a simulation, and an experiment. As Molebash argues, history studies needs to shift from “learning *about* history to the *doing* of history.”⁶² Just as we can set up classroom science experiments that express scientific principles and teach investigation and analysis, we need a history “laboratory” that simulates moments from history and allows students to experiment with social problems and practice critical thinking, reflection, and interpretation.⁶³

Paxton argues that, in general, history curricula where students are motivated to “think historically” and are working with historical evidence and concepts can help them begin to

⁵⁹ See, for example, Anita C. Danker, “Multicultural Social Studies: The Local History Connection,” *The Social Studies*. May/June 2003.

⁶⁰ Bruce A. VanSledright, “What Does it Mean to Think Historically ... and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

⁶¹ Discussed in William Uricchio, “Historicizing Media in Transition,” *Rethinking Media in Transition: The Aesthetics of Transition*. Edited by David Thorburn and Henry Jenkins. (Cambridge, MA: MIT Press, 2003).

⁶² Philip Molebash, “Web Historical Inquiry Projects,” in *Social Education*. 68(3): 226-229, 2004.

⁶³ As Brush and Saye argue, problem-based learning is often used in mathematics and science classrooms, but not in social studies and history classrooms, despite the espousal of such reforms. Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005.

practice the discipline of history.⁶⁴ This involves more than memorization of historic facts; it requires students to participate in learning activities that encourage empathy⁶⁵ and the understanding of alternative viewpoints, such as role-plays, authentic problems, recreations of historic events, field trips, interactions with primary documents, and debates of historic issues.⁶⁶ For example, “in problem-based learning activities, learners interact with a wide variety of resources, develop strategies for utilizing those resources to address authentic, content-specific problems, and present and negotiate solutions to those problems in a collaborative manner.”⁶⁷ It also involves encouraging students to question standardized texts and their assumptions,⁶⁸ and creating learning experiences that enable students to construct and generate their own questions, collect their own information, make their own connections, defend their conclusions, and write their own narratives of the past.^{69,70,71} Teachers should expose students to multiple viewpoints

⁶⁴ Richard J. Paxton, “A Deafening Silence: History Textbooks and the Students Who Read Them,” *Review of Educational Research*. 69(3): 315-339, 1999.

⁶⁵ “An ability to view the world from the perspective of another,” from Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005.

⁶⁶ Wolk explains, for example, how the “silenced voices can be brought to life in classrooms through poetry, oral histories, children’s literature, interviews, drama, videos and movies, music, newspapers, magazines, the Internet, field trips, and the local community” (Wolk, Stephen. (2003). “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106). See also Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005. (http://dp.crlt.indiana.edu/AERA_2005_BrushSaye.pdf) and John Hoge. “Teaching History for Citizenship in the Elementary School.” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003).

⁶⁷ Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005, citing Hannafin, Hill & Land, 1997.

⁶⁸ For example, teachers should seek to encourage questions such as, “Whose knowledge is this? Where did it come from? Whom might this knowledge (or perspective) benefit? What perspectives are missing? What voices are silenced?” (Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003.)

⁶⁹ Stephen Wolk, “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003.

⁷⁰ Philip Molebash, “Web Historical Inquiry Projects,” in *Social Education*. 68(3): 226-229, 2004. Molebash writes, “classroom inquiry has students asking their own questions, defining procedures for how to answer these questions, collecting their own or pre-existing information needed to answer the questions, manipulating the collected information, and ultimately defending the results of their investigation.”

⁷¹ Bruce A. VanSledright, “What Does it Mean to Think Historically...and How Do You Teach It?” *Social Education*. 68(3): 23-233, 2004.

until the students feel it is customary to seek out and incorporate other perspectives while constructing a history.^{72,73}

Similarly, the National Center for History's description of national history standards⁷⁴ expresses the appeal of "doing history," which they say includes "encounters with historical documents, eyewitness accounts, letters, diaries, artifacts, photos, a visit to a historic site."⁷⁵ The architects of this document argue that an even richer educational experience occurs when students are exposed to people with differing views or diverse backgrounds, and that historic understanding develops when students conduct their own investigations of evidence⁷⁶ (including the

⁷² "Diverse materials should be used to present diverse viewpoints. Students should become comfortable with the fact that often there is more than one perspective, and rather than believing only one version, they should learn to expect and seek out multiple viewpoints." (Masato Ogawa, "Building Multiple Historical Perspectives: An Investigation of How Middle School Students are Influenced by Different Perspectives," paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001), citing C.E. Sleeter & C.A. Grant, *Making Choices for Multicultural Education: Five Approaches to Race, Class, and Gender*, (Upper Saddle River, NJ: Prentice Hall, 2001).

⁷³ Howard Gardner, in describing his theory of multiple intelligences, uses the American Revolution to show the importance of incorporating other perspectives in history education: "We almost always study it from the point of view of U.S. history: the Tories are bad, the colonists are good, and in the end goodness triumphs. Read about the American Revolution from the British perspective, though, and things appear quite different: The American Revolution isn't a revolution, it's a rebellion—a revolt of those dastardly colonists...If you approach a topic from different perspectives, you get a much richer view about what the American Revolution, or Yankee Uprising, was really like." In Howard Gardner's "Educating for Understanding," *The American School Board Journal* 180, No. 7 (July 1993), pg. 24.

⁷⁴ The National Center for History in the School's standards are intended as voluntary guidelines, according to Mimi Coughlin. The standards caused much debate and controversy, particularly by Lynne Cheney, in terms of the examples it used and the narratives it told about the United States. (Mimi Coughlin, "Teaching History: Personal and Public Narratives," paper presented at the Annual Meeting of the American Educational Research Association (84th, Chicago, IL, April 21-25, 2003). For an in-depth look at the debates over the content of history education in public schools, see Jonathan Zimmerman's *Whose America? Culture Wars in the Public Schools*. Cambridge, Mass: Harvard University Press, 2002.

⁷⁵ National Center for History in the Schools, *Standard 4: Historical Research Capabilities*. For the complete description, see <http://nchs.ucla.edu/standards/thinking5-12-4.html>

⁷⁶ The National Center for History description of Standard 4 expands on the idea of historic inquiry by supplying the types of questions a historian must ask: "Historical inquiry proceeds with the formulation of a problem or set of questions worth pursuing. In the most direct approach, students might be encouraged to analyze a document, record, or site itself. Who produced it, when, how, and why? What is the evidence of its authenticity, authority, or credibility? What does it tell them of the point of view, background, and interests of its author or creator? What else must they discover in order to construct a useful story, explanation, or narrative of the event of which this document or artifact is a part? What interpretation can they derive from their data, and what argument can they support in the historical narrative they create from the data?" (National Center for History in the Schools, *Standard 4: Historical Research Capabilities*. For the complete description, see <http://nchs.ucla.edu/standards/thinking5-12-4.html>)

information in their textbooks) and begin to create their own narratives of what happened.⁷⁷ Similarly, for middle school students, the International Society for Technology in Education (ISTE)⁷⁸ recommends that students be expected to: “Identify and use processes important to reconstructing and reinterpreting the past, such as using a variety of sources, providing, validating, and weighing evidence for claims, checking credibility of sources, and searching for causality.”⁷⁹ The ISTE standards also state that high school students should be able to “systematically employ processes of critical historical inquiry to reconstruct and reinterpret the past...[and] investigate, interpret, and analyze multiple historical and contemporary viewpoints within and across cultures related to important events...while employing empathy, skepticism, and critical judgment.”⁸⁰ In other words, ISTE supports the teaching and practice of specific historic inquiry skills, such as the ability to address, critique, and navigate multiple historic viewpoints. Students should not only know historic content; they need to know how to reconstruct, analyze, and interpret historical evidence.

Likewise, Hoge writes that, “powerful history instruction involves helping students (a) acquire a meaningful understanding of key historical themes and important people and events from local, state, and national history, (b) build experience-based knowledge of the methods and limitations of history, and (c) confront multiple perspectives—including mainstream interpretations—of the past.”⁸¹ I used these guidelines to anchor my pedagogical objectives for creating “Reliving the Revolution”:

⁷⁷ National Center for History in the Schools, *Standard 4: Historical Research Capabilities*. For the complete description, see <http://nchs.ucla.edu/standards/thinking5-12-4.html>

⁷⁸ The ISTE creates educational technology standards called the National Educational Technology Standards (NETS) and promote proper use of technologies for learning, particularly for K-12. See www.iste.org for more information.

⁷⁹ As described on the ISTE website at cnets.iste.org/currstands/cstands-ss_ii.html, accessed on June 30, 2005.

⁸⁰ As described on the ISTE website at cnets.iste.org/currstands/cstands-ss_ii.html, accessed on June 30, 2005.

⁸¹ John Hoge. “Teaching History for Citizenship in the Elementary School.” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, In: ERIC Digest, 2003).

(a) Acquire a Meaningful Understanding of Key Historical Themes and People
(1) Understand better the people and leaders involved in the Battle of Lexington and the American Revolution
(2) Become more aware of the social, economic, geographic, and political forces surrounding the Battle of Lexington and the American Revolution
(3) Learn more about a local historic site and how it functioned in the past.
(b) Build Knowledge of the Methods and Limitations of History
(4) Question sources and authorial intent of evidence; identify biases in evidence;
(5) Create hypotheses, and draw inferences and conclusions based on historical evidence;
(6) Consider the limits of historical methods and representations of the past
(c) Confront Multiple Perspectives and Mainstream Interpretations of the Past
(7) Understand and critique master narratives of the Revolutionary War, the Battle of Lexington and history in general
(8) View, seek out, consider and manage multiple views of the Battle of Lexington and other historic moments
(9) Reflect on ones' own perspective on the past and recreations of events

“Some researchers have suggested that rich, authentic contexts that can be facilitated by multimedia environments encourage students to become engaged with the content, explore more deeply, and develop more complex views of issues...tools and resources available in multimedia learning environments may be used to help scaffold more disciplined inquiry into ill-structured problems.”⁸² For example, results of Brush and Saye’s research on using a problem-based multimedia learning environment to teach students about the civil rights movement suggested that students developed greater engagement with the social problem and more empathy for alternative perspectives; they began to change their assumptions about the nature of history and the importance of historic inquiry.⁸³ How can other multimedia platforms for learning, specifically AR games such as “Reliving the Revolution,” support problem-based historic inquiry?

⁸² Thomas Brush and John Saye, “The Effects of Multimedia-Supported Problem-Based Historical Inquiry on Student Engagement, Empathy, and Assumptions about History,” AERA paper presented, 2005.

⁸³ Ibid.

CHAPTER TWO

USING GAMES FOR LEARNING

NOT JUST FUN AND GAMES

When I was in elementary school, I spent hours playing *Where in the World is Carmen Sandiego?*⁸⁴ and all of its various spin-offs,⁸⁵ which inspired me to then spend hours poring through its related reference books. Geography, as such, became a personal passion, and I had captured knowledge while capturing Carmen and her henchmen.



Geographic concepts were accessible to me because they were part of my extracurricular repertoire of play. In my educational toy chest, I played with a puzzle of the 50 states, interacted with geography video games, and spun a globe in my den. I enjoyed my journeys through geographic games so much that I did not realize how much I had learned until I won a school-wide geography bee.

In part, I learned geography by playing these games because I was intrinsically motivated⁸⁶ by the game play. While I could have also learned geography in the classroom through more typical pedagogical methods, such as tests or projects, I was driven to seek outside-the-game resources, such as encyclopedias or atlases, because I wanted to master the game. I had fun figuring out facts about foreign countries because of *Carmen*, and I was excited to learn the state capitals because this learning was embedded in the game play. Playing with geographic concepts also

⁸⁴ Broderbund, 1985

⁸⁵ Including “Where in the USA is Carmen Sandiego?” (1986), “Where in Time is Carmen Sandiego?” (1989) computer games and various spin-offs into other media, such as a game show, cartoon, and a film.

⁸⁶ For the importance of motivation in learning, see Edward Deci, “Motivational and Emotional Controls of Cognition,” *System Principles*, 1967. In Seymour Papert’s “Hard Fun,” he writes that kids enjoy working at activities if they are matched to the desires of the individual and the needs of society, whereas the kids become more motivated from within. “Hard Fun” accessed on September 25, 2004 at www.papert.org/articles/HardFun.html.

made them more accessible and personally meaningful, and constructing my knowledge of the real world from within the game world made the abstract more tangible.

WHO WANTS TO PLAY?

As games become an increasingly popular form of entertainment, understanding their potential for learning becomes more essential. While games have always been a source of entertainment—from baseball to board games—digital games⁸⁷ are rapidly growing in their market share of this lucrative sector. According to Ben Sawyer of DigitalMill, “Games are the fastest-growing entertainment business and represent billions in worldwide revenue.”⁸⁸ In 2004, there were retail sales of video games coming in just under \$10 billion⁸⁹ and \$28 billion worldwide.⁹⁰ The demographics of game players is changing too: in 2004, the average age is 29 (the typical age range of game consumers is from 18–35), and one third of gamers are women.⁹¹ The new workforce will likely have grown up playing games. According to an MIT report by Henry Jenkins and Kurt Squire, a survey of freshman at MIT suggested that students are playing games often and spending more time on games than television or non-academic reading.⁹² Oblinger writes that the “average 8th grader plays video games for approximately 5 hours a week. . . . ‘by high school 77% of respondents had played computer games and over two-thirds (69%) had been playing video games since elementary school.’”⁹³ Their game playing is highly social; many of

⁸⁷ This term is used similarly as in Sarah Ellinger and Dan Perkel, “Appendix C: Games,” part of “Literature Review: Kids’ Informal Learning and Digital-Mediated Experiences” by Peter Lyman, 2005 (unpublished draft). There, they write that digital games includes “electronic games played on various platforms, including personal computers, dedicated consoles, and mobile phones and devices.”

⁸⁸ Ben Sawyer, “Not Just Playing Games,” *Threshold*, Summer, draft, 2005.

⁸⁹ According to the NPD Group’s annual 2004 U.S. video game industry retail sales report at: http://www.npdfunworld.com/funServlet?nextpage=pr_body.html&content_id=2076

⁹⁰ Dan Lowenstein’s Electronic Entertainment Expo 2005 State of the Industry Address. Also, compare that to \$45 billion in the worldwide film industry. Price Waterhouse Coopers estimates that by 2008, video games will exceed music to become the second most popular form of entertainment in the world (\$33 billion for recorded music, and \$55 billion for video games). Dan Lowenstein’s Electronic Entertainment Expo 2005 State of the Industry Address, accessed on June 1, 2005: http://www.theesa.com/archives/2005/05/e3_2005_state_o_1.php.

⁹¹ Entertainment Software Association State of the Industry Address (2004). Accessed at: http://www.theesa.com/archives/2004/05/e3_2004_state_o_1.php

⁹² Kurt Squire and Henry Jenkins, “Harnessing the Power of Games in Education.” *Insight*. Vol. 3, 2003. They write, “88 percent of them had played games before they were 10 years old, and more than 75 percent of them were still playing games at least once a month. By comparison, only 33 percent spend an hour or more a week watching television, and only 43 percent spend an hour or more per week reading anything other than assigned textbooks.”

⁹³ Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004.

them play in groups or against each other, and they share strategies in online and offline communities.⁹⁴

Although video games have become a popular form of entertainment, there has been less acceptance of the pedagogical potential of games, despite research that supports the use of games and simulations in education.⁹⁵ Researchers suggest that digital games can be incorporated into educational programs, not as replacements for standard curricula, but as enhancements of other modes of instruction.⁹⁶ According to a 2001 U.K. Home Office report, “those who play computer and video games regularly are more likely to be academically successful, to go to University and to have better employment prospects.”⁹⁷ In a meta-analysis of studies on games and learning, Maja Pivec notes that “Eight out of eleven studies showed that retention is better when using game-based learning, whereas the results of the three studies showed no significant difference. Researching students’ preference, results of seven studies out of the either were in favor of games.”⁹⁸ Although many students believe that games could be used in education, a study cited by Oblinger found that 69% had never played a game in the classroom.⁹⁹

Some researchers argue that learners who are growing up on games and getting a daily dose of digital media might also need digitally-compatible educational nourishment. Oblinger contends that most students today are “accustomed to operating in a digital environment for

⁹⁴ Ibid.

⁹⁵ See for example E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003 or James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, New York, NY: Palgrave Macmillan, 2003.

⁹⁶ Games would not replace teachers either; in fact, teachers are necessary support for helping students achieve the potential of games as a learning environment. For kids to get the educational benefits from games suggested by Johnson and others, Healy says they need to be supervised by an adult who understands learning and games and can encourage them to reflect on what they're doing when they play. This takes time, she says: “sometimes more teacher time and energy to do it right than it would to teach a standard lesson.” As quoted in: Jim McClellan, “Playtime in the Classroom,” *The Guardian*, June 2, 2005. Accessed on June 2, 2005 at <http://education.guardian.co.uk/elearning/story/0,10577,1496931,00.html>.

⁹⁷ Aleks Krotoski, “Game for Learning,” *TechnologyReview.com*, 2005, http://www.technologyreview.com/articles/05/04/wo/wo_040605krotoski.1.asp. Accessed on June 7, 2005.

⁹⁸ Maja Pivec, Olga Dziabenko, and Irmgard Schinnerl, “Aspects of Game-Based Learning,” http://www.unigame.net/html/I-Know_GBL-2704.pdf. Accessed on June 16, 2005.

⁹⁹ As referenced in Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004. by a survey by Steve Jones, “Let the Games Begin: Gaming Technology and Entertainment Among College Students,” 2003.

communication, information gathering and analysis”:¹⁰⁰ Students age 13-17 are heavily involved with digital media, particularly games.¹⁰¹ Prensky, in *Digital Game-Based Learning*, posits that learners are changing in terms of their expectations and the way that they are interacting with educational material.¹⁰² He proposes games as another method for appropriately instructing these “new” learners and meeting the needs of those students who might flourish under this form of learning.¹⁰³ Dede argues that new learners exhibit a “Neomillennial Learning Style” that is characterized by the use of multiple forms of media, collaborative learning, experiential, reflective, and mentored learning, nonlinear expressions of ideas and creating individualized learning experiences.¹⁰⁴ Teachers need to create educational experiences that reflect Neomillennial learning styles and approaches, which could include media such as games.

GAMES AS TEACHER

“[Good games] situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world. That’s not all that bad—and people get wildly entertained to boot. No wonder it is hard for today’s schools to compete.”

—James Gee¹⁰⁵

¹⁰⁰ Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004.

¹⁰¹ Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004, pg. 3.

¹⁰² Prensky’s list of the 10 major ways that learners are different include:

1. Twitch speed vs conventional speed
2. Parallel processing vs linear processing
3. Graphics first vs text first
4. Random access vs step by step
5. Connected vs stand alone
6. Active vs passive
7. Play vs work
8. Pay-off vs patience
9. Fantasy vs reality
10. Technology as friend vs technology as foe

(Marc Prensky, *Digital-Game Based Learning*. (New York: McGraw-Hill, 2004)).

¹⁰³ Marc Prensky, *Digital-Game Based Learning*. New York: McGraw-Hill, 2004.

¹⁰⁴ Chris Dede writes, “Fluency in multiple media and in simulation-based virtual settings, communal learning involving diverse, tacit, situated experience, and with knowledge distributed across a community and a context as well as within an individual, a balance among experiential learning, guided mentoring, and collective reflection; expression through nonlinear, associational webs of representations; co-design of learning experiences personalized to individual needs and preferences.” (Chris Dede, “Planning for Neomillennial Learning Styles,” *Educause Quarterly*. No. 1., 2005)

¹⁰⁵ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003), pg. 48.

For his doctoral research, Kurt Squire adapted *Civilization III*¹⁰⁶ for use in a classroom setting to test the use of games to simulate social studies systems (such as politics, economics, and geography) “to show how students to understand the positionality and theoretical assumptions behind any representation of history.”¹⁰⁷ Squire’s research suggested that the students were more motivated to consult reference history books and maps in order to play *Civilization III* better: “Failure to understand basic facts (such as where the Celts originated) drove them to learn.”¹⁰⁸ Using *Civilization III* in the classroom changed the discipline of history from one of “memorizing facts and mastering sanctioned narratives”¹⁰⁹ to that of investigating historic models, social systems, and methods of historic inquiry.



Similarly, researchers have argued that games can teach a wide range of skills, and can adapt to students’ learning styles and pace of mastery.^{110, 111} Jim Gee, in *What Video Games Have to Teach Us About Learning and Literacy*, outlines 36 different learning principles integrated into good games. For example, he explains that “good” games¹¹² are compelling environments for learning a semiotic domain,¹¹³ upholding or pulling apart one’s beliefs, trying on or altering

¹⁰⁶ Created by Sid Meier and published by Atari, 2001.

¹⁰⁷ K. D. Squire (draft) *Civ III as a Geographical Simulation for World History Education*. Accessed on June 30, 2005 at labweb.education.wisc.edu/room130/PDFs/civ3-education-chapter.doc.

¹⁰⁸ For example, Kurt Squire and Sasha Barab, “Replaying History: Engaging Urban Underserved Students in Learning World History Through Computer Simulation Games,” (accessed at <http://labweb.education.wisc.edu/room130/PDFs/squire01.pdf> on June 10, 2005)

¹⁰⁹ Kurt Squire and Sasha Barab, “Replaying History: Engaging Urban Underserved Students in Learning World History Through Computer Simulation Games,” (accessed at <http://labweb.education.wisc.edu/room130/PDFs/squire01.pdf> on June 10, 2005)

¹¹⁰ Henry Jenkins, “Game Theory,” TechnologyReview.com, http://www.techreview.com/articles/02/03/wo_jenkins032902.asp, 2002. Accessed on June 16, 2005.

¹¹¹ Also, for example, Henry Jenkins argues that “games do offer teachers enormous resources they can use to make their subject matter come alive for their students, motivating learning, offering rich and compelling problems, modeling the scientific process and the engineering context and enabling a more sophisticated assessment mechanisms.” Henry Jenkins, “Game Theory,” TechnologyReview.com, http://www.techreview.com/articles/02/03/wo_jenkins032902.asp, 2002. Accessed on June 16, 2005.

¹¹² James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003), pg. 46, or ones that are crafted to “encourage and facilitate active and critical learning.”

¹¹³ Writes Gee, “By a semiotic domain I mean any set of practices that recruits one or more modalities (e.g., oral or written language, images, equations, symbols, sounds, gestures, graphs, artifacts, etc.) to communicate distinctive

one's identity or affinities, establishing the rubrics and tools for problem solving and then transferring learning to related domains, reflecting on one's own abilities, and going back and forth among modes of knowledge (such as text, images and symbols).¹¹⁴

Games provide an environment in which players strive to complete their objectives, further motivating the player to attain those goals that they may not necessarily meet.¹¹⁵ Players cannot be passive during the game; they must actively perform to discover and remember information, find solutions, and transfer learning from other contexts.¹¹⁶ Games motivate students to learn because they can, for example, direct students to solve problems and seek other resources. This directed play, which uses a set of rules and objectives, can generate engagement and motivation.¹¹⁷

Games can also push learners to be more involved with educational material because they have the power to spark interest, maintain attention, and make its content more personally meaningful.¹¹⁸ Indeed, Mitchel Resnick, when describing why students become more interested in learning activities that are personally related, quotes Edward Deci, who argues that “Self-

types of meanings.” James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003), pg. 18, 207.

¹¹⁴ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

¹¹⁵ Keri Facer, “Computer Games and Learning: Why Do We Think it’s Worth Talking about Computer Games and Learning in the Same Breath?” Nesta FutureLab website.

<http://www.nestafuturelab.org/research/discuss/02discuss01.htm>. Accessed on June 10, 2005. Ben Williamson & Kerry Facer, “More Than ‘Just a Game’: the Implications for Schools of Children’s Computer Games Communities,” *Education, Communication, and Information*, Vol. 4, No. 2/3, July/Nov. 2004).

¹¹⁶ Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004.

¹¹⁷ Keri Facer, “Computer Games and Learning: Why Do We Think it’s Worth Talking about Computer Games and Learning in the Same Breath?” Nesta FutureLab website.

<http://www.nestafuturelab.org/research/discuss/02discuss01.htm>. Accessed on June 10, 2005. Ben Williamson & Kerry Facer, “More Than ‘Just a Game’: the Implications for Schools of Children’s Computer Games Communities,” *Education, Communication, and Information*, Vol. 4, No. 2/3, July/Nov. 2004).

¹¹⁸ Henry Jenkins, “Game Theory,” TechnologyReview.com, http://www.techreview.com/articles/02/03/wo_jenkins032902.asp.2002. Accessed on June 16, 2005; Keri Facer, “Computer Games and Learning: Why Do We Think it’s Worth Talking about Computer Games and Learning in the Same Breath?” Nesta FutureLab website. <http://www.nestafuturelab.org/research/discuss/02discuss01.htm>. Accessed on June 10, 2005. Ben Williamson & Kerry Facer, “More Than ‘Just a Game’: the Implications for Schools of Children’s Computer Games Communities,” *Education, Communication, and Information*, Vol. 4, No. 2/3, July/Nov. 2004).

motivation, rather than external motivation, is the heart of creativity, responsibility, healthy behavior, and lasting change.”¹¹⁹ Similarly, Thomas and Schott discuss the importance of creating a game where players are not extrinsically motivated (compelled by an outside or external reward), but are intrinsically motivated (through personal enjoyment and accomplishment) to successfully complete the game.¹²⁰

Games encourage play,¹²¹ which may relate to motivation, learning, and openness to new ideas, as well as the nebulous “fun factor.”¹²² Play can involve interacting with real-world mechanisms and processes, without the real-world consequences: it is “optimal generic learning by experimentation in a relaxed field.”¹²³ When we play, we often perform “unusually challenging and difficult activities,”¹²⁴ and play often requires deep thought and concentration. Resnick discusses how, through play, kids naturally learn, discover, and experiment.¹²⁵

Experiences—such as serious play¹²⁶—that offer just the right amount of challenge and potential for learning, as well as fun and pleasure, are more deeply immersive, engaging, and fulfilling. This is similar to Papert’s conception of “hard fun,”¹²⁷ where activities such as writing,

¹¹⁹ Mitchel Resnick, “Edutainment? No Thanks. I Prefer Playful Learning.” *Associazione Civita Report on Edutainment*. Unpublished copy, 2004. <http://web.media.mit.edu/~mres/papers/edutainment.pdf>.

¹²⁰ S. Thomas, G. Schott, and M. Kambouri, “Designing for Learning or Designing for Fun? Setting Usability Guidelines for Mobile Educational Games,” *Proceedings of MLEARN 2003: Learning with Mobile Devices*, London, 2003.

¹²¹ Rieber defines play as being voluntary, intrinsically motivating, actively engaging, and distinct from normal behavior (i.e., it involves some element of pretend). (Lloyd Rieber, “Seriously Considering Play,” *Educational Technology Research & Development*, 44(2), 43-58, 1996.)

¹²² Play is not contrary to work; rather, play is active and can be serious. See for example, Lloyd Rieber, “Seriously Considering Play,” *Educational Technology Research & Development*, 44(2), 43-58, 1996 and Johan Huizinga, *Homo Ludens: A Study of the Play Element in Culture*, Roy Publishers, 1950.

¹²³ Keri Facer, “Computer Games and Learning: Why Do We Think it’s Worth Talking about Computer Games and Learning in the Same Breath?” NESTA FutureLab website.

<http://www.nestafuturelab.org/research/discuss/02discuss01.htm>. Accessed on June 10, 2005. Ben Williamson & Kerry Facer, “More Than ‘Just a Game’: the Implications for Schools of Children’s Computer Games Communities,” *Education, Communication, and Information*, Vol. 4, No. 2/3, July/Nov. 2004).

¹²⁴ Lloyd Rieber, “Seriously Considering Play,” *Educational Technology Research & Development*, 44(2), 43-58, 1996

¹²⁵ Mitchel Resnick, “Edutainment? No Thanks. I Prefer Playful Learning. Associazione Civita Report on Edutainment,” Unpublished copy, 2004. Available at <http://web.media.mit.edu/~mres/papers/edutainment.pdf>

¹²⁶ Lloyd Rieber, “Seriously Considering Play,” *Educational Technology Research & Development*, 44(2), 43-58, 1996

¹²⁷ Seymour Papert, “Hard Fun,” 1994, accessed at <http://www.papert.org/articles/HardFun.html>

programming, or design could be demanding but fun—and part of the pleasure are its challenges. Fun and engagement seem to matter for learning. This makes sense, as Shneiderman argues, because “Children often link the idea of fun to challenges, social interaction, and control over their world.”¹²⁸

When an individual engages in play, s/he may be more ready to accept and internalize new knowledge and ways of thinking and may be able to grasp more complex ideas or solve more intricate problems. This possibly occurs because of the idea of Csikszentmihalyi’s flow state, defined in games by Lyman as “losing a sense of time and becom[ing] lost in the activity.”¹²⁹ According to Prensky’s interpretation, one is in the flow state when “the challenges presented and your ability to solve them are almost perfectly matched, and you often accomplish things that you didn’t think you could, along with a great deal of pleasure.”¹³⁰ Play might enable a learner to solve problems that they might otherwise not be able to address in a different state of mind.¹³¹

Furthermore, the subversion of master narratives and the simultaneous introduction of agency and power are intrinsic to games. Through play we can access and perform norms, and we can also redefine and overturn them. In *Homo Ludens*, Huizinga explains that playing reflects cultural norms and practices, or “constitutes forms and modalities of meaning that facilitate the norms and codes of societal semiotics.”¹³² On the other hand, in *Rules of Play*, Salen and Zimmerman argue that, in play and gaming, there is a “resistance of social norms or established

¹²⁸ Ben Shneiderman, “Designing for Fun: How Can We Design User Interfaces to Be More Fun?” *Interactions*, “Special Issue on Fun,” September and October 2004.

¹²⁹ Peter Lyman, “Literature Review: Kids’ Informal Learning and Digital-Mediated Experiences,” 2005 (unpublished draft)

¹³⁰ Marc Prensky, *Digital-Game Based Learning*. (New York: McGraw-Hill, 2004).

¹³¹ Keri Facer, “Computer Games and Learning: Why Do We Think it’s Worth Talking about Computer Games and Learning in the Same Breath?” NESTA FutureLab website.

<http://www.nestafuturelab.org/research/discuss/02discuss01.htm>. Accessed on June 10, 2005, Ben Williamson & Kerry Facer, “More Than ‘Just a Game’: the Implications for Schools of Children’s Computer Games Communities,” *Education, Communication, and Information*, Vol. 4, No. 2/3, July/Nov. 2004).

¹³² As discussed in Bo Kampmann Walther, “Playing and Gaming: Reflections and Classifications,” in *Game Studies*, May 2003. Quoting Johan Huizinga, *Homo Ludens: A Study of the Play Element in Culture*, Roy Publishers, 1950.

practices,” and that “games intrinsically support and encourage the movement of free play.”¹³³ Children may be drawn to games because they feel they have more authority can transgress rules and boundaries. They can also, as Gee describes, take risks in the game world that they otherwise could not do in the real world.¹³⁴ In play, there is a balance between vertigo and stasis, between overturns and right-side-ups—“play emerges in the space between the constraint of detail and the exhilaration of improvisation.”¹³⁵ Play allows us to try on a new perspective, but to also understand our standard one, so that we can properly reflect on both.

The following is an overview of some potential characteristics of games that could support learning, based on current research on digital games:

1. Games can teach skills and content^{136,137}
2. Games can support different learning styles¹³⁸
3. Games can model and simulate real-world processes¹³⁹
4. Games can be used in assessment¹⁴⁰
5. Games can support social interaction^{141,142}

¹³³ Katie Salen and Eric Zimmerman, *Rules of Play*. (Cambridge, MA: MIT Press., 2003).

¹³⁴ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

¹³⁵ William Urichhio, “Simulations, History, and Computer Games.” (forthcoming) Cambridge, MA: MIT Press, 2005.

¹³⁶ For example, students are more likely “to develop conceptual frameworks that integrate prior knowledge into understanding” when they are more interested in the learning. Thomas M. Sherman and Barbara L. Kurshan, “Constructing Learning: Using Technology to Support Teaching for Understanding,” *Learning & Leading with Technology*, 32:5, 2005.

¹³⁷ See for example, Sarah Ellinger and Dan Perkel, “Appendix C: Games,” part of “Literature Review: Kids’ Informal Learning and Digital-Mediated Experiences” by Peter Lyman, 2005 (unpublished draft), pg. 6.

¹³⁸ See for example, James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

¹³⁹ For example, James Gee argues that “academic areas, like biology or history, are themselves like games,” so using a game to simulate the activities of a biologist or historian is appropriate, and adds to the activity’s authenticity. Moreover, using games to simulate processes make a discipline and its questions more engaging than simply presenting puzzles or problems. Quoted in Jim McClellan, “Playtime in the Classroom.” *The Guardian*, June 2, 2005. <http://www.guardian.co.uk/online/story/0,3605,1496803,00.html>. Accessed on June 5, 2005. McClellan quotes James Gee as arguing that, “Scientists act and interact in terms of certain identities and values and use knowledge and information to accomplish certain sorts of goals. So learning science should be about learning how to ‘play the game’ of science. Games could do this as well, since they are based on taking on distinctive identities in order to act and value in certain ways.”

¹⁴⁰ For example, games can reinforce teachers’ assessments, because they can examine their students’ decision-making and problem-solving processes during realistic situations. Games can be used as one of a number of assignments or sections on a test. See for example Henry Jenkins, “Game Theory,” TechnologyReview.com, 2002. http://www.techreview.com/articles/02/03/wo_jenkins032902.asp. Accessed on June 16, 2005

¹⁴¹ For example, games can also support social interaction, which can lead to greater engagement and understanding of material. Students can learn from each other: Henry Jenkins argues that “peer-to-peer teaching reinforces mastery.” Similarly, Seymour Papert argues that participating in an activity where you can learn from, teach, and

6. Games can motivate learning^{143,144}
7. Games can support reflection¹⁴⁵
8. Games can enhance sense of agency¹⁴⁶
9. Games can help support identity formation¹⁴⁷

“AUGMENTING” LEARNING

“A singular country, superior to all the others, as Art is to Nature, where the latter is transformed by the dream, where it is corrected, embellished, recast.”

—Charles Baudelaire¹⁴⁸

In a San Francisco museum called the Exploratorium, students use handheld computers at its exhibits to access additional information and to “capture” data for later study and discussion.¹⁴⁹ Across the world in Italy, game players of VeGame explore Venice by embarking on a handheld computer-enabled virtual treasure hunt through the city, which helps them learn about the history, culture, and art of Venice.¹⁵⁰ In a midwestern classroom, students simulate the spread of

share ideas with others, can help foster deeper learning through a more meaningful engagement with that activity. Games are one such activity that can enhance the sharing of ideas and collaborative learning. Henry Jenkins, (2002). “Game Theory,” TechnologyReview.com, 2002, http://www.techreview.com/articles/02/03/wo_jenkins032902.asp. Accessed on June 16, 2005

¹⁴² Also see Sarah Ellinger and Dan Perkel, “Appendix C: Games,” part of “Literature Review: Kids’ Informal Learning and Digital-Mediated Experiences” by Peter Lyman, 2005 (unpublished draft) and James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

¹⁴³ Henry Jenkins, in describing the impetus for the Games-To-Teach Project at MIT, explains that “Games push learners forward, forcing them to stretch in order to respond to problems just on the outer limits of their current mastery”; it compels them to create and apply novel solutions, to expand their knowledge base, or to seek out other resources to advance their progress. Henry Jenkins, “Game Theory,” TechnologyReview.com, 2002, http://www.techreview.com/articles/02/03/wo_jenkins032902.asp. Accessed on June 16, 2005

¹⁴⁴ See for example, James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

¹⁴⁷ Ibid., pg. 139.

¹⁴⁸ Charles Baudelaire, “L’Invitation au voyage,” as quoted in Sophie Biriotti, *Gardens of the Imagination*, Chronicle Books, 1999.

¹⁴⁹ This is part of the Electronic Guidebook project at San Francisco’s Exploratorium. See for information, www.exploratorium.edu/guidebook/. See also, Robert Semper and Mirjana Spasojevic, “The Electronic Guidebook: Using Portable Devices and a Wireless Web-based Network to Extend the Museum Experience,” In *Museums and the Web 2002: Proceedings*. 2002.

¹⁵⁰ See Francesco Bellotti, et al., “VeGame: Exploring Art and History in Venice,” *Computer*. IEEE Computer Society, 2003.

disease by playing a collaborative game called “Cooties” using networked handheld computers.¹⁵¹

The penetration of mobile handheld devices, such as PDAs (personal digital assistants) and cell phones is increasing; almost 55% of Americans carry a cell phone.^{152,153} Mobile handheld devices are becoming increasingly popular in education because of their low cost, flexibility, accessibility, wireless capability, portability, and ease of use.^{154,155} Mobile technologies may also be particularly effective for reaching Prensky’s new learners, and adapting to students with a Neomillennial Learning style.¹⁵⁶ Dede argues that ubiquitous computing¹⁵⁷ and mobile wireless devices will shape learning over the next 10 years,¹⁵⁸ making this an important area for study. New learners seem to favor more experiential and collaborative learning activities,¹⁵⁹ which may be supported by these uses of handheld computers.

Typically, handheld devices are used in the classroom to teach basic skills such as graphing or vocabulary-building.¹⁶⁰ Educational settings may not yet fully capitalize on the social and collaborative affordances of handhelds. Handheld devices can be networked with and transfer information among other devices, which could enable a group to share information and participate in a distributed learning environment. The mobility of handhelds may also enhance

¹⁵¹ See for example, Jean Shields and Amy Poftak, “A Report Card on Handheld Computing: Case Study: A Palm Learning Unit for Middle School.” *Teaching & Learning*, 2002.

http://www.techlearning.com/db_area/archives/TL/2002/02/handhelda.html, accessed on October 12, 2004.

¹⁵² Edward Dieterle, “Handheld Devices for Ubiquitous Learning and Analyzing” (review paper, draft), 2005. citing S. Baker and H. Green, “Big Bang! Digital Convergence is Finally Happening,” 2004.

¹⁵³ For example, “55 percent of Americans now carry cell phones, and the first data services—radio, photos and short data clips—are starting to take off,” according to Chris Dede, “Planning for Neomillennial Learning Styles,” *Educause Quarterly*. No. 1., 2005.

¹⁵⁴ E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003 and C. Dede, “Enabling Distributed-Learning Communities via Emerging Technologies.” Proceedings of the 2004 Conference of the Society for Information Technology in Teacher Education (SITE), pp. 3-12. Charlottesville, VA: American Association for Computers in Education, 2004.

¹⁵⁵ Edward Dieterle, “Handheld Devices for Ubiquitous Learning and Analyzing” (review paper, draft), 2005.

¹⁵⁶ Chris Dede, “Planning for Neomillennial Learning Styles,” *Educause Quarterly*. No. 1., 2005.

¹⁵⁷ This type of computing, also known as pervasive computing, integrates computers into the environment. For more information, see <http://www.ubiq.com/hypertext/weiser/UbiHome.html>.

¹⁵⁸ Chris Dede, “Planning for Neomillennial Learning Styles,” *Educause Quarterly*. No. 1., 2005.

¹⁵⁹ Diana Oblinger, “The Next Generation of Educational Engagement.” *Journal of Interactive Media in Education*, Vol. 8., 2004.

¹⁶⁰ See <http://k12handhelds.com/101list> and PalmONE’s education website: <http://www.palmone.com/us/education/studies/#k12>

their social potential. In everyday life, people often use “their mobility and the mobility of artifacts to coordinate their collaboration with others,”¹⁶¹ such as paper documents or moving to a colleague’s computer in a workplace. Danesh et al. argues that the mobility of handheld devices can enhance inter-group collaboration: “Children can walk around, maintaining the flexibility of interacting with many other children, rather than limiting their collaboration to those on the computer beside them.”¹⁶²

Educators also may not fully make use of other aspects of this device’s ubiquity.¹⁶³ Advances in wireless handheld computers (or PDAs, personal digital assistants), mobile phones, location-determining technologies such as GPS (Global Positioning Software), wireless standards (such as 802.11), and RFID (Radio Frequency Identification tags) allow people to use mobile technologies to interact with the physical environment. This provides a new opportunity for people to play computer games without being tied to a desktop or an unwieldy laptop, and thus enables people to play digital games that teach them about a specific site while they are actually exploring that location. Users can access (location and context aware) digital information from anywhere in the real world, connecting the real to the virtual world, which can potentially change the way people interact with each other, their environment, and their education. Digital games played on portable handheld devices have been available for over twenty years—first in the form of GameBoys and Apple’s Newton, and now in next generation products such as the Sony PSP (Playstation Portable) and GameBoy Advanced.

Mobile educational games usually fall into two main groups: AR games and participatory simulations. In participatory simulation games, participants rely on each other to gather information and/or test hypotheses to better understand the underlying mechanism of a system or

¹⁶¹ Helen Cole and Danae Stanton, “Designing Mobile Technologies to Support Co-Present Collaboration.” *Personal Ubiquitous Computing*. Vol. 7: 365-371, 2003.

¹⁶² Arman Danesh, et. al. “Geney: Designing a Collaborative Activity for the Palm Handheld Computer.” *CHI 2001*. Vol. 3, No. 1., 2001.

¹⁶³ For example, schools do not take advantage of handhelds’ “connectivity, location sensitivity, and context awareness, nor do they make considerations for ubiquity, which would make the ‘real-world environment’ an ‘intrinsic and meaningful game element.’” (S. Thomas, G. Schott, and M. Kambouri, “Designing for Learning or Designing for Fun? Setting Usability Guidelines for Mobile Educational Games,” *Proceedings of MLEARN 2003: Learning with Mobile Devices*, London, 2003)

process. Each participant plays the game as one node in a representation or simulation of a process or event, such as genetic reproduction or the spread of a disease. These games are not location-specific and can be used anywhere, including a classroom. They are typically designed to be collaborative and/or iterative. For example, in one participatory simulation, each person takes on the role of a different bodily system. Together, all the nodes compose the human body, and must work in concert to successfully complete complex processes such as eating.¹⁶⁴ (See Appendix II for descriptions of three other participatory simulations: Tit for Tat, Virus, and Sugar and Spice).

Augmented reality (AR) games are location-based or context-aware games that integrate the physical environment with virtual information. These games use mobile technology, such as a handheld computer and/or mobile phone, to interact virtually with the actual world. “Rather than immersing people in an artificially-created virtual world, the goal is to augment everyday objects in the physical world by enhancing them with a wealth of digital information and communication capabilities.”¹⁶⁵ In such games, participants are encouraged to look more closely, deeply, or differently at their physical environment, because specific locations are now embedded with a variety of virtual information. These games are ubiquitous, since in theory they can be played anywhere, allowing the player to explore in-depth a physical location. Location is paramount to how the game is played; participants may interact with specific objects in the environment, as well as other players in the game. Your building or city suddenly becomes a game board; statues or doors can provide virtual clues or portals in the context of a game.

In the past few years, mobile game researchers have designed location-based games such as “Mad Countdown,”¹⁶⁶ “Can You See Me Now,”¹⁶⁷ and “Uncle Roy All Around You.”¹⁶⁸ In

¹⁶⁴ Mr. Vetro is the name of this game, by Alexander Repenning (http://agentsheets.com/about_us/papers/)

¹⁶⁵ W. E. Mackay, “Augmenting Reality: A New Paradigm for Interacting with Computers.” *La Recherche*, 1996.

¹⁶⁶ According to co-creator Steffan Walz, who spoke at the Serious Games Summit, this game involved students working on teams to search and defuse a “bomb” located in a building on campus. At various locations, for example, students would receive a phone number on their PDA, which would allow them to call a number and get a code for a hidden locker.

¹⁶⁷ In this game, twenty players are connected via the Internet and moving avatars around a city using an online map. Three other players or “runners” physically chased these avatars around the actual city. The runners had handhelds that provided them with a map of the online players’ avatars, and they had walkie-talkies to communicate with each

VeGame, for example, participants play an AR game using a Pocket PC, while weaving through Venice's unique urban setting. The game leads the player through real-world sites of interests, such as churches or monuments, while also providing them "microgames" at each stage. These microgames incorporated some aspect of their physical location, either calling their attention to a painting, or inviting them to search the neighborhood for clues or speaking to Venetian people to get answers.¹⁶⁹

At MIT, the Teacher Education Laboratory has created four AR games. In Environmental Detectives, an outdoor game, participants work in groups to analyze a virtual oil spill that occurred on the actual MIT campus. The participants navigate a physical location and use a handheld to "talk" to virtual people to gather information. They also use the handheld to make virtual analyses of the toxicity levels of specific sites around campus. All the information is location-specific—the information they receive is dependent on where they are physically located on campus.¹⁷⁰

Another, Mystery at the Museum (2003), is an indoor game where kids work in teams with their parents to find virtual clues and solve virtual puzzles in the physical space of the Science Museum. The teams needed to walk through different rooms and exhibits to find virtual items or clues needed to solve the mystery.

Outbreak@MIT, also an indoor game, incorporates features and findings from these previous games. In Outbreak@MIT, the participants work in teams to investigate a virtual mystery on the

other. For more information about Can You See Me Now, see Martin Flintham, et al., "Where On-Line Meets On-The-Streets: Experiences with Mobile Mixed Reality Games." *CHI 2003* (2003), and Steve Benford, et al., "Coping with Uncertainty in a Location-Based Game" in *Pervasive Computing*, IEEE, July-September, 2003.

¹⁶⁸ In this game, players physically travel through a city to find a character called Uncle Roy. Simultaneously, online players also travel through a 3D version of the city, and can see the street players as avatars moving through the city. The street players have a handheld computer that provides them with a map of the city, and clues to where they need to go next. The online players can communicate with the street players and either help or hinder their progress. For more information about Uncle Roy All Around You, see Steve Benford, et al. "Uncle Roy All Around You: Implicating the City in a Location-Based Performance," ACE '04 June 3-5, 2004, Singapore.

¹⁶⁹ For more information on VeGame, see Francesco Bellotti, et al. "VeGame: Exploring Art and History in Venice," *Computer*. IEEE Computer Society, 2003.

¹⁷⁰ For more information, see Eric Klopfer, Kurt Squire, Henry Jenkins. "Environmental Detectives: PDAs as a Window into a Virtual Simulated World," *wmte*, vol. 00, no., p. 95, IEEE, 2002.

MIT campus¹⁷¹: a possible disease outbreak. Participants must first decide whether there is an outbreak, and if so, what disease is spreading, who spread it, and how to minimize its spread. To investigate the disease, participants use handhelds to interview virtual people in specific rooms around MIT's campus, take and analyze virtual samples, medicate real and virtual players, and quarantine real and virtual people who might be infected with a disease.

The main change in this game, as compared to the previous games, is that each individual on the team has a prescribed role in the game (doctor, public health official, or lab technician) and distinct responsibilities based on this role. Each person can only gather a portion of the evidence—teammates must work together effectively to communicate data or information, take measurements, or ration supplies.¹⁷² Further, quarantines, supplies, visits to information sources, and medical tests are limited; so each sub-group of three roles needs to coordinate and collaborate as well.

Similarly, in Charles River City AR, another augmented reality game created by the Teacher Education Laboratory at MIT, and based on Dede's MUVE¹⁷³ River City, participants investigate a potential biological epidemic in an outdoor portion of MIT's campus. Again, a team of participants with distinct roles must work together, and they interact with virtual characters (NPCs or non-playing characters). Like *Outbreak@MIT*, the locations of the NPCs can change over time, and the players themselves can get virtually sick.¹⁷⁴

What can mobile media and AR games provide powerfully in an educational context, and what are the underlying pedagogical potentials of AR? Dede recommends more experimentation with

¹⁷¹ The instructions on the scenario were as follows: "The Department of Public Health has been investigating a recent flight from Chicago to Boston. Several passengers have become ill with a respiratory disease that may be SARS and are being housed in a Boston medical facility. Have two passengers associated with MIT contracted or spread the disease?"

¹⁷² For example, only the doctor can qualitatively assess a virtual person's health and/or administer medication. The public health official is the only one who can quarantine or un-quarantine virtual players. The lab technician is the only one who can collect and then analyze the samples.

¹⁷³ A MUVE is a multi-user virtual environment, where participants can interact with digital artifacts in a 3-D environment that is networked so users can be in the virtual environment simultaneously.

¹⁷⁴ See <http://education.mit.edu/ar/crc.html> for more information.

mobile technology-supported activities, such as AR games, along with concomitant changes in the way teachers teach, such as including more guided learning-by-doing, knowledge sharing, and personalized learning activities.¹⁷⁵ In the next chapter, I use my design of a unique AR game, “Reliving the Revolution,” to explore these questions.

CHAPTER THREE:

“RELIVING THE REVOLUTION”: A TEST CASE

“TEST; ANALYZE; REFINE. AND REPEAT”¹⁷⁶

“As a game evolves...it defines and redefines its own form, the experiences it can provide for players and the very questions about design that it can ask. Through this play of design itself, new questions come into being, present themselves to the designers, and sometimes are even answered.”

—Eric Zimmerman¹⁷⁷

Mobile and AR gaming experiences are not automatically fun, engaging, or useful; educational games are not necessarily effective. While there is research on general video game design,¹⁷⁸ there are few models for effective educational games,¹⁷⁹ particularly AR and handheld games. I designed “Reliving the Revolution” to create such a model. One of the major challenges in designing “Reliving the Revolution,” and in educational games in general, is incorporating the learning (pedagogical goals) into the game play: “Play which is not removed from a learning experience, but inherent to it.”¹⁸⁰ How do we scaffold learning within the game—in a way that does not water down the educational content or disengage the game player?¹⁸¹ How do I best

¹⁷⁵ Chris Dede, “Planning for Neomillennial Learning Styles,” *Educause Quarterly*. No. 1., 2005.

¹⁷⁶ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

¹⁷⁷ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

¹⁷⁸ See for example, Katie Salen and Eric Zimmerman, *Rules of Play*. (Cambridge, MA: MIT Press., 2003).

¹⁷⁹ S. Thomas, G. Schott, and M. Kambouri, “Designing for Learning or Designing for Fun? Setting Usability Guidelines for Mobile Educational Games,” Proceedings of MLEARN 2003: Learning with Mobile Devices, London, 2003.

¹⁸⁰ K. Squire, H. Jenkins and the Games-To-Teach Team, “Designing Educational Games: Design Principles from the Games-To-Teach Project,” *Educational Technology*, September-October, 2003.

¹⁸¹ S. Thomas, G. Schott, and M. Kambouri, “Designing for Learning or Designing for Fun? Setting Usability Guidelines for Mobile Educational Games,” Proceedings of MLEARN 2003: Learning with Mobile Devices, London, 2003.

match the practical and theoretical affordances¹⁸² of handheld technology and mobile games with my pedagogical goals, while also considering the psychological, social, and physical characteristics of this type of distributed learning environment? I needed to consider how to create the actual details of the AR experience: Should this even be a game? Where would it take place? What would the participants do at? What would types of information would the game provide? How would each design choice support my initial pedagogical goals?

As Eric Zimmerman writes in “Play as Research,” “Design is a way to ask questions.”¹⁸³ Throughout the design of “Reliving the Revolution,” I grapple with questions of game play, location, content, and tone, and propose ways to answer them. I provide a rationale in-depth review, justification, and assessment for each design choice, based on educational or game design theory, findings from other studies, evaluations of other games and learning experiences, and results from trials of “Reliving the Revolution” and previous prototypes. Throughout the process, I consider how to create an engaging game experience, while also designing to meet the educational needs of the game.¹⁸⁴ Most research on handhelds and AR in education has focused on the participants’ overall enjoyment or the experience’s general effectiveness and pedagogical value, rather than examining specific aspects of the game and how each might relate to learning and engagement. I take both a design-focused and user-centered approach,¹⁸⁵ and when appropriate, include oral and written responses from game participants, as well as my own observations on the game, to explore and appraise my design choices.

¹⁸² As defined in Klopfer, et al., affordances are “interactions between the attributes of an object and an organism that determine how the object can be used. So, for example, a chair affords sitting and a doorknob affords turning. ...Norman (1988) describes how learning to detect the affordances of objects is also a learned activity bound by cultural symbols.” (See E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.)

¹⁸³ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003)

¹⁸⁴ Designing for both is important because as Zimmerman writes, although we often design for “a particular function (for exercise, to meet people, to learn about a topic, by and large, games are played for the intrinsic pleasures they provide.” (Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003)).

¹⁸⁵ I consider the function and form of the design, as well as the perspective of the audience or end user of the game.

The design of this game has been extremely iterative. Eric Zimmerman explains the iterative design process as “a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a work in progress.”¹⁸⁶ With an iterative process, the product or game develops through a meaningful dialogue between the designers and the audience or participants. This means continually testing the game with participants, observing their play and asking targeted questions, redesigning the game, and then testing it out again.¹⁸⁷

In February 2004, I wrote an initial proposal for the game, then named “Heard Around the World,” which at that stage was described as a handheld-enabled multimedia tour of Lexington, MA during the moment of the Battle of Lexington (see Appendix III). In February 2004, I began to amass data and resources to use in designing the game’s content and finalizing the gameplay including primary and secondary sources, maps and artifacts, images and graphics, music and videos, books and literature, diaries and testimonials, statistics and brochures. I started to regularly visit the Lexington site; take photographs and video footage of Lexington Center and its monuments, buildings, greens, and historic sites of interests; take guided tours of buildings and grounds; and speak to Revolutionary War experts. I began to conduct an extensive Internet search of materials, as well as classroom activities, curricula, standards, ThinkQuests, games, interactive modules and other material related to the Battle of Lexington or teaching history using multimedia platforms. I also observed the April 19, 2004 live annual reenactment of the Battle of Lexington to conceptualize ways to recreate the moment using other media as well as watched the videotape of an earlier live reenactment.¹⁸⁸ (See Appendix IV for a list of the resources I used for researching, conceptualizing, and creating “Reliving the Revolution” and a more detailed overview of the resource collection process).

In March 2004 and May 2004, I devised two prototypes of “Heard Around the World,” using PowerPoint and Flash, respectively. I began to consider making the program more game-like,

¹⁸⁶ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

¹⁸⁷ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

¹⁸⁸ “The Fight for Independence: The Battle of Lexington and Concord.” Video Plus Productions, 2000.

thus my goal in creating these prototypes was to begin to test out aspects of the game play and game rules, rather than to highlight the aesthetics or narrative content. Writes Zimmerman, “Initial prototypes are usually quite ugly. Game prototypes do not emphasize aesthetics or narrative content; they emphasize game rules, which manifest as the internal logic of the game, tied to the player’s interaction ... the questions that a prototype should address, lie in the more fundamental elements of rules and play.”¹⁸⁹ In these prototypes, I only showed a very small portion of the game, and focused on showing the participants’ actions in the game. In both prototypes, the participants did not receive content based on a GPS trigger. Rather, the participants controlled their advancement in the game by pressing on a button when they found a particular object, site, or building. There were four or five possible roles that each player would be able to experience throughout the game; each participant would switch roles periodically through the game and be able to view the Battle from all the perspectives. I incorporated my own evaluation of the game and others’ feedback into a plan for a redesign to create the next iteration of the game.

In the next iteration of the educational program, now called “Reliving the Revolution,” I began to finalize the game play and content for the game. Based on my assessment of my prototype and analysis of AR games, I decided to create an augmented game/historic simulation that would incorporate elements of virtual and physical guided tours, and interactive database narratives.¹⁹⁰ Instead of self-directed retrieval of content, GPS would trigger information in various specific locations. To design the game to incorporate GPS technology, I used a new interface called the RiverCity AR Editor system, developed at MIT’s Teacher Education Laboratory. This editing system allowed me to modify an existing AR handheld game, RiverCity AR. The software enabled me output my content in XML format, so that it could be read by the RiverCity .NET game engine. Although the game editor enabled me to include most of the functionalities I envisioned, it also added a few new constraints. I will describe these limitations, and how I altered or influenced my design throughout the next chapter. (For a more in-depth explanation of

¹⁸⁹ Eric Zimmerman, “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

¹⁹⁰ I define this in detail in “Storytelling/Narrative Elements.”

how I used the RiverCity AR Editor system to create the game and its general specifications, please see Appendix V).

TESTING THE GAME

I first tested prototypes (“Heard Around the World”) in March 2004 and May 2004 to an audience of graduate students in education. Although they did not play the game on-site in Lexington, they tested its game play, and provided oral and written feedback on their experience with it. For the next iteration, I designed the game in its entirety (“Reliving the Revolution”) (the game elements are summarized in Appendix VI). Thus, my Pilot and subsequent test of the game were much more rigorous. On June 1, 2005 and June 8, 2005, I conducted two trials of “Reliving the Revolution.” The first trial involved eight individuals, ranging in age from 26 to 41, and was a mix of graduate students and local educators. The second trial involved six individuals, ranging in age from 24 to 31, and consisted of all graduate students. I call these the **Pilot study trials**. Following these results I did an extensive redesign of the game (summarized in Appendix VII) and then conducted another trial of the game on July 11, 2005. This trial involved eight individuals, ranging in age from 13 to 17, all attending local and regional high schools. I call this the **Redesign trial**.



Each of these trials of the game lasted for about 2 hours, with an additional forty minutes for pre-game instructions and setup and forty minutes for post-game focus group discussion and critique. I did not participate in any of the game trials; rather, I remained an unbiased observer of the participants during the game play. I tried to observe rather than guide,¹⁹¹ listening to participants' comments rather than reacting to them. To better assess the behavior of the game participants—

¹⁹¹ As recommended by Eric Zimmerman, in “Play as Research,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

how they derived meaning from and interacted with the game¹⁹²—I employed an ethnographic research method. In my readings of the games, I looked in general at whether the game met my pedagogical goals; I also investigated how the game supported social interactions, encouraged group problem solving, and enabled the communication of ideas. I studied whether these collaborations enhanced the participants’ overall engagement with the game—including their attention, interest level, enjoyment, mood, and level of activity.

To do this, I used a pre-game and post-game survey instrument (please see Appendix XI and Appendix XII, respectively). After the game ended, I led a focus group discussion with all of the participants following the game (see Appendix XIII for a list of the questions I used), to gather the participants’ subjective feedback on their experience of the game and what they felt they learned. I observed the entire game in-person and later, via videotape. Finally, I collected and analyzed notes taken by each of the participants during the game.

I focused on the participants’ engagement in the mobile gaming environment, and how this affected their learning experience. I specifically looked at the following:

- a) **What Were the Patterns of Collaboration?** How did the game content and game play support collaboration? What was the content and quality of the participants’ interaction during the evidence collection and debate? How did the roles support collaboration and social interactions? Was everyone interacting as a group, or were some people working individually? When were the roles working with the other roles? How were the paired participants working together? How did pairs delegate responsibility and make decisions? What types of tasks or ideas were they discussing or sharing? When were they listening or talking to each other?
- b) **What Were the Affective States?** What were the participants’ affective states during the game and debate? Did they seem bored, engaged, happy or frustrated? When were they more attentive to the game content? What was their perceived mood and body language

¹⁹² Tim Plowman writes that this type of understanding is anthropological; “product use and usability...how products are experienced or interpreted...are both deeply cultural activities.” (Tim Plowman, “Ethnography and Critical Design Practice,” in *Design Research: Methods and Perspectives*, (Cambridge, MA: MIT Press, 2003).

when they were interacting with the handheld or with other people? How did their affective states change throughout the game?

- c) **What Were the Interactions with the Physical/Game Environment?** How were the participants interacting with the physical environment? What types of activities did the handheld game support? How did participants interact with the content of the game? When were they most attentive to the physical environment? How were the interactions between the physical world and historical material?
- d) **What did the Participants Learn?** What types of questions did the participants ask? How were they interpreting the evidence? What types of hypotheses did they propose or conclusions did they draw? What decisions did they make during the evidence collection and debate? What did they self-report learning? How did the answers to the content questions on the surveys change?

Each of these categories is interrelated to the others. Affect influences social interactions, learning, and physicality. I use these as guidelines for evaluating my design choices and refining my program to best meet its pedagogical objectives and the needs of the user. In the following sections, I pose a question about the design of “Reliving the Revolution,” and then pose possibilities and evaluations of my choices, based on these results of the trials.

WHICH MEDIUM TO USE?

Why use AR to support and motivate historical thinking? The written page and its linear structure may not easily afford the opportunity to present multiple and overlapping views and stories. The advent of dynamic platforms for nonlinearity (such as computer/video games, websites, and other potentially hypertextual environments) presents a rich possibility for exploring multiple historical narratives and a deconstructionist approach to a historic moment. I decided to focus on one such medium—augmented reality games—as facilitating learners to consider multiple, layered perspectives on a historic moment.

AR games have the potential to allow nonlinear narratives, multiple and distributed points of entry into a story, thus presenting alternate lenses through which to observe a past event. This

learning experience combines new media and new historiographic methods. In “Simulation, History, and Computer Games,” William Uricchio explores the confluence of hypertext and games with poststructuralist historiography, which is, as he explains, “charged by its critics with the upsetting the applecart of the historical trade by challenging notions of facticity, explanatory hierarchies, master narratives, and indeed, the interpretive authority of the historian.”¹⁹³ He argues that games can “empower the user... to organize one’s own text,”¹⁹⁴ or, in the case of history computer games, can enable the participant to shape his/her own story of a historical event, instead of relying on an authoritative retelling.

AR games provide an opportunity to simulate more than one possibility for a historical event, and to underscore the influence of a changing present on our understandings of the past. The hypertextual functionality of handhelds strengthens this connection because it allows game players to actively choose where they want to enter or exit the narrative (both physically and virtually), to decide what parts of the narrative to privilege or downplay, and to arrange hierarchically the narrative they receive. This further encourages “epistemological vertigo,” because it helps the game player to realize that s/he is not a passive receiver of an objective history and to reflect of his/her role as a subjective constructor of history—to wander virtually and physically through history’s “alternatives, its ‘might-have-beens,’”¹⁹⁵ while also recreating for oneself that historic moment.¹⁹⁶

WHICH PEDAGOGICAL FRAMEWORKS TO USE?

Two main theoretical frameworks seem to support the use of augmented reality for learning: Constructivism/Constructionism and Situated Cognition.¹⁹⁷

¹⁹³ Uricchio, William. “Simulations, History, and Computer Games.” (unpublished draft, forthcoming MIT Press, 2005.)

¹⁹⁴ Ibid.

¹⁹⁵ Uricchio, William. “Simulations, History, and Computer Games.” (unpublished draft, forthcoming MIT Press, 2005.)

¹⁹⁶ Uricchio argues that games can simulate multiple outcomes for a historic event, and it can also recreate and detail a historic event. I argue that a game can do both simultaneously, and that my program, “Reliving the Revolution,” is a hybrid of both of these types of games. Uricchio, William. “Simulations, History, and Computer Games.” (unpublished draft, forthcoming MIT Press, 2005.)

¹⁹⁷ See for example, E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.

(1) CONSTRUCTIVISM/CONSTRUCTIONISM

“We learn by relating new experiences to our prior knowledge: we construct new understandings based on what we already know.”

—Thomas Sherman and Barbara Kurshan¹⁹⁸

Proponents of Constructivism, pioneered by Jean Piaget, take an “exploratory approach to learning”^{199,200} and believe that learners actively acquire and construct knowledge. Learners are engaged “in restructuring, manipulating, re-inventing, and experimenting with knowledge to make it meaningful, organized, and permanent,”²⁰¹ making it more “applicable and memorable.”²⁰² In an AR game such as “Reliving the Revolution,” “River City AR,” or “Environmental Detectives,” participants must actively find information, manipulate evidence, construct hypotheses, and make decisions. Participants need to reflect on their tasks, cooperate with team members, and set their own pace in regard to their time constraints. Characteristics of effective constructivist learning environments include²⁰³:

- Supporting opportunities for students to construct knowledge
- Encouraging social interaction, cooperative learning, and collaboration
- Inviting reflection and self-awareness of the learning process
- Providing ways to learn from multiple perspectives
- Allowing for student to self-regulate and set individualized goals in learning process
- Finding ways to realistically contextualize learning and enhance its authenticity

¹⁹⁸ Thomas M. Sherman and Barbara L. Kurshan, “Constructing Learning: Using Technology to Support Teaching for Understanding,” *Learning & Leading with Technology*, 32:5, 2005. They also describe eight characteristics related to constructivism: “Learning centered/interesting/real life/social/active/time/feedback/supportive.”

¹⁹⁹ Maja Pivec, Olga Dziabenko, and Irmgard Schinnerl, “Aspects of Game-Based Learning,” http://www.unigame.net/html/I-Know_GBL-2704.pdf. Accessed on June 16, 2005.

²⁰⁰ Learners “actively construct their own knowledge by testing ideas and concepts based on prior knowledge and experience...and develop cognitive structure through action and spontaneous activity” Discussed in Maria Roussou, “Learning by Doing and Learning Through Play” in *ACM Computers in Entertainment*. Vol. 2, No. 1., 2004.

²⁰¹ Maja Pivec, Olga Dziabenko, and Irmgard Schinnerl, “Aspects of Game-Based Learning,” http://www.unigame.net/html/I-Know_GBL-2704.pdf. Accessed on June 16, 2005.

²⁰² Quoted in Chris Dede, Tara Brown L’Bahy and Pam Whitehouse. “Designing and Studying Learning Experiences that Use Multiple Interactive Media to Bridge Distance and Time.” Draft for *Current Perspectives on Applied Information Technologies. Vol 1: Distance Education*, 2002.

²⁰³ Based on research by Marcy P. Driscoll, “Psychological Foundations of Instructional Design,” Chapter 4, *A History of Instructional Design and Technology*, citing Driscoll, Marcy P. (2000). *Psychology of Learning for Instruction (2nd Ed)*. Needham Heights, MA: Allyn and Bacon.; and Maja Pivec, Olga Dziabenko, and Irmgard Schinnerl, “Aspects of Game-Based Learning,” http://www.unigame.net/html/I-Know_GBL-2704.pdf. Accessed on June 16, 2005; and Chris Dede, Tara Brown L’Bahy and Pam Whitehouse. “Designing and Studying Learning Experiences that Use Multiple Interactive Media to Bridge Distance and Time.” Draft for *Current Perspectives on Applied Information Technologies. Vol 1: Distance Education*, 2002.

Building on Constructivism is Seymour Papert's theory of Constructionism,²⁰⁴ which focuses on learning by constructing, building, and designing; Papert uses Piaget's idea of "children as builders of their own intellectual structures,"²⁰⁵ and reinterprets Piaget's theoretical framework of a "knowledge-based theory of learning,"²⁰⁶ where students actively build their own knowledge. He argues people learn more deeply when they are engaged in constructive acts that result in the creation of an evocative and shareable product; by focusing on the process of creating the artifact, people can more easily make personal connections with its construction. Mitchel Resnick also argues that the prime experiences for learning are often when we are most engaged in the design and creation of objects and ideas, and that computers can help facilitate this learning.^{207,208} Complex concepts or abstract ideas such as interpretation, critical thinking, subjectivity, and multiple perspectives can become more learnable when a person is engaged in personally-meaningful constructionist activities, like narrative creation or the recreation of historic moments. With proper design and scaffolding, an augmented reality game could support these types of constructionist activities.

Moreover, a constructivist activity may be particularly suitable for learning critical thinking skills, such as questioning sources and evidence, creating hypotheses, or drawing conclusions. Wolk argues that teachers in constructivist classrooms are already inviting the type of thinking

²⁰⁴ Constructionism is an educational theory pioneered by Seymour Papert in the 1980s and outlined in his book, *Mindstorms: Children, Computers, and Powerful Ideas* (New York: The Perseus Book, 1980).

²⁰⁵ Seymour Papert, *Mindstorms: Children, Computers, and Powerful Ideas*, (New York: The Perseus Book, 1980), pg. 7.

²⁰⁶ Maja Pivec, Olga Dziabenko, and Irmgard Schinnerl, "Aspects of Game-Based Learning," http://www.unigame.net/html/I-Know_GBL-2704.pdf. Accessed on June 16, 2005.

²⁰⁷ Resnick writes, "Learning is an active process in which people construct new understandings of the world around them through active exploration, experimentation, discussion, and reflection...people don't get ideas, they *make* them." In Mitchel Resnick, "[Rethinking Learning in the Digital Age](#)." In *The Global Information Technology Report: Readiness for the Networked World*, edited by G. Kirkman. (Oxford University Press, 2002).

²⁰⁸ Much of the research on applied Constructionism has come out of MIT. For example, Beaudin showed how people, through constructionist activities, can access what Papert calls "powerful ideas" that empower the learner to approach a subject domain and beyond with a model or process that is both view broadening and personally intuitive (Jennifer Beaudin dissertation, MIT, 2003). Also, Umaschi Bers used the constructionist approach to show how young people can learn about their self, such as their personal and moral values, through the design of a virtual city. Amy Bruckman showed how kids participating in a text-based virtual world (MUD) learn by using programs and words to create new places and objects (Amy Bruckman dissertation, MIT, 1997). LOGO, a computer program (Papert 1980), and LEGO Mindstorms, LEGO bricks that can be programmed, are two examples of constructionist activities.

that develops critical literacy, because such classrooms rely on the students to construct their own knowledge, rather than memorizing and regurgitating back information that the teacher provides to them: “Teachers who strive for constructivist and generative classrooms are constantly asking their students to think for themselves, to voice their opinions and ideas, and to assess how topics and questions being studied connect to their lives.”²⁰⁹ This suggests that Constructivist classrooms and educational experiences are good models for teaching critical thinking and historiographic skills.

(2) SITUATED COGNITION

In the situated cognition approach to education, context and learning, knowing and doing, are seen as intertwined and interdependent.²¹⁰ Cognition is tied to a specific situation or context because, as Klopfer, et al. explains, “How people think, learn, act, and know is fundamentally rooted in the materials available in a situation . . . tools and resources are actually inseparable from thinking and activity.”²¹¹ Since knowledge occurs in conjunction with context, the learning process should be tied to a meaningful situation.²¹² The learners’ environment is seen as essential to the process; an environment can alter, enhance, and support certain types of performances, approaches to problems, or learning activities.

Activities based on a situated cognition model can seem more authentic because students are working within a “practice field,” or an environment that sets up problems and goals using real-world contexts and tools.²¹³ In Dewey’s *Experience and Education*, he discusses the importance

²⁰⁹ Stephen Wolk. “Teaching for Critical Literacy in Social Studies.” *The Social Studies*. May/June 2003. 101-106, 2003.

²¹⁰ “Neither the individual nor the setting, but instead the relationship between the two.” (Chris Dede, Tara Brown L’Bahy and Pam Whitehouse. “Designing and Studying Learning Experiences that Use Multiple Interactive Media to Bridge Distance and Time.” Draft for *Current Perspectives on Applied Information Technoloies. Vol 1: Distance Education*, 2002.)

²¹¹ E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003. There is what Klopfer, et al. describes as a dialectical relationship between the situation or environment and its knowledge, making the learning more dynamic.

²¹² “Learning happens in the context of activity when a person is trying to accomplish some meaningful goal and has to overcome obstacles along the way.” (David Shaffer, “Epistemic Games,” *Innovate*, Vol. 1, Issue 6, August/September 2005.)

²¹³ E. Klopfer, K. Squire, & H. Jenkins, *Augmented Reality Simulations on Handheld Computers*. Paper presented at the 2003 AERA, Chicago, IL, 2003. These “practice field learning environments,” are characterized by models such as “problem-based learning, anchored instruction, or goal-based scenarios” and typically include ownership, collaborative work, reflection, and a motivating context.

of exploration and experience in learning, and suggests that students should work on tasks that are related to real-world issues, and “learn history in a way that helps them better understand the present.”²¹⁴

Also, with this type of instruction, students can learn from within the sociocultural context through which these skills, concepts, and problems are typically practiced.²¹⁵ Students form an identity within an interlinked social system or “community of practice,”²¹⁶ from which they form and apply knowledge to solve actual problems,²¹⁷ further deepening their learning. In a community of practice, the individuals internalize epistemic frames, or the rules of participation in that community.^{218,219} As a result, in a situated learning context, it is important to create a learning environment where the problems, questions, and concerns are seen as more authentic by the students. Memory et al. recommend that teachers create circumstances for students that more closely align with how historians and social scientists practice their discipline.

Researchers are beginning to use computer and media such as games to create more authentic learning environments and “practice fields” to enable students to work together to solve real-

²¹⁴ David Memory, Carol Yoder, Kevin Bolinger, and Wilson Warren. “Creating Thinking and Inquiry Tasks that Reflect the Concerns and Interests of Adolescents.” *The Social Studies*, July/August 2004. 147-154.

²¹⁵ E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.

²¹⁶ Klopfer, et al. describes Barab and Duffy’s three characteristics of community-oriented learning: “Communities have a common cultural and historical heritage, they situated[sic] learners as part of interdependent social systems, and contain a reproduction cycle, the processes whereby newcomers are initiated into the communal system and mature into old-timers.” E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.

²¹⁷ Dede defines a community of practice as having social constructivist roots and that it is a “Collaborative groups of professionals who develop shared resources (e.g., problem-solving strategies, terminology of tools) and who promote ongoing reflection and feedback to advance their learning goals over time.” (Chris Dede, Tara Brown L’Bahy and Pam Whitehouse. “Designing and Studying Learning Experiences that Use Multiple Interactive Media to Bridge Distance and Time.” Draft for *Current Perspectives on Applied Information Technologies. Vol 1: Distance Education*, 2002.)

²¹⁸ David Shaffer, “Epistemic Games,” *Innovate*, Vol. 1, Issue 6, August/September 2005

²¹⁹ “Alternatively, one might think of an epistemic frame as a form of Bourdieu’s (1977) habitus—but habitus as part of a social world in which individuals take on multiple habiti as they move among the different communities of practice with which they affiliate” David Shaffer, “Multiculturalism: Computers and the End of the Progressive Education” (submitted to *Teachers College Record*), 2005.

world problems.²²⁰ For example, David Shaffer uses the game Madison 2200 to explore how to create authentic learning environments using multimedia, particularly epistemic games.²²¹ In this game, students work as urban planners to redesign a street in downtown Madison, Wisconsin. Shaffer argues that, “When learners engage in socially-valued practices toward ends *they* value—that is when learners can use real tools and methods to address issues they care about—motivation and learning tend to follow.”²²² Shaffer posits that what is necessary is a learning context that is thickly authentic, or one in which “activities are simultaneously aligned with the interests of the learners, the structure of a domain of knowledge, valued practices in the world, and the modes of assessment used.” These epistemic frames are reproduced within the community through a reflective and dialogic process of “epistemology, practice, identity, interest, and understanding.”²²³ This type of learning also involves reflective practice, in that learners continue to practice and employ these epistemic frames. By participating as an urban planner, students began to develop the epistemic frames of this profession.

Handheld computers and other locative mobile media can help establish scenarios and provide resources so that students can effectively work together to solve problems, and can enable students to work on these problems in the environment where they would typically occur. Explains Klopfer, et al., “the affordances of handheld computers can be used to create unique situationalities for learners, where they can collect data in doing investigations, assess authentic tools and resources, and participate in collaborative learning practices while in the field.”²²⁴ Navigating historic evidence that is situated in a historic context and physical site could make the process of doing history more authentic. In “Reliving the Revolution,” students can tackle a real history problem in the site where it took place, while collaborating with other learners. They can

²²⁰ For example, Klopfer, et al. points to studies that suggest that technologies can unite learners within a community of practice, and help learners transcend the boundaries of the classroom to create a more situated learning environment. E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.

²²¹ He describes epistemic games as one in which players are given access to the epistemic frames of a community of practice, or their conventions, grammar or rules of being. (David Shaffer, “Epistemic Games,” *Innovate*, Vol. 1, Issue 6, August/September 2005)

²²² David Shaffer, “Epistemic Games,” *Innovate*, Vol. 1, Issue 6, August/September 2005

²²³ Ibid.

²²⁴ E. Klopfer, K. Squire, & H. Jenkins, “Augmented Reality Simulations on Handheld Computers.” Paper presented at the 2003 AERA, Chicago, IL., 2003.

use the handheld to access a different time or historic moment, where they can gather testimonials, primary documents, and other resources that can help them analyze the problem. This might alter how students approach and assess historic questions, and make the discipline of history and historic thinking more relevant.

My design of “Reliving the Revolution” considers how to best support these two theoretical frameworks, including enhancing:

- (1) The authenticity of game’s problems, tasks, tools, and resources
- (2) The social learning and cooperation
- (3) Self-guided, but mentored discovery
- (4) Reflective practice

WHERE WILL THE GAME BE LOCATED?

As I described in “Augmenting Learning,” two of the affordances of handhelds are that they are portable and can be context aware, making them valuable for experiential and kinesthetic learning, as well as for interacting with a specific place. While I wanted to integrate handhelds in an appropriate and convenient educational context, I thought the richest learning experience would be one where you did not just learn from the handheld, but from the interaction between the environment and the information on the handheld. Deanne Shiroma argues that “A commonly overlooked type of primary source is historic places, the sites of significant events, which communicate the past to students in numerous ways. Historic places ‘speak through relationships to their settings, their plan and design, their building materials, their atmosphere and ambience, their furniture, and other objects they contain.’”²²⁵ The Boston area is replete with such environments, as there are numerous physical sites where historic, popularized events occurred.

I chose Lexington, MA as the site for my educational program for a number of reasons:

²²⁵ Deanne Shiroma, “Using Primary Sources on the Internet to Teach and Learn History.,” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, IN: ERIC Digest., 2000) citing Marilyn Harper, “Including Historic Places in the Social Studies Curriculum,” Bloomington, IN: ERIC Digest, 1997,

1. It is the location of an important historic event. This may seem obvious as an impetus for a history-based game, but the significance of the site itself to the historic event should be considered when choosing a location. Lexington, MA is the location of the Battle of Lexington, an integral moment in the history of the United States and America’s independence from England. The Battle of Lexington is the first battle of the Revolutionary War, so it is commonly taught in history and social studies classes.

As I investigated the Battle of Lexington further, I also discovered an abundance of relevant resources. In addition to numerous books and articles on The Revolutionary War and the Battle specifically, there is also wide availability and access to first-hand accounts, testimonials, diaries, and records of witnesses of and participants in the Battle. I will describe in more detail the choice of the historic moment in the next section.

2. Lexington is an appropriate and convenient site for a location-based AR game. First, in terms of conducting my research, proximity to MIT campus was an important factor in choosing Lexington, MA (30 minutes from MIT), since I would be driving back and forth to create the program and assess it. Lexington is also near many school districts, it is quiet and safe, and is a well-known, but not too crowded destination for locals and tourists. Most of Lexington Common is public, so game players would be able to freely move around Lexington.

Second, the actual site of the Battle of Lexington is relatively compact and dense with historic buildings, monuments, and plaques within a small area, bounded physically by a row of houses and a fence. Within a short walking distance, participants can interact with a variety of historic structures that were involved in the Battle of



Lexington. The layout is also appropriate for such a game; the buildings, houses, and other points of interest are spaced out, encouraging participants to wander about the Common. Thus, Lexington worked as a “game board.”

3. History is already present in Lexington. “History” is embedded in the present structures of Lexington Common in terms of signage—there are plaques that announce the previous owners of a house and signs that explain the role of a building. As participants amble around Lexington, they would not only learn about the past; but also about the present-day town. There are many of the same structures still present today as in 1775, such as Buckman Tavern and the Old Belfry, and these structures are mentioned in the stories of the Battle of Lexington.

Furthermore, using local history accents the economic, social, political and ethnic diversity within a historic moment, and also within an actual place: “local history is people’s history...it lends itself to multiple interpretations.” This emphasizes the validity of multiple perspectives in history because it doesn’t just happen in far away lands, but also in proximal locales.²²⁶ Using a local site can help encourage citizenship by fostering students’ interest in their communities and its history, as well as tolerance for other perspectives and social groups in their area. It can also make more concrete abstract ideas by it locating these in a tangible (and possibly familiar) place. All of these are related to my original pedagogical goals, particularly of seeking and integrating other points of view on history.

4. Personal Familiarity with Lexington. I chose Lexington, MA because I was already intimately familiar with the historic landscape from a design perspective. Previously, I had completed a project on images of flags in Boston, and chose Lexington as a site of investigation. As a result of my photographic and design work in Lexington, I considered it a site for artistic inspiration, reflection, and contemplation.

5. Lexington’s role in popular historic imagination. Even if a game participant has not visited Lexington, it is part of the American imagination as a site of patriotism and democratic ideals. This conception of Lexington is symbolically vetted by our country; for example, the American flag in the center of the Lexington Common is one of the only flags in the country that can fly at

²²⁶ Anita C. Danker, “Multicultural Social Studies: The Local History Connection,” *The Social Studies*. May/June 2003.

full-mast all the time. Just down the road from Lexington Common is the “Museum of Our National Heritage.”

Lexington is part of the American “imaginary.”²²⁷ In locating the game in Lexington, I felt that I could play off the participants’ preconceived notions of Lexington and knowledge of popularized or textbook versions of what happened at the Battle of Lexington. By highlighting the myths of Lexington, I could help teach the participants how to tease apart master narratives. I wanted to design my program to encourage people to reflect on their earlier notions of the Battle and the Revolutionary War and how their views changed as a result of the “Reliving the Revolution” program. Using a familiar site of history, and of myth, responds to Seixas’s view of typical history education as “myth creation,” and perhaps reinforces the “epistemological vertigo” of the participants, because myths about Lexington are so prevalent.



The comments from participants in the Pilot studies of “Reliving the Revolution” suggested that Lexington, MA was an appropriate choice of a site for a location-based game. In fact, participants often mentioned the site as one of their favorite aspects of the game, not only because it was a beautiful town, but also because it felt like a historical playground with many obvious reminders of the past. Lexington is a site that many of the participants had visited before, though they never had a chance previously to look closer at the various buildings and statues. The game made the physical location more meaningful, because it attached historical significance and people’s stories to the town’s buildings, statues, and plaques. Said one participant: “One of the best parts of the game was the discovery of the [Lexington] Green and looking more closely at some of the statues and buildings that I might have just walked by before.” This also resonates with the idea that the game can help “augment” the physical

²²⁷ See, for example Benedict Anderson’s explanation of the nation as an “imagined community.” (Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. London: Verso, 1983)

environment by highlighting certain aspects, encouraging the participant to view it anew or observe it differently, creating a unique topography. “Reliving the Revolution” reorients Lexington by providing a “1775 Battle” lens, which allows the participant to experience a new place.

On the post-game survey, most of the participants each liked or strongly liked the Lexington town, and almost every participant commented that playing the game in Lexington was one of the highlights of the game. They considered Lexington “beautiful” and “filled with discovery.” Some participants were even wary to add more features to the game that would take them away from experiencing the site. Almost everyone who played the game felt that with the game, they learned more about the historic site of Lexington, MA. I will discuss more participants’ experiences in the physical game environment in “Kinesthetic/Mobility Elements”).

WHAT IS THE HISTORIC MOMENT?

The choice of Lexington, MA as the site of the game was necessarily coupled with the choice of the historic moment. Since the game is location-based, and I wanted to recreate a historic moment that actually took place in the site I chose, I needed to select the site and historic moment simultaneously. The two main historic events that took place in Lexington, MA were the Battle of Lexington, and then the battle following the British (Regular) retreat from Concord. One reason I chose the Battle of Lexington is because it was an amalgamation of many of the political, social, and economic tensions leading up to 1775 between Britain and the American colonies. It is an important moment in American history, since it is the first battle of the Revolutionary War, and pivotal in terms of changing popular support for a revolution. Most middle and high school students in the United States learn about the Battle of Lexington in their unit on the American Revolution, so students playing the game would have at least a general sense of the battle, when it took place, and the main issues and tensions. On my pre-game survey, most students were able to name the two major sides of the battle, and provide a few reasons why the two sides were fighting. Almost all named the Battle of Lexington as the initial battle of the Revolutionary War, and were generally aware of some of the major leaders.

Students may also have many misconceptions and misinformation about the Battle of Lexington. My hope was that, by showing students alternate ways to view the battle and unraveling the myths that students had learned about it, they would be even more encouraged to seek out other points of view on issues, or to be more critical of the information they received. For instance, according to the pre-test results, almost all of the participants privileged the American or colonist reasons for wanting the revolution to begin, but none considered the British reasons. Their understanding of the tensions in the colonies was very limited, and most participants did not realize that not all of the colonists wanted a revolution to occur. Said one participant in a Pilot study trial, “I learned about all the different sides. Normally you would just think of the American soldiers and the British soldiers, but there were the slaves, and the wives, and the people at the bar, and the Minutemen. There are people frustrated for personal reasons, patriotic reasons....” Another participant echoed this sentiment, saying that “In the beginning part, I thought who fought the Revolutionary War, well it’s the British vs. Americans. Then you realize it’s not just the British and the Americans, it’s the British army against the rebels, slaves, and others, and everyone has their own agenda.” The high school and middle school students also noted that they enjoyed hearing another side to the war; one fourteen-year-old participant wrote on her survey that “It was interesting to get the British POV [point of view] because as Americans we see things other way.” In the debate especially, participants began to explore the motives of other groups involved in the American Revolution.²²⁸ By having the opportunity to overturn and pull apart master narratives about the American Revolution, the students were able to begin to see other stories, reasons, tensions, and perspectives emerge.

Other reasons for choosing the Battle of Lexington are interrelated to the choice of the site itself. In brief, the Battle took place in a specific, contained area of Lexington, MA, and incorporates many (still extant) buildings and sites into the stories and events of that day. There is a vast archive of information still available on the Battle of Lexington, enabling a detailed recreation of

²²⁸ For example, they explored why the British Regulars were in Lexington. In the Redesign trial, the participants tried to interpret why there were British spies in Lexington before the Battle began. They felt that their presence implicated the British as starting the war. One participant, who had played the game as a Loyalist, took the point of view of the British, saying that perhaps they were just there to gather information, and the presence of British spies may have been for innocuous reasons.

the moment of the Battle. Thus, the location of the Battle of Lexington was very amenable to a game that incorporates and combines physical and virtual information. There is an abundance of historical information already physically present in Lexington, and concomitant virtual information that could be tied to specific physical locations within Lexington. (See Appendix XVI for more detail on the background of the Battle of Lexington)

CHAPTER FOUR:

HOW SHOULD WE PLAY THE GAME?

WHAT ARE THE GAME'S OBJECTIVES?

Every game needs goals to orient and motivate one's play. I decided that, in "Reliving the Revolution," there should be one main question driving the entire action of the game; a central task for the participants. This goal and its related subtasks should also support my pedagogical objectives and framework. In this game, I did not want the students just to relive the Battle of Lexington; I wanted them to engage with the historical material surrounding the battle and to view it from distinct points of view. This meant that I needed to provide specific objectives to the participants to direct them through their experience of historic moment. Why were they reliving Lexington and what historical question were they trying to answer?

The choice of the historic moment—the Battle of Lexington—and its unanswered questions lent itself to becoming the main objective of the game. What were the compelling questions, objectives, and mysteries of this historic event? Fortunately, there is a popular historical puzzle—who fired the first shot at the Battle of Lexington—which is unsolved by historians. There are numerous, differing accounts of what happened at Lexington, and specifically about who fired the first shot. Most of these accounts seem to diverge because of the differing biases, values, beliefs, and experiences of the person telling the story. Moreover, historians still debate who fired the first shot—no one knows who did it, and there is no one right answer. Using this open-ended question would highlight the validity of multiple perspectives and would allow the

participants to realize that there can be many simultaneous truths about the past. Thus, the question of who fired the first shot had the potential of motivating my pedagogical goals.

In my research on the Battle of Lexington, I encountered numerous hypotheses about who fired the first shot, and I incorporated the stories of what might have happened into the testimonials and evidence I created for the game (See Appendix XVII for a list of the hypotheses that I used in the game). The participants' goal would be to decide who they think fired the first shot, based on the evidence they had collected, and to provide their resulting interpretations of what happened at the Battle of Lexington.

In general, the participants seemed very excited by this goal, and it seemed to motivate their actions throughout the game. For example, one participant in the Redesign trial felt that trying to figure out who fired the first shot drew him into the game. Another participant noted that this goal helped orient her thoughts about the evidence and navigate a vast amount of game content, saying that "When you have a goal to figure it out, you look more."

In the Redesign, I also decided to add features that would enhance collaboration, role awareness, and intrinsic motivation. At the beginning of the game, I gave to each role two mini-objectives (called "secret missions") in a sealed envelope. For example, the Philip Howe team had as one of their secret missions to find out what is in the trunk. (See Appendix XVIII for a list of the mini-objectives). During the collection of evidence in Times 1 and 2 (Part I of the game) the pair came across a testimonial from Paul Revere, who said he would only tell a minuteman like John Robbins what is in the trunk. Immediately, the Philip Howe pair ran over to pair playing John Robbins and asked them what was in the trunk. They had not encountered the trunk yet, so the Philip Howe group told them to find Paul Revere and ask him about the trunk, so they could complete their mission. The participants seemed to feel that the secret missions were integral to the game play, because it helped them direct their interpretive readings of the evidence. One participant commented that "the secret missions orient you to figure out a certain thing," while another said that the missions helped her think more deeply about the game content: "[I] had to think about what people gave [me] and how it tied into a goal."

HOW IS THE GAME INTRODUCED?

How would the participants would learn about the rules of the game and understand the objectives? How would “Reliving the Revolution” initially draw the participants into the game world? How would I introduce them to the historic moment and provide the participants with necessary context?

In my prototypes of the game, I decided to use a narrator to introduce the game and the mission, as well as to describe the game functionalities. The narrator was a live actor who provided necessary instructions to the game players. Although the narrator was dynamic,²²⁹ I decided that it was not an appropriate feature for the game. First, the narrator was a jarring contrast to the experience of Lexington and the historic moment of the Battle. Second, once I decided not to continuously switch roles throughout the game, I did not need a feature such as a narrator to explain the role change. Finally, when I began to create the actual game and used the River City AR Game Editing System, a narrator would not have been feasible. (See Appendix V for the system specifications).

For the Pilot and Redesign trials of the game, I decided instead to provide the following to each participant to properly orient them: (1) a printed handout on the role that the background of the participants’ role in the game (see Appendix X for the character sheets); (2) a paper map of Lexington in addition to their virtual map (see Appendix XV); and (3) an instruction manual (see Appendix VIII and Appendix IX). Instead of using a narrator to explain the participants’ mission, I provided the game’s objectives as part of my pre-game in-person instructions.²³⁰ I also taught the participants on how to use the game’s interface and gave them troubleshooting tips for common problems, such as GPS difficulties. The game’s interface was generally self-explanatory and easy-to-use; the participants all were able to adapt to the interface rather quickly. The pre-game instructions seemed sufficient, and I did not need to provide further

²²⁹ The narrator in my prototype served four main purposes, he: (1) offered background information about each new historic figure, (2) provided a reason why the participant needs to go to the past (he/she is on a special mission), (3) explained when the participant was switching to a new role (or perspective), and (4) added a humorous, lighthearted element to the program.

²³⁰ In the trials I conducted, the instructions usually lasted between 20 and 30 minutes.

instructions after the game began.²³¹ The participants, however, could carry the instructional materials with them if they wanted to refer back to these during the game. In the Redesign trial, for example, almost all of the participants found the handheld easy to use, and only one participant mentioned having trouble at first (she quickly adapted soon after).

In the Pilot study of the game I did not provide any historical background prior to the game to familiarize the participants with the historic moment. I wanted to test whether the game's internal details were sufficient for enabling the participants to extrapolate an overview of the Battle of Lexington. My hesitation in providing this information in the instruction phase was that I wanted to encourage participants to construct their own master narrative of what was happening in Lexington. I did not want to privilege one narrative over another in how I would situate the historic moment. My observations of the debate suggested that, even without providing historical context, the participants were able to express both rich detailed and general ideas about the Battle. If some participants needed more clarification, they would query other participants, and someone else would propose an answer. This suggested to me that they were deeply engaged with the material, and were reflecting on the process by teaching others what they had learned. For example, the following exchange happened in one of the Pilot study trials:

Participant #1: Why were [the British Regulars] here? Was it just the road going to Concord?

Participant #2: The meetinghouse was here.

Participant #3: And also because they had Adams and Hancock. And they were here, and they knew if they killed off these two, the whole spirit of the revolution would have just gone kaput.

Despite my appraisal of the debate, many Pilot study participants expressed during the focus group that they would have preferred receiving historical background before they started the game. For example, one participant felt that she spent too much time trying to orient herself in the moment, which took away from the time to test hypotheses or evaluate the trustworthiness of a virtual historic figure (NPC). She commented, "I think it would have been easier for me to know a little bit before, so you didn't have as much to keep track of. Because I was really engrossed in [the game], but if you had a better idea of some of the things, you could jump into

²³¹ In fact, Gee posits that games are quite good at teaching people how to use them. (See James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

the details more easily, without taking the time to get the general overview down.” Similarly, another participant felt that he was “wondering what happens before you get [to the historic moment].” He thought people would need a “lead-up,” unless they are already studying the Revolutionary War in the classroom.

Although counter-intuitive to my pedagogical goal of helping participants unravel master narrative and construct their own, in terms of orienting the participants in the game environment I realized it was important to provide general context, at least on what was happening in Lexington and America prior to the Battle. In the Redesign trial of the game, therefore, I decided to provide more historical context for the participants during the instruction phase.²³² In the focus group or post-activity survey, none of the participants mentioned needing more background information. Although even more background may have been helpful to them, they did not mention it as a limitation of their experience in the game, perhaps because they recently had studied the Revolutionary War in class, or perhaps they did not feel it was as necessary in helping them complete the goals of the game (as opposed to learning about the Battle).

WHAT DO THE PARTICIPANTS DO DURING THE GAME?

In the original prototypes of the game, each game participant would start at the same point and end at the same point. The game was untimed; the learning experience was over when the participant successfully went from start to finish. The participants would use a handheld to retrieve location-based content, such as audio, video, photographs, or text. This multimodal media would provide information and evidence about the Battle of Lexington, the historic site, or who fired the first shot; while also providing clues on where the participant should travel next. The content of the interactions centered only on the very moment leading up to the first shot of the Battle of Lexington. In different locations, the participant would gather items that were appropriate for their role. While the participant would start out in the role of one historic figure,

²³² I did not favor one side’s view; rather, I tried to ground the background in the context of the physical location of Lexington. I gave a broad overview of what was happening in the town right before the Battle by pointing out various locations around the Common. For the second half (Part II), I oriented the participants spatially by explaining how the British (Regular) soldiers walked into town, and where the Regular (British) soldiers and Minutemen stood on the Common.

s/he would switch to a new perspective, thereby inhabiting all the perspectives by the end of the game. It was a *Groundhog Day*-like approach to the Lexington moment.²³³

After completing and testing out the prototype, I decided on a number of changes in the game play. First, I decided to make the game more **open-ended and non-linear** (see “Game Content” and “Storytelling/Narrative Elements”). Second, the participants would **interact with various “hot spots” of information** throughout Lexington, which were all available simultaneously, instead of navigating Lexington in a pre-established order. This meant, for example, that I needed to change the way I conceived of the location-based content—no longer would I have to write the testimonials so that they provided clues for the next location.

Instead of focusing on the moment leading up to the Battle of Lexington, I decided to also include the moment after the Battle. This would allow the participant to see how people’s beliefs and views changed after the Battle. It also enabled me to embed the historic context of the Revolutionary War into the game. In the first half of the evidence collection (Time 1), which covers the moment leading up to the Battle, the participants could learn what was happening previous to the Battle and what events were taking place as the townspeople tried to prepare for a possible attack from the Regulars. Participants could also begin to evaluate the trustworthiness of the NPC sources. In the second half of the evidence collection of the game (Time 2), which covers the moment after the Battle, participants could see how tensions and alliances changed, as

²³³ For example, the content of the Minuteman soldier’s (Sylvanus Wood’s) perspective might include the following: The participant, as Sylvanus Wood, begins on the common and introduces himself/herself to a nearby soldier. The soldier directs him/her to find Captain Parker at Buckman Tavern. The participant, as Sylvanus, needs to first find Buckman Tavern and, upon arrival, receives some background information on the Tavern. The participant also earns a part of Sylvanus’s minuteman uniform—as (s)he completes tasks and finds certain locations, (s)he earns different items. Once at the Tavern, for example, the participant might virtually search through the rooms in the Tavern to find Captain Parker. Once (s)he finds the Captain, (s)he is asked to meet at what is now called Parker’s Boulder and then told to convene on the common after the Captain receives word that the British are coming. The participant, as Sylvanus, returns to the Common and prepares for battle. The sounds and images that the participant experiences as (s)he goes to sites on the Common are based on what Sylvanus Wood would likely have heard or seen, based on his account, his status, and his attitudes. Each of the perspectives would include some type of virtual activity or task, such as searching through a virtual Buckman Tavern to find Captain Parker, and would include information about those locations. Also, for each perspective, the participant would gather items related to the historic figure. For example, the participant would earn a quill, an inkwell, and parchment paper when viewing the moment from Ann Hulton’s (a female loyalist’s) perspective. Afterward, the participants would gather together to reflect on the differing views of the historical moment that they experienced.

well as the effect the Battle had on the town, and could learn how people in the town viewed or remembered the event. (See Appendix for the overall schematic of the game).

WHAT IS THE GAME CONTENT?

In “Reliving the Revolution,” participants use GPS-enabled handhelds to access location-based content—all of which I needed to create. But what content could the participants retrieve at these “hot spots?” The RiverCity AR Game Editing system enabled the participants to do four possible actions (see Appendix V); only two were appropriate for my historical simulation:

- (A) **Interact with an NPC.** The NPC provides a text-based testimonial. The NPC may or may not provide a document. This document is in HTML form, so it can include images and/or text.
- (B) **Collect/analyze a game item**

These two types of information provided an ample opportunity to create rich historical game content. The NPCs, for example, could provide historical testimonials and documents, both of which could be used in the game to help simulate the process of searching through an archive of primary and secondary sources. Thus, the game content of “Reliving the Revolution” consists of NPC-provided **testimonials and documents**, and inspections of **game items**.

Creation of the Content

Many of the documents that the NPCs provide in “Reliving the Revolution” are copies or recreations of actual documents from the Revolutionary War period, such as diary entries, letters, or newspaper articles. The incorporation of primary documents and authentic voices into the content of the game was important because, as Shiroma argues, “Primary sources are keys to reconstructing and interpreting the past...[they] lead to active learning and development of critical thinking, reasoning and problem solving (Craver 1999)...students have the opportunity to do more than just absorb information; they can also analyze, evaluate, recognize bias and contradiction, and weigh the significance of evidence presented by the source (Percoco 1998).”²³⁴ Using primary sources, the participants can rediscover and construct new historical narratives and ways of representing the past. They also feel more immersed in the historic

²³⁴ Deanne Shiroma, “Using Primary Sources on the Internet to Teach and Learn History.,” *ERIC Clearinghouse for Social Studies/Social Science Education*. (Bloomington, IN: ERIC Digest., 2000).

moment because the primary documents provide an authentic flavor of the historic period, through their language, tone, and style. Finally, using these documents might compel the students to consider and identify author's intent and motive. All of these characteristics support the pedagogical goals of the game, as well as the educational theories of social constructivism and social cognition, where students learn by actively creating their own knowledge, and by being involved in tasks that are authentic to the real practice of a discipline.

To design the virtual information found at the various locations across the physical site of Lexington, I needed to consider and balance the following pedagogical, practical, design, historical, and artistic concerns:

- (1) **The interaction between the physical site and the virtual information.** What types of historical information was already present in Lexington's physical environment? How could the virtual information play off of the physical world to create novel interactions?
- (2) **The pedagogical goals of the game.** What types of content would inspire the participants to evaluate evidence, pose hypotheses, make connections, draw conclusions, consider alternate views, and identify biases? How would the content help the participant gain a better sense of the historic site and see the Battle of Lexington through a specific socio-cultural lens.
- (3) **The gameplay.** How would the content support the game's objectives (such as evaluating who fired the first shot)? How would the content motivate the player to explore different areas of Lexington, to interact socially, or feel a sense of accomplishment or mastery? How would the content provide novelty or a feeling of discovery? How would the content appropriately direct or guide the participant to navigate this interactive narrative database? How would the content be different for different roles, and how would this support interdependence among the roles? How do I design the content so that the order of retrieval does not matter? How would the content be paced appropriately to support the reflection of game material?

- (4) **The limitations of the game system.** What specific constraints did the game system provide? What types of content was available for me to create given that I was modifying an existing game system? How could I exploit the system's flexibilities or adapt it so that I could create the content I wanted?
- (5) **The limitations of the handheld computer.** How should I alter the content to fit, for example, the smaller screen size? How might I optimize the content for the bright outdoors?
- (6) **Historical accuracy.** How can I properly represent the stories and perspectives of actual historic figures? How can I incorporate or alter appropriately real accounts of the battle into the game? How can I place authentic evidence, such as diary entries, maps, and drawings into the game?
- (7) **Use of language.** How could I immediately evoke voice, tone, and character through the use of lively language? How could I avoid anachronistic language, and convey a time period through the use of language? How could I encourage humor or creativity via the language I use?

The content creation as a highly interactive and dialectic process among these variables. The testimonials, evidence, and game item descriptions were a mix of artistry and historic precision. To write the NPCs' testimonials, I needed to decide the following: where the NPCs were located before and after the Battle (see Appendix XXII), why they were there, what was motivating them, what their beliefs and views on independence and the Battle might have been, and how they would have interacted with the four different roles I chose. I needed to understand what s/he might have been thinking at the time and, considering their class or status in society, how they would have interacted with each of the roles. I then altered the style, nuance, and content, so it would be appropriately different for each role. (See Appendices XIX, XX, and XXI) for examples of testimonials and documents in the game, and also Appendix XXIII for the final testimonial script for the game, and Appendix XXIV for a summary of the testimonials)

I included as game items some points of interest that were present in the actual physical site of Lexington, to further emphasize their role in the Battle as a means of providing further

information about the points and to encourage the participants to inspect the item in the real world.²³⁵ I also tried to include items that would be appropriate for the time period and the roles, such as a colonial hat or a musket. One of the participants in the Pilot trial noted that it was strange to virtually inspect a real item, but the others and the Redesign participants seemed to effortlessly switch between the real and virtual worlds.

In my descriptions of the items, I offered one or more of the following: (1) data that could refute or corroborate an NPC's evidence, (2) information that could help the participant understand more about the context of the Battle, and (3) detail that would provide flavor for the historic moment/time period or encourage the participant to look closer at the physical world. (For a list of the items and their descriptions, please see Appendix XXV.)

Results of the Redesign

For the redesign of the game, I tried to make the evidence even more specific and concrete. I streamlined the evidence so each role would receive strands of 5-6 stories of what happened at the Battle (see Appendix XVII), based on historians' actual hypotheses. Some of the evidence was not clear enough in expressing who the NPC thought fired the first shot, for example, so I revised each testimonial and document to ensure that each had a purpose—every piece needed to add another layer or refine other fragments of stories about who fired the first shot and/or provide flavor to the overall environment or game world. (See Appendix VI for a comparison of evidence between the Pilot and Redesign). I also removed or edited some of the document-based evidence that was too wordy or confusing. I tried to delete excess textual information and instead provide more graphic-based documents. I also added role-specific “secret missions” or mini-objectives to help direct the participants' navigation through this vast evidence.

In my observations of the game, it seemed that the participants in the Redesign trial were able to understand the evidence and how it fit into their understanding of what happened during the Battle of Lexington. In terms of evidence use during the debate, the participants offered testimonials, item inspections, and physical objects as evidence, but rarely used documents to

²³⁵ For example, game items include Buckman Tavern and the Old Belfry, which lets the participant find out more information about these structures on Lexington Common.

support a point. The Pilot study participants more fluidly moved from testimonials to documents during the debate period. Perhaps the younger Redesign trial participants needed more time to evaluate the (usually more dense) documents to be able to then use it during the debate period. Further research is necessary to understand how to better scaffold the documents to be used in the participants' interpretive dialogue.

WHO WERE THE GAME'S CHARACTERS?

I cast the game's virtual historic characters, or NPCs, decided on the total number of NPCs, and located them on the Lexington "game board" all at the same time. I needed to balance the problem of overwhelming the participant with ensuring that they would interact with a variety of viewpoints.²³⁶ How could I use enough NPCs with different views to provide a holistic and balanced sense of that time period? I wanted them to feel like there were more NPCs they could have "met," and that there was an abundance of evidence they could sift through. I also wanted the participant to develop a sense of their assigned historic role as they interacted with the NPCs.

Casting

To decide who to "cast" as the NPCs, I considered a number of factors. The first was that I tried to include NPCs that were based on actual historic figures. While most were based on real people, a few were amalgams of figures or the types of people that lived during the Battle I chose historic figures where I had access to their testimonies, diaries, or other sources on their views and beliefs about the Battle of Lexington; and I tried to incorporate their actual words and phrases into their interactions in the game. I attempted to identify and capture the spirit of each historic figure (NPC), and then communicate that through their testimonial. (Please see Appendix XXII for a chart on the NPCs).

Number of NPCs

²³⁶ Next, just like with my role choice, I wanted to provide a spectrum of values, beliefs, and backgrounds. In the history books I read, the authors privileged the voices and testimonies of the white male minutemen or the Regular soldiers. I also sought to include more women, children, African Americans, as well as a variety of beliefs about America's relationship with Britain. As you see in Appendix XXII, there is a variety of types of characters. I also wanted to provide a balance among these views, particularly between the two sides of the War, while also making it realistic for the moment. For example, in terms of properly supporting my pedagogical goals and the game play, it was necessary for me to include more "Regular soldier NPCs" in the first half than might have actually been in Lexington before the Battle began.

In deciding on the NPCs, I also needed to consider the constraints of the game system. In the RiverCity game system, each of the NPCs are designated by a purple dot on the map. Too many dots on the map could overwhelm the participant. Thus, in my pilot design, I decided that each role would have the opportunity to speak to ~30 NPCs out of 40 total NPCs, which would be widely distributed throughout the Lexington Common. While most of the NPCs are present for every role; a few of the NPCs would be available to some roles and not to others. I decided which NPC could speak to which role based on historical evidence and logical relationships.²³⁷ It was important to ensure that many of the NPCs spoke to more than one person because this provided opportunity during the debate for the various roles to compare what the NPCs said to each of them; and to interpret why the NPC offered different evidence. (Please see Appendix XXIII for the game's testimonial script, which denotes each NPC and to whom they each speak)

Although there were approximately 40 NPCs in each of the first and second time periods (Time 1 and Time 2) of the game (before and after the Battle of Lexington), I estimated that the participants would only interact with 10-15 of them in each game time period. In the Redesign, at first one of the participants was concerned about having to talk to all of the NPCs. After I told her that she only needed to gather a proportion of the evidence available, she was satisfied. At the end of Periods 1 and 2, the participants all wanted more time to talk to NPCs and gather and interpret evidence, so as better to argue their claims during the debate.

Thus, each trial and resolution of the game would be distinct from each other. Depending on the types of evidence that each participant gathered, that person would draw distinct conclusions and privilege different evidence, which would lead to novel group deliberations about who fired the first shot. This was evident in the two trial runs of the Pilot study design. The participants in each trial privileged different evidence based not only on what they retrieved, but also on how they interpreted their evidence based on what other participants offered. In a later section, I discuss how, as a result, the debate resolutions were distinct among the three trials.

²³⁷ For example, I thought that the child of the Reverend would not be allowed to speak to the Regular soldier. Or, some regular soldiers refuse to talk to the African American slave. Most of the NPCs, however, could speak to everyone.

There is flexibility in the number of NPCs that can be included in the game, which reflects the games' adaptability. Some of the NPCs can be "turned on" or "turned off," so that the instructor can choose which NPCs could be included and which can be excluded. Thus, the instructor could alter the game for his/her pedagogical needs; s/he could also massage the game so that certain evidence is biased, and then work with the participants to see how this might affect the outcome. Another way to use the game is that participants, after they play the game, can alter the NPCs that are available, and can discuss how this might change the way each role views the historic moment, and how this might change how we view history. Thus, participants can learn experientially as game designers how valuing evidence and suppressing others can change the way we interpret history.

Location

I wanted the participants to learn the physical landscape, while receiving the virtual content, so I tried to spread out the "hot spots" of information throughout the "game board." I distributed the NPCs and items throughout Lexington Common, constrained only by the size of the virtual map and its corresponding physical area. When deciding on how to place the NPCs and items, I considered how the information and the environment would work together, and how the physical layout would affect how participants received virtual information. I also based it on their motivations and beliefs—where I imagined they would be located before and after the Battle.

I also designed the game so many of the NPCs change location from the first half to the second half of the game. This makes it more challenging for the participant, because s/he cannot go to the same location to find an NPC, and it further encourages the participant to search for certain characters and to collaborate with other roles to find out where particular NPCs are located. Changing the location of the NPC makes the game more realistic and authentic, because we would assume that the historic figures would have moved from before to after the Battle.²³⁸ (See

²³⁸ For example, after the battle, we wouldn't expect that a Minuteman soldier would still be deliberating near Buckman Tavern if he just fought in a battle, or that Paul Revere was still rousing the troops if he was supposed to be moving a trunk out of Buckman, according to historical sources. Also, some new NPCs are introduced in the second half of the game, while some old NPCs from the first half leave the game—either because they are wounded, or because they had physically left Lexington. For example, Sam Adams and John Hancock had escaped to the

Appendix XXII and Appendix XXV for a chart of NPCs and game items, respectively, and where they are located)

WHAT ARE THE GAME'S ROLES?

In my first iteration of game design, I brainstormed the following list of potential roles:

1. **White/Free Minuteman soldier**²³⁹
2. **British loyalist**²⁴⁰
3. **African-American slave**²⁴¹
4. **British soldier**²⁴²:
5. **Child**²⁴³:
6. **Optional possibilities:** Native American, neutral colonist, another British perspective

After completing a prototype of the game, I decided only to include four roles. (See Appendix XXVII for an explanation of this). I decided to create four different roles through which the participant could view the Battle of Lexington event.

The four final historic figures are:

- (1) **Prince Estabrook**, an African-American slave/Minuteman;
- (2) **John Robbins**, a middle class Minuteman soldier/Patriot;
- (3) **Ann Hulton**, an upper class Loyalist; and

woods just before the Battle of Lexington began. Their disappearance before Time 2 is historically accurate, but also may affect how the participants view their testimonials. For example, they might question the trustworthiness of leaders who do not stand by their men in the battle.

²³⁹ As described in my second (May 2004) proposal: "Most likely this will be Sylvanus Wood, a 23-year-old male from Woburn who heard the warning bell and ran to Lexington to join the militia. Sylvanus arrived in Lexington and immediately looked for Captain John Parker, the leader of the Lexington militia, who gave the orders to meet the British on the common. Sylvanus gave an official account of this moment while he was in his 70s."

²⁴⁰ As described in the May 2004 proposal: "Most likely this will be Ann Hulton, the sister of a British Commissioner. Anne had moved from Britain just a few years previous to the War, and she was loyal to the British cause. There is a published book of her letters to a British friend, one of which includes her take on the events that took place on April 19, 1775. Although it is unclear exactly what she was doing during that moment, the letters provide insight into her perspective on the war, as well as context for her activities during that time. I also thought it would be useful to have a female's perspective on the war."

²⁴¹ As described in the May 2004 proposal: "This will most likely be Prince Estabrook, an African-American slave who was wounded during the Battle of Lexington. There is a book based on his story called *Prince Estabrook, Slave and Soldier*, by Alice Hinkle. I thought it would be important to include the perspective of an African-American slave, especially since most students do not realize that slaves fought in the Revolutionary War. Also, a slave's role in the fight for freedom would take on a different significance and would provide a unique point of view on the historic moment."

²⁴² I will pick a British soldier or "redcoat" as well. The likely candidate will be Marine Major John Pitcairn, who was in charge of the British troops.

²⁴³ One possibility for this role is William Diamond, who was the drummer for the Minutemen. He was sixteen years old at the time, and there are sources that illustrate his perspective on the war.

- (4) **Philip Howe**, a poor soldier in the King George III's army.
(See Appendix X for the description of the roles as handed out to the game participant.)

Prior to beginning the game, each player receives a character sheet that describes the role: personal, social and economic background; motivations; and historic context. The participant (or team of participants) then inhabits this role while collecting evidence, hearing first-hand accounts, and exploring the historic site of the Lexington Battle. In the game, this manifests itself when the virtual characters (NPCs) provide different stories, information, or evidence depending on one's role.²⁴⁴

I based my final choices for the four roles on a number of factors. I tried to choose roles where there was an abundance of historical resources so I could accurately and authentically recreate how other people would have treated them, and what types of information they would or would not receive.²⁴⁵ In choosing the number and types of the roles, I wanted to provide a variety of distinct perspectives. I took a cue from *Revolution*, a MUVE that recreates Williamsburg, Virginia during the Revolutionary War.²⁴⁶ In that game, the roles included loyalists and patriots, as well as middle class, upper class, and lower class figures, men and woman, and slaves and

²⁴⁴ Sometimes a NPC would tell their story only slightly differently to each role. Other times, the stories, language, and tone are completely distinct. Because of a person's role, a participant might receive wrong or misleading information, or extremely personal anecdotes that would not be shared with anyone else. The game players must actively evaluate the evidence, stories, and documents they gather based on these prescribed roles, and they also learn more deeply about the role as reflected in the way they interact with the NPCs. For example, game players get a deeper sense of the way African American slaves were treated during the Revolutionary War period; while experiencing the Battle through the eyes of a slave; and incorporating the slave's point of view in their estimation of stories and evidence. As the game players interact with more and more NPCs, they get a deeper, richer sense of their role's perspectives, because of the way NPCs treat them. Not only does the game play expose the multiplicity of histories, it also expresses the reciprocity of perspectives and the relativity of interpretation as described by a Deconstructionist approach to history. All at once, the game player can intimately enter a historic moment, while also reflecting on one's role in evaluating history and constructing one's own story of what happened.

²⁴⁵ Originally, I had conceived of including the points of view of various "stock characters" that might have been involved in the moments leading up to the Battle of Lexington. By choosing actual historic figures as the four game roles, I could research their relationships with other historic figures, and look at the stories that they told about the Battle, to provide more authentic color and detail to the characterization and narrative that I created for them.

²⁴⁶ This was created by the Education Arcade at MIT's Comparative Media Studies Program. See <http://www.educationarcade.org/modules.php?op=modload&name=Sections&file=index&req=viewarticle&artid=9&page=1> for more information.

free men. I wanted to express social class and economic distinctions, cultural and racial backgrounds, as well as diverse perspectives on the Revolutionary War.²⁴⁷

I decided the most salient perspectives included the two sides of the War: the American colonist view and the British,²⁴⁸ and the two American colonist views on the tensions, the loyalists and patriots.²⁴⁹ I also decided to include a female's perspective to further encourage female game players to participate in the game environment, and to show the presence of females in a battle, since they are often under-represented in textbooks, particularly in discussions of wars.²⁵⁰ This also fits into the deconstructionist framework, which tries to consider both the well-represented and the under-researched, but equally essential views of history.

HOW IS THE GAME RESOLVED?

In any game, it is important for the participant to know how it ends and what they need to do to complete the game. How is their success measured and what qualifies as “being done?” One way that an AR game can be resolved is with time: when the time is out, the game is over (the participants had only 30 minutes for each period of the game). In *Outbreak@MIT*, for example, one of the constraints was time. Having this “limited resource” encouraged the participants to work together quickly to mete out responsibilities, solve problems, and create strategies. Participants would be all working together to gather as much evidence as possible in the time allotted.

It was important to communicate the time constraints to the participants and ensure that they understood these limitations. In my Pilot studies, however, the participants did not feel the time pressure because they were unaware of time running out. Future iterations of this game should

²⁴⁷ In determining the roles, I needed to consider that, each time I chose a role, I was privileging a particular point of view and possibly silencing other points of view. Therefore, I tried to select a diverse set of views, and choose the major frameworks during 1775, while also thinking about including other cultures and genders. I also thought about how to show complexities in each perspective; and how to bring in other voices and subtle differences through the testimonials of the NPCs or the document-based evidence.

²⁴⁸ In 1775 the British were called the “Regulars” by the colonists, since most Americans then still considered themselves to be British citizens.

²⁴⁹ The loyalists felt allegiance to the British King George III, and the Patriots wanted America to have a government independent of Great Britain.

²⁵⁰ See for example, *Women in the Age of the American Revolution*, ed. By Ronald Hoffman and Peter J. Albert, (Charlottesville, Va: 1989).

have a clock or stop watch incorporated into the interface of the game, reminding the participants that time is running out. Such a mechanism would motivate them further, and engage them more in meeting their objectives. In the Redesign, however, one of the participants mentioned that she was very aware of the time because she wanted to know how many more NPCs she could speak to in the remaining time.

The other important resolution to the game was the convergence of evidence at the end of the game in the form of the debate. As I changed the game play for “Reliving the Revolution” so that each participant inhabited only one role, and I decided to emphasize more collaboration, I thought it was important to have an extended discussion period or debate as part of the game.²⁵¹ The students confer about who they think fired the first shot, and deliberate until they can agree what they think happened based on the evidence they received. The debate, and thus the game, ends when the participants agree on who fired the first shot.

This debate period would be an important extension of the learning because the participants could reflect on what they were learning. In the debate, participants have the opportunity to discuss and describe their gathered material, and share their thinking processes, thereby solidifying personal connections to this new practice. Participants weren’t just gathering material, they were using it: sifting through it, analyzing it, talking about it, and showing where they retrieved it. Second, the debate period could be a motivating factor for the participants in the game to learn their roles, gather evidence, and interact with the game world. It provided another impetus for the participants to engage in the game, because they knew they would have to share their learnings with the group later, and others would rely on them for knowledge.

I changed the structure of the debate based on my evaluations of previous AR games. I observed that, during the trials of *Outbreak@MIT*, the participants were so busy gathering data and running to locations, they did not have time to reflect on their findings or to collaborate on

²⁵¹ As opposed to in my first iteration of the design (the prototype), I conceived that each individual would inhabit each role and follow one set game path, and then decide for him or herself who fired the first shot at the end. I conceived that there would be a guided discussion at the end, where each participant would share his/her views with the others.

solutions to the problems they found. I wanted to alter the pace of the game and to incorporate a time period where the participants could gather and deliberate, exchange ideas and share hypotheses, and then come to a consensus. Thus, in my Pilot and Redesign trials, I encouraged the students to spend time speaking to their partners and comparing information before we even began the debate. Participants, though, in my game trials noted that they wanted even more time to digest the material. They were also very excited to share information with other roles. At the end of Part I²⁵² of the game, as soon as the participants were together again for the debate period, they immediately began exchanging information, comparing notes, and reading their testimonials aloud to each other.

In the Pilot study, I did not address in my instructions the possibility of sharing information during Part I of the game; as a result, the participants only shared with other roles during Part II (the debate). A few participants in the Pilot study commented that they wanted more social interaction with other roles during Part I. For example, one participant recommended that I make the game “more interactive between the actual players, during [Part I] of the game.” In the redesign of the game, I tried to enhance the potential for such interactions by showing the participants how to share information during Part I, and by encouraging them to interact with other pairs (roles) during Part I, as well as Part II. Part II, however, will always support more inter-role collaboration, because the participants are physically together, rather than separately wandering around Lexington.

Debate Results

For the Pilot study (Trial 1 and Trial 2), the debates lasted for 22 minutes and 40 minutes, respectively. During each of these debates, the participants were constantly talking to each other, sifting through evidence and showing it to each other on their handhelds, reading aloud pieces of testimonials, and offering hypotheses or counter-arguments. I only needed to direct the debate a few times for each trial; in other words, the group was completely engaged in a historically-informed discussion, based just on the evidence that they had gathered in Part I of the game. The

²⁵² The period of the game where students are gathering evidence, information, and testimonials with their handheld, as opposed to Part II, where they are debating their findings with their cohorts. See Appendix I for a schematic of the game.

participants seemed fully invested in collectively working through the objective—to figure out who fired the first shot at Lexington’s battle based on their evidence.

In the Redesign trial, the participants debated for over twenty minutes and were able to conduct a rich investigation of the main and mini-objectives after an initial slow start. These younger participants needed some more probes, or targeted questions; to spark further discussion, elaboration of ideas and alternate readings. Throughout the debate, I provided these guiding questions in as minimal a form as feasible.

Overall, however, the Redesign trial participants were able to create their own unique hypotheses and interpretations of the material; they could construct counter arguments and work fluidly among multimodal texts. This fits into the model of guided self-directed learning. Students need some scaffolding to support their visit to a “practice field” and incorporation of new epistemic frames, tools, and concepts. This also further expresses the need for an instructor or mentor in learning. Multimedia platforms for learning are not replacements for teachers.

In each trial of the game, the group had a distinct result for who they think fired the first shot. In the first trial, the participants focused on information about two guns firing simultaneously, as well as multiple pieces of evidence about faulty guns and weapons misfiring, which they feel was likely the cause for the first shot. In the second trial, the participants decided that the Minutemen had the greatest motive for firing the first shot, because they were passionately angry that the British were impinging on their freedoms; whereas the British were just trying to quell the rebellion. Further, they felt that the British were better-trained and stricter, so those soldiers wouldn’t have misbehaved by firing the shot. In the Redesign trial, the participants felt that the British Regulars actually had more reason to fire, because they were angry that the Minutemen were keeping secret stores of guns and holding them up on their way to Concord. They also felt that, because the British had already stationed plainclothes spies in Lexington, the initiating of a Battle might have been premeditated. Each group collectively created a story of what happened at the Battle of Lexington; each unique reconstruction was possible based on the available

evidence, depending on how the group privileged and interpreted the evidence and what types of conclusions they drew.

CHAPTER FIVE:

ENGAGING ELEMENTS

OTHERWISE ENGAGED

A truly compelling game, like any engaging media, is an experience. Overbeeke, et al. argues “the designer needs to create a context for the experience, rather than just a product. He offers the user a context in which he may enjoy a film, a dinner, cleaning, playing, working, *with all his senses*.”²⁵³ As a game designer, how do I create a game experience that holistically engages our mind and senses?

In defining engagement, Laurel invokes Samuel Taylor Coleridge’s notion of the “willing suspension of disbelief”...the state of mind we must attain in order to enjoy a representation of an action.”²⁵⁴ In viewing the theater, she argues, we must willingly suspend our belief that it is only a representation. Only by fully engaging ourselves in this new world can we derive a more powerful emotional response from it. Her definition suggests that we are most engaged when our suspension of disbelief is most actuated.

Similarly, Richard Wagner used art—opera—to entice one to enter a new world. According to Wagner, the goal of a work of art is to imitate, recreate, and be life; something akin to our conception of a virtual reality. Through the synthesis and cooperation of art forms, the artist creates a new reality so compelling that the audience “forgets the confines of the auditorium, and lives and breathes now only in the artwork which seems to it as Life itself, and on the stage which seems the wide expanse of the whole World”²⁵⁵ The audience suspends their disbelief,

²⁵³ Overbeeke, et al. “Chapter 1: Let’s Make Things Engaging,” *Funology: From Usability to Enjoyment*. Kluwer Academic Publishers., 2003.

²⁵⁴ Brenda Laurel, *Computers as Theatre*. (Reading, MA: Addison-Wesley, 1993).

²⁵⁵ Richard Wagner. “Outlines of the Artwork of the Future,” in *Multimedia from Wagner to Virtual Reality*. (New York: W.W. Norton & Co., 2001).

becomes wholly engaged in the Wagnerian world, and can more fully achieve emotional expression.

In the Heideggerian interpretation of *repraesentio* or representation, “To represent [*vor-stellen*] means to bring what is present at hand [*das Vorhandene*] before oneself as something standing over against, to relate it to oneself, to the one representing it, and to force it back into this relationship to oneself as the normative realm.”²⁵⁶ The Heideggerian man becomes more present, in a sense more engaged, into the representation, and thereby makes himself the norm.

In other words, by putting oneself into the picture, you are thereby applying your subjectivity onto the representation: “to set out before oneself and to set forth in relation to oneself.” “In that man puts himself into the picture in this way, he puts himself into the scene....Man becomes the representative [*der Repräsentant*] of that which is, in the sense of that which has the character of object.”²⁵⁷ Likewise, in “Reliving the Revolution,” the world of 1775 is grasped as a picture. The game players subjectively share this picture, which becomes the representation for them—“Man becomes the relational center.”²⁵⁸ There seems to be a connection between engaging with and grasping this new world picture and seeing that representation as subjective or relative to oneself.

In “Reliving the Revolution,” I use the art of web technologies to create a representation of the moments before and after the Battle of Lexington. Using a handheld computer as a window to this world—similar to Wagner’s stage—game players enter a new time period, a new reality. Although the participants are in 2005, they can revisit the moment of the Battle of Lexington—actively explore it; become emotionally aroused by it; and learn from it. As a designer, I must consider how to best craft the experience so that players are compelled to suspend their beliefs and enter a new world. How do I make them forget the confines of time? How do I compel them to transcend the limitations of their own perspective and inhabit a new viewpoint? How can I move them to this new world, while also moving them emotionally?

²⁵⁶ Martin Heidegger, “The Age of the World Picture,” in *The Question Concerning Technology and Other Essays*, (New York: Harper & Row, 1977).

²⁵⁷ Ibid.

²⁵⁸ Ibid.

It is necessary, then, to first unpack the role of affect, attention, pleasure, and engagement in computer-mediated experiences, such as AR games. In *Computers at Theatre*, Brenda Laurel considers the limits of conventional human-computer interaction analysis, ones that focused on “rational and intellectual”²⁵⁹ choices, rather than “emotional and aesthetic relations.”²⁶⁰ She conceived of computer-mediated activities as designed experiences, and showed the importance of applying lenses from artistic disciplines, particularly the theatrical and dramatic, making “ideas like *pleasure* and *engagement*”²⁶¹ more relevant. McCarthy and Wright echo Laurel, explaining that we must consider how to design not just for a game, but for an experience.²⁶² They argue that technology should be seen as an “experience with technological artifacts,” which focuses on emotional and affect-driven attributes of technology, such as “engagement, enchantment, irritation, and fulfillment.” This research suggests that, as a designer of a game or any media, it is important to consider not only mechanics and usability, but also to think about the “fun, enjoyment, aesthetics, and the experience of use.”²⁶³ (See Appendix XXVIII for a comparison of the human experience approach and usability analysis).

We need to design for the right balance of game play and pedagogy to enable the participant to play and learn seamlessly, but also to actively and pleasurably engage with the experience. We need to scaffold learning within the game in a way that does not water down the educational content or disengage the game player.²⁶⁴ For example, Blyth refers to Brenda Laurel’s analysis of math software, whereby finding the correct solution could advance you in the game. Blyth argues that the more engaging solution would be to design a game in a “causally related way”; to

²⁵⁹ As discussed in Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003).

²⁶⁰ Ibid.

²⁶¹ Brenda Laurel, *Computers as Theatre*. (Reading, MA: Addison-Wesley, 1993).

²⁶² In John McCarthy and Peter Wright, “Technology as Experience,” in special issue *Funology, Interactions: New Visions of Human-Computer Interaction*, September/October 2004, writes about user experience and experience-based design of technology.”

²⁶³ Mark Blythe, et al., *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003)

²⁶⁴ S. Thomas, G. Schott, and M. Kambouri, “Designing for Learning or Designing for Fun? Setting Usability Guidelines for Mobile Educational Games,” Proceedings of MLEARN 2003: Learning with Mobile Devices, London, 2003.

incorporate play with mathematical reasoning and problem-solving; one that combines the affective with the cognitive.²⁶⁵

Games and simulations can be effective learning environments if they support fun and engaging play, where students can naturally learn, discover, and experiment.²⁶⁶ In *Funology: From Usability to Enjoyment*, part of the Human-Computer Interaction Series and a related *Interactions* journal issue, the concept of fun and its relationship to engagement takes center stage. In defining “fun,” John Carroll explains that “Things are fun when they attract, capture, and hold our attention by provoking new or unusual perceptions, arousing emotions in contexts that typically arouse none, or arousing emotions not typically aroused in a given context.”²⁶⁷ He argues that fun happens when things are surprising and unexpected, challenging and enigmatic, providing feedback and closure.

In other words, participants find pleasure in a game because it holds attention and “captivates”; it is novel and arouses new emotions beyond the quotidian. Carroll argues that, for something to be fun, both the cognitive and affective must be stimulated. To have “fun,” we need to be not just aroused emotionally, but cognitively aware of some disconnect or surprise. In other words, emotional arousal needs to be supported by a mental challenge, intriguing context, and/or sensory surprise.

Similarly, Marc Hassenzahl argues that emotion and cognition are “integral parts of each other.”²⁶⁸ Complex emotions are felt and expressed in tandem with, for example, decision-making and thinking processes. To create effective design, Hassenzahl contends that designers need to consider the interaction between emotion and cognition in how they might shape an

²⁶⁵ Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003) and Brenda Laurel, *Computers as Theatre*. (Reading, MA: Addison-Wesley, 1993).

²⁶⁶ Mitchel Resnick, “Edutainment? No Thanks. I Prefer Playful Learning.” Associazione Civita Report on Edutainment, unpublished copy, 2004. Available at <http://web.media.mit.edu/~mres/papers/edutainment.pdf>

²⁶⁷ John M. Carroll, “Beyond Fun,” “Interactions,” in special issue *Funology, Interactions: New Visions of Human-Computer Interaction*, September/October 2004

²⁶⁸ Marc Hassenzahl, “Making Sense of Experience” in Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003)

experience. “Designers can shape, but they cannot determine”²⁶⁹ people’s emotions; so Hassenzahl suggests that, instead of designing for people’s emotions, we should design for people’s needs and try to fulfill them. We should shape for an experience that will create positive, aroused emotions. In designing experiences, we should consider how emotion interacts with mental activities—that we often need one to have the other.

So, designers of a media experience need to consider fun, engagement, and emotion; and research has suggested that these are interrelated. For example, Overbeeke, et al. explain that “fun can result from engagement, but is not a goal of such”;²⁷⁰ experiences can be more engaging, however, if they are more fun.²⁷¹ For Carroll, “fun” is subsumed under deep engagement. It describes one part of deep engagement—the end of the spectrum filled with a mix of surprise, intrigue, and positive emotions.²⁷² Ben Shneiderman, on the other hand, argues that things are fun because they are pleasurable and different, or challenging and satisfying, or socially-fulfilling. For him, the difference is that, in deep engagement, all of these elements are working together, or they are at a greater intensity or level.²⁷³ I wanted to design “Reliving the Revolution” with the appropriate balance of engaging elements, such as challenge and achievement; novelty and security; and social interactions.

To design, assess and evaluate “Reliving the Revolution” within the scope of this thesis, I focused on four characteristics that suggested greater engagement in AR games and seemed relevant to my pedagogical goals: (1) Interpersonal or collaborative elements, (2) role-playing, (3) storytelling/narrative elements, and (4) kinesthetic/mobility elements. For example, I chose the characteristic of role-playing because it directly supported my pedagogical goals of

²⁶⁹ Ibid.

²⁷⁰ Kees Overbeeke, et al. “Engineering of Experience,” in Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003)

²⁷¹ Stephan Wensveen and Kees Overbeeke, “Fun With Your Alarm Clock,” in Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003)

²⁷² John M. Carroll, “Beyond Fun,” “Interactions,” in special issue *Funology, Interactions: New Visions of Human-Computer Interaction*, September/October 2004.

²⁷³ As Shneiderman describes, relaxing, or being “disengaged” with goals or action can also be fun. We can be not be engaged at all and still be having fun. In that sense, deep engagement and fun are separate. (Ben Shneiderman, “Designing for Fun: How Can We Design User Interfaces to Be More Fun?” *Interactions*, “Special Issue on Fun,” September and October 2004.)

considering multiple perspectives in history and understanding that each person interprets the past from their unique role. These are based in part on previous research, in which I devised criteria for engaging AR games (see Appendix XXIX for a chart of these criteria). I wanted to see how each of these elements played out in terms of engagement and in meeting the pedagogical objectives of this learning environment. (See Appendix XXVI for a visual representation of the four elements, engagement, and learning). In the following subsections, I consider theories of engagement, design, and pedagogy in light of these four factors, and review my choices based on the iterative trials of the game.

COLLABORATE AND LISTEN: COLLABORATIVE ELEMENTS

“Tell me, I forget.
Show me, I remember.
Involve me, I understand.”
—Chinese proverb²⁷⁴

Are two heads really better than one? Is more really the merrier? Axioms such as these suggest that activities that involve teamwork or collaboration can be more fun, engaging, and educational. In designing “Reliving the Revolution,” I considered the relationship among collaboration, engagement, and learning, particularly in regard to AR games. What elements of collaboration lead to deeper engagement and learning? In which educational situations are collaborative activities appropriate? When should activities be collaborative or competitive?

Collaboration in appropriate contexts can foster deeper and more complex learning. Cole and Stanton, for example, refer to previous studies of children and collaborative learning activities, where participants use and hone skills such as “planning, negotiation, tolerance, and the ability to listen to others.”²⁷⁵ They argue that “social interaction is important for sharing ideas, constructing and shaping understanding and fundamental for educational development.”²⁷⁶

²⁷⁴ Quoted from Marcy P. Driscoll, “Psychological Foundations of Instructional Design,” Chapter 4, *A History of Instructional Design and Technology*

²⁷⁵ Ibid.

²⁷⁶ Helen Cole and Danae Stanton, “Designing Mobile Technologies to Support Co-Present Collaboration.” *Personal Ubiquitous Computing*. Vol. 7: 365-371, 2003.

Collaboration and teamwork may be a factor in more deeply engaging a participant in an activity²⁷⁷—which could in turn increase the potential for solving complex problems.

Encouraging collaboration also fit into the constructivist and constructionist framework, whereas students work together to construct a common product or idea (such as historic narrative), and learn through their reflection of the process of creation. In such environments, Resnick and Papert posit that reflection—the act reflecting on your thinking or creation and sharing those ideas with others²⁷⁸—is also integral to active learning. By reflecting on the process of reconstructing a historical moment, learners can gain a deeper understanding of their role in interpreting history. Papert argues that, by building an “object to think with,”²⁷⁹ people can externalize their thinking and reflect on the process and, through reflection, create deeper internal connections. Reflective practice is aided by working on a team—by sharing an idea or product with others, you are necessarily more likely to reflect on it. Reflection also motivates one’s interest in the task by making it more meaningful. Through reflective practice, students can connect more personally with an unfamiliar location or novel historic time period.

For example, results from “Virtual Space Design Tools for Girls in the Computer Clubhouse,”²⁸⁰ a research project I co-conducted on architectural software in the Computer Clubhouse,²⁸¹ suggested that female teenagers seek out ways to collaborate and share their work with others. In fall of 2003, we observed girls (ages 10-14) at the Clubhouse using software to design their own bedrooms, and found that the girls enjoyed sitting in close proximity when they were constructing their rooms on their individual computers. They sought out ways to reflect on each other’s work; for example, by giving advice on the bedroom’s layout or showing someone else

²⁷⁷ For example, Mandryk and Inkpen’s results suggested that there is a “different physiological response in the body when playing against a computer versus playing against a friend” R. L. Mandryk and K. Inkpe., “Physiological Indicators for the Evaluation of Co-Located Collaborative Play.” *CSCW '04*. Nov. 6-10, 2004.

²⁷⁸ See for example, Mitchel Resnick, [Rethinking Learning in the Digital Age](#). In *The Global Information Technology Report: Readiness for the Networked World*, edited by G. Kirkman. (Oxford University Press, 2002).

²⁷⁹ Papert, Seymour. (1980). *Mindstorms: Children, Computers, and Powerful Idea*.

²⁸⁰ Karen Schrier and Tripti Gore. (2003). Unpublished paper. “Virtual Space Design Tool for Girls in the Computer Clubhouse.”

²⁸¹ A technology community center for junior high and high school students. See <http://www.computerclubhouse.org/index.htm> for more information.

how to create a particular object. Girls who were more experienced with the software would automatically help girls who were newcomers.²⁸²

All of the girls who participated in our study wanted printouts of their new bedroom and wanted to share the design with others, such as her friends or family. Their shareable, tangible designs initiated conversations about collaborations, as well as collaborative interactions. Our research suggested designing technological environments that use a collaborative approach²⁸³ if we want to maintain and encourage girls' participation and interest.

Further, the learning preference of the next generation, or those young adults and teenagers born after 1982, are geared toward "teamwork, experiential activities, structure, and the use of technology. Their strengths include multitasking, goal orientation, positive attitude, and a collaborative style."²⁸⁴ Similarly, students who have a Neomillennial Learning Style²⁸⁵ prefer educational activities that involve social interaction. Emerging learning environments should support teamwork and learning through a collaborative style.

Are handheld computers appropriate for collaborative activities? Klopfer, et al. have shown that handheld computers support conditions for learning by supporting social interactivity, remaining contextually sensitive, and offering individualized scaffolding.²⁸⁶ When handhelds are used in appropriate situations, Klopfer et al. argue, "New forms of collaboration can form, as students,

²⁸² For example, the following is an interaction that took place between two participants, Chelsea and Ana, who were sitting at separate computers across from each other:

Chelsea starts playing with 3D Home Architect. Ana comes over and starts helping her out by teaching her and showing different options. She helps her out by saying that the couch was too close to the TV in the 3D mode.

At one point, Chelsea shows Ana all the objects she has put in her room, and Ana reciprocates.

Chelsea: I've got a sofa, TV....

Ana: Chelsea, do you like my house from the outside?... 'Do you want to see my house in 3-D? There is my shower.

Chelsea: We have the same bed!

²⁸³ This is not to neglect male engagement, because all learners can benefit from collaborative exercises. We only happened to use females in our study, which provided more support to the concept of collaborative learning in a handheld game environment. While conducting the study, boys at the Computer Clubhouse were very interested in also designing their bedrooms. They were allowed to participate, but were not included in the results of our study.

²⁸⁴ Diana Oblinger, "The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004.

²⁸⁵ Chris Dede, "Planning for Neomillennial Learning Styles," *Educause Quarterly*. No. 1., 2005.

²⁸⁶ E. Klopfer, K. Squire, & H. Jenkins, "Environmental detectives PDAs as a window into a virtual simulated world." Paper presented at the International Workshop on Wireless and Mobile Technologies in Education, Växjö, Sweden, 2002.

connected via their handhelds investigate different resources, collaborate in asking questions, and negotiate the exploration of physical spaces.²⁸⁷

In everyday life, people often use “their mobility and the mobility of artifacts to coordinate their collaboration with others,”²⁸⁸ such as paper documents or moving to a colleague’s computer in a workplace. Likewise, Danesh et al. posits that the mobility of these devices can enhance inter-group collaboration: “Children can walk around, maintaining the flexibility of interacting with many other children, rather than limiting their collaboration to those on the computer beside them.”²⁸⁹ This study of handhelds in education focuses not on the technology, but on the activities, interactions, and learning it supports.

Mobility and mobile technologies, however, do not necessarily encourage collaboration. “The physical size of mobile technologies presents interesting challenges when designing for collaborative activities. When designing mobile technologies the importance of collaborative tasks has often been overlooked.”²⁹⁰ Similarly, Cole and Stanton warn, “with an inappropriate design, a mobile interface may equally prove to be a barrier to learning.”²⁹¹ The personal nature of handhelds may hinder collaboration, rather than promote it. The small size of a handheld may also isolate the user from meaningful social interactions.²⁹² On the other hand, handheld computers are smaller than portable technology such as laptops, which can isolate users by creating impromptu walls.²⁹³

²⁸⁷ E. Klopfer, K. Squire, & H. Jenkins, Augmented Reality Simulations on Handheld Computers. Paper presented at the 2003 AERA, Chicago, IL, 2003.

²⁸⁸ Helen Cole and Danae Stanton, “Designing Mobile Technologies to Support Co-Present Collaboration.” *Personal Ubiquitous Computing*. Vol. 7: 365-371, 2003.

²⁸⁹ Arman Danesh, et. al. “Geney: Designing a Collaborative Activity for the Palm Handheld Computer.” *CHI 2001*. Vol. 3, No. 1., 2001.

²⁹⁰ Helen Cole and Danae Stanton, “Designing Mobile Technologies to Support Co-Present Collaboration.” *Personal Ubiquitous Computing*. Vol. 7: 365-371, 2003.

²⁹¹ Helen Cole and Danae Stanton, “Designing Mobile Technologies to Support Co-Present Collaboration.” *Personal Ubiquitous Computing*. Vol. 7: 365-371, 2003.

²⁹² This is argued in R. L. Mandryk, K. M. Inkpen, M. Bilezikjian, S. R. Klemmer, & J. Landay, “Supporting Children’s Collaboration across Handheld Computers.” *Conference on Human Factors in Computing Systems*, 255-256, 2001.

²⁹³ Suggested by Ed Dieterle and Chris Dede, referencing a photograph from the Sixth International Conference on Ubiquitous Computing found at http://hextone.com/v-web/gallery/Final-Assembly-Photos/CRW_2445.

AR games seem to have the potential to be a powerful nexus, where they can provide meaningful experience that can harness playful, collaborative, and engaging learning, if they are used appropriately. Without competition, however, how would I also motivate game play? I structured the game to be played non-competitively among the four roles: No one pair “wins.” During the game, each pair of game players needs to gather as much data, so that the entire group of eight people has as much data to work with as possible. During the discussion after the game, the four pairs share the evidence that they have gathered from their perspectives/roles. Then, the pairs all work together as a committee to create a collective reconstruction of the Lexington moment. Their final decision of who fired the first shot is not judged as right or wrong; it is based on what the entire group decides together, based on how they regard the evidence they collected and the quality of their interpretation. Thus, the game players do not just learn from the actual game play, but they also learn from and teach each other.

In designing of “Reliving the Revolution,” I built into the game play a variety of ways to support collaborative play. This includes supporting intra- and inter-role interaction and the debate period.

Intra-Role Interactions

First, two participants play the entire game together as one of the four roles. I thought that this would directly encourage an exchange of ideas, dialogue, and joint decision-making. For example, the pairs would need to work together to decide who to speak to next, how to analyze evidence they received, or whether they should trust some information. They would also be able to split duties, such as using the handheld and taking notes or navigating through the physical location.

My hypothesis was supported by my findings from the Pilot and Redesign trials. In the post-game survey, one participant noted that she liked playing with a participant because she could “could exchange ideas, notes, plan what to do next,” while another participant noted that “It was fun to play with others; specifically, having a partner was important for two reasons: 1. to have someone to help with the handheld/taking notes, and 2. Just to have someone to bounce ideas/theories off.”

All of the participants in the Redesign game trial enjoyed playing the game with a partner, because they could share ideas and tasks. The participants self-responded that they learned through the mini-debates in their role partnerships throughout the game, each time they discovered new information. For example, one participant said she “liked playing with others because you could get corrected and get new ideas.” Another participant noted that “it’s cool to do it with a partner because you can argue with them and...hear their take on it,” which she felt helped her learn more. Participants do not only have the opportunity to make their own conclusions and hear the historic figures’ perspectives on what happened, but they are also exposed to a partner’s opinions. Having pairs also compelled the participants to immediately digest, debate, and draw conclusions about the information. In the pair, they would split duties: one participant would read aloud, while the other would listen and take notes. Together they would decide what it meant, whether it was important, and what they should do next. One participant felt it was valuable to “bounce ideas off of each other,” while another commented that “if you talk things out, you can remember them better than just writing them down.” This provided more opportunity for reflection on the information and collaborative decision-making and interpretation.

In focus group discussions, participants often noted that the opportunity to play the game with a partner was one of their favorite aspects of “Reliving the Revolution,” and they felt that it added to their interaction of the historical material. In the post-game survey, every participant except one answered that they either enjoyed or strongly enjoyed playing the game in a group. While most players felt that it was best to have a partner to discuss strategies and piece together clues, some noted the drawbacks of having a partner. For example, while it was easier to juggle the PDA and notes with a partner, one player noted that he could have “gone faster alone, and it might have been easier to keep everything straight because I can concentrate better by myself.” This comment is echoed in my observations of the participants who played the game solo, versus the participants who played the game in a pair. Needing to stop and deliberate with a partner made the game slower, but possibly deeper. Because the game play and collaboration necessitated dialogue and sharing of evidence, the participants needed to reflect on the evidence

and their interpretations, formulate and offer hypotheses, and collectively decide on next steps—all related to developing critical thinks and social problem solving skills.

Although I decided to place the participants in pairs, the game is flexible and adaptable to individual's preferences, and people can play in pairs or solo. In the first Pilot study trial, I tested the game with 8 people total: four pairs; in the second study I tested the game with 6 people total: two pairs and two individual players. In comparing the pairs vs. the solo players, the solo players seemed less happy and enthusiastic overall while playing the game. They were also less likely to interact with the other pairs during Part I²⁹⁴ of the game; and more likely to quickly gather information and evidence without taking the time to stop and reflect on what the evidence meant, or why it was important. During the debates, solo players seemed to contribute a greater breadth of information; however, they did not have the same depth of engagement with the material as the participants in pairs. Because the paired participants had already bounced ideas off of each other, they had a built in editor before they arrived at the debate. The solo players were offering many hypotheses, but had not taken as much time to think through how to support them.

On the other hand, people who were with a partner were constantly smiling, laughing, and talking through decisions and interpretations of data. They read testimonials aloud and shared thoughts and hypotheses. They also seemed to take their "role" more seriously, in that they often play-acted or performed the historic role to each other. For example, one team, playing the loyalist Ann Hulton, would often playfully comment to each other that "we are Ann Hulton and we believe this person and not that person," and would tease the pair of Minutemen (John Robbins) during Part One of the game (saying, for example, "we're loyalists, you sorry rebels"), but not socially interact with the two other roles, who were played by solo participants. If they had problems or questions, they would first begin to work out the solutions or answers aloud with each other.

²⁹⁴ The period of the game where students are gathering evidence, information, and testimonials with their handheld, as opposed to Part II, where they are debating their findings with their cohorts. See Appendix I for a schematic of the game.

Inter-Role Collaboration

Moreover, even during the game, the four roles can share information. The relatively compact space of the game, and the mobility of the handheld, allow for verbal exchanges of evidence among the various roles. They can ask each other for advice, share discoveries, and make connections based on serendipitous exchanges. The game structure further enables the physical sharing of information. For example, players can literally “beam” evidence from one handheld to another, if the handhelds are close enough. Thus, players can send interviews or documents to other roles for review.

I thought that making the roles interdependent, where each role would need to rely on each other to collect enough information, would also help motivate the participants to play the game and work together. In the Pilot trials, some participants noted that at first they did not realize there was overlap of evidence, and that they needed to work together with other roles to piece together clues. One participant commented that she wished she knew the roles would need to compare evidence during the debate because then she would have “harvested as much [evidence] as possible.” Similarly, another participant noted that, “I felt like it was fun that we had the same clues overlapping and I feel like there wasn’t enough of that.” Participants in the Pilot study trial wanted even more reliance on each other. In my redesign of the game, I made clearer in the instructions that the roles would have to rely on each other to create a compelling case for who fired the first shot. Also, I changed the evidence so there would be more places where the roles could find separate clues that they would need to compare to other roles’ clues to make sense of it.

In the Pilot study, the collaborative debate in Part Two of “Reliving the Revolution” seemed extremely beneficial to encouraging the critical thinking of history, such as the sharing and consideration of multiple perspectives, the questioning of sources and evidence, and the reflection on one’s interpretations and narrative constructions of the past. In the group setting, participants were constantly bouncing hypotheses off of each other, asking other roles about evidence and testimonials that they gathered, questioning authorial intentions and pointing out biases, and evaluating each other’s conclusions. For example, one participant would offer a

hypothesis and a few pieces of evidence, such as a diary entry or a testimonial. Then, another participant would counter with a contradictory piece of evidence or offer supporting evidence.

The Debate

In my redesign of the game, I told the participants that it was important to gather evidence and interpret it properly, because then they would be better able to support their arguments and sway others' opinions when they came to the debate at the end. I also encouraged more collaboration by providing two mini-objectives (See Appendix XVIII for a list of the mini-objectives) for each role, one of which would require them to rely on other roles for the answer. The mini-objectives directed their game play, and also encouraged the pairs to collaborate and exchange information informally during Part I of the game, because they depended on each other for information. One of the participants playing Philip Howe noted during the focus group that interacting with the other roles, such as John Robbins, was important because she could "ask them for help" on certain characters that would only speak to them. Another participant, who played Prince Estabrook, agreed saying that an NPC might "only tell someone they trusted if they were a spy or something. And if that was your secret mission, then it is helpful to hear other people's comments."

Although the debate and collaborative decision-making during the game seemed beneficial to strengthening the participants' understanding of history, application of critical thinking skills, and reflection on historical inquiry, as well as increase their social interactions, it also made "Reliving the Revolution" sometimes feel less like a "game." In the Pilot study, one participant noted that, because she was working with a partner, she felt less pressure to perform the game as quickly. Although there were time constraints, she didn't feel like she was working against anything or anyone, so she was not as motivated to, for example, gather as much evidence. Another participant noted that she loved the collaborative aspect, she felt like, since there was no competition *per se*, "we're all going to just come together and see what we got anyway." It was not as important to gather everything, or to digest all the evidence, since there would be that time for sharing later.

ROLE ALONG: ROLE-PLAYING ELEMENTS

“All the world’s a stage,
And all the men and women merely players.
They have their exits and their entrances;
And one man in his time plays many parts,”
—William Shakespeare²⁹⁵

In any game, each participant takes on a role. Someone is “the batter,” “the pitcher,” “the punter,” “the hider,” “the seeker,” or simply, “It.” The roles and/or social relationships among the players may change as the game progresses: “Each player has a role in the social network of the game... Roles are not fixed and may change many times within the course of the game.”²⁹⁶ For example, in the game Tag, one person is “It,” until s/he tags someone else, who then becomes “It.”²⁹⁷ In “Reliving the Revolution,” I provide the game players with specific tasks, in addition to their game roles. While the game players might take on game duties such as “the reader,” “the note-taker,” or “the navigator,” I also created four character roles of historic figures from The Battle of Lexington (described in detail later in this section).

The game players inhabit the role of a historic figure—follow in his/her footsteps—while they are navigating Lexington and collecting testimonials using their handheld computers (Part I of the game). Each historic role receives different evidence depending on their background, beliefs, and attitudes about the revolution. I imagined how various other historic characters would interact with each role, and this informed my writing of their testimonials and creation of the documents they provide. The game encourages the participants to reflect on their roles’ and their own reading of evidence, and to formulate a socially-constructed narrative of history based on the historic figures’ unique perspective, as well as their own.

In Part II of the game (the debate), participants discuss their perspectives, and debate what really happened at the Battle of Lexington. While they offer and evaluate evidence in light of their four

²⁹⁵ William Shakespeare. *As You Like It*. Act ii. Scene 7.

²⁹⁶ Katie Salen and Eric Zimmerman, *Rules of Play*. (Cambridge, MA: MIT Press., 2003).

²⁹⁷ Brian Sutton-Smith, *The Ambiguity of Play*, (Cambridge, MA: Harvard University Press, 1997).

individual roles, they also take a collective step back, and act “like a historian” to decide the best answer to who fired the first shot.

My inclusion of multiple roles in “Reliving the Revolution” is three-fold, and all possibly work together to support the learning objectives of the game. One purpose of incorporating role-playing is to emphasize the effect of perspectives on our reading of history. The participants learn how to see a historic moment through a different lens, and they also practice incorporating others’ perspectives into their analysis, particularly during the debate period. The inclusion of roles may also further engage the player in the game environment, as well as the historic moment represented in the game. Game interactions and objectives seem more specific and authentic, because evidence is directed to a clearly-defined role. Finally, these roles may provide built-in ways that the participants need to depend on each other to meet the objectives of the game, thus encouraging them to collaborate. I will discuss each of these purposes in more detail in this section.

Having distinct, meaningful roles further integrates the historiographic theory into the game. As suggested by the Deconstructionist approach to history, personal and culturally prescribed roles influence our interpretation of past events. Roles also support my pedagogical goal of encouraging students to integrate and negotiate multiple historic views, and to understand that there are simultaneous truths and many different ways to represent the past. In *Rashomon*,²⁹⁸ director Akira Kurasawa presents a sort of “epistemological vertigo” for the film viewer when he shows a criminal incident atop a mountain from four distinct perspectives. Each eyewitness to the event—the samurai, the woodcutter, the wife, and the suspect—narrates their story of what happened. As the testimonies visually unfold, the film asks the audience to judge their truths. The film asks us to search for limitations and biases, to evaluate each version, and decide which we should believe. Yet in the end, each version is valid, because we realize that each individual believes that their story is true: all four stories are simultaneous truths.

²⁹⁸ *Rashomon* (1950), directed by Akira Kurasawa

In the presentation of histories at “Reliving the Revolution,” I wanted to recall *Rashomon*, and its concurrent, conflicting testimonies. I drew upon multiple, sometimes contradictory, histories about who fired the first shot The Battle of Lexington. As the game player walks around Lexington, MA, the virtual NPCs²⁹⁹ (based on actual historic figures) express their sides of the story, which are often incongruous. I sought to express, like Kurasawa, the motivations, relationships, and complexities of the four individuals who told their tales. *Rashomon* sheds light, not just on an opaque event, but on the lens through which each storyteller looks.

Using roles can also help draw an audience into a new reality. As an audience for a theatrical performance, we watch actors perform roles; the production entices us step out of our roles and enter the world of the stage by appealing to “our fullest selves, to our minds, bodies, hearts, and sense of beauty.”³⁰⁰ In a virtual reality, however, “the spectator *can* step out of his or her seat, so to speak, and onto the stage.”³⁰¹ In an augmented reality game such as “Reliving the Revolution,” the participants step out of 2005 and into Lexington in 1775. It is what Wagner envisioned as the ultimate goal of Art: the performance transports the audience into the virtual world of the stage and a new reality—to be completely engaged in a new world.

Role-playing, thus, can more deeply engage a participant in the historic moment, as well as the game’s learning environment. By inhabiting the perspectives of a historic figure, participants can feel more like they are actually experiencing the past; they become more immersed in the world of the game. The role is an avatar through which the participants can access the personal stories, secrets, and testimonials of the Battle of Lexington.³⁰² Brenda Laurel, in *Computers as Theatre*, describes the importance of acting out drama, rather than just reading what happens.³⁰³

According to her notion of engagement, the game player gives himself over to a new world. One

²⁹⁹ Non-playing characters or the virtual characters that aren’t playing the game, but can provide virtual information.

³⁰⁰ Larry Friedlander, “Space of Experience: On Designing Multimedia Applications,” Contextual Media, ed. by Edward Barrett and Marie Redmond, Cambridge, MA: MIT Press, 1997), pg. 164.

³⁰¹ Larry Friedlander, “Space of Experience: On Designing Multimedia Applications,” Contextual Media, ed. by Edward Barrett and Marie Redmond, Cambridge, MA: MIT Press, 1997), pg. 164, with emphasis added.

³⁰² In games, avatars are the digital or virtual manifestations of your play within the gaming environment. The word is derived from the Hindu tradition, avatars were intermediaries between the Supreme Being and mortals (according to Wikipedia).

³⁰³ Brenda Laurel, *Computers as Theatre*. (Reading, MA: Addison-Wesley, 1993).

way to transcend to this new world is by becoming a character in that world: by living vicariously through an avatar? Further, placing this game in a physical environment might also help a game player suspend their disbelief, and more fully inhabit the role and the game environment.³⁰⁴ Participants during the Pilot studies, for example, mentioned that they enjoyed trying to imagine how Lexington looked in 1775. Giving the participants a role through which they could perceive the town helped to reorient them spatially and temporally in a historical imaginary.

Using roles encourages collaboration. Each role relies on the other roles to gather information for the group as a whole. By providing each historic role with separate evidence and overlapping mini-objectives, the participants can interact more to compare evidence, decide which sources are trustworthy, or conceptualize what is happening during the Battle of Lexington.

Overall Role Results

As I described previously, there are four roles: Prince Estabrook (African American Minuteman soldier); John Robbins (Free/White Minuteman soldier); Ann Hulton (Female loyalist/townsperson); and Philip Howe (British/Regular soldier in King's troops). Overall, using roles seemed to encourage inter- and intra-collaboration. For example, during the debate, the participants would explain what one NPC told them, and then they asked the other roles to read what they found from that same NPC. In one particular instance, the participants work together to figure out the identity of the spy in Lexington:

Participant #1 (John Robbins, Minuteman soldier): Does everyone sense of who is the spy?

Participant #3 (Philip Howe, British soldier): We found one spy, Henry DeBerniere.

Participants #1 and #2 (both John Robbins): Oh really? We didn't have that.

Participant #2 (John Robbins): We had Daniel Murray. There were two spies? What is interesting is that you are a loyalist woman. Who did you get to talk to?

Participant #4 (Ann Hulton, Loyalist) Essential loyalists, soldiers in the king's troops and the drummer. William Diamond. They were all essentially blaming it on the rebels, the Minutemen.

Participant #3 (Philip Howe): Did any of you talk to Margaret Winship?

³⁰⁴ Falk argues that live role playing games, in which physical location becomes the game world, have a more socially interactive and immersive game environment than in online role playing game. She writes that "the online role-player is a puppeteer while live role player is a person going through a transformation into a character." In a way, "Reliving the Revolution," is a hybrid between a live role playing game and online/computer RPG, because the navigable game world is both real and virtual, and the characters that they interact with can be virtual and real. (Falk in Mark Blythe, et al. *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003))

Participant #5 (Prince Estabrook, Slave): Yes, we did. In the first part she said “Stay away from me slave,” she was mean to us.

Participant #4 (Ann Hulton): We talked to her in the beginning, and she had seen Daniel Murray talking with the members of the King’s regiments by the schoolhouse.

Participant #3 (Philip Howe): You are a loyalist? How was she described to you? (looking at the evidence on her handheld) Oh, for us she said it was probably some drunken Lexington townsmen....

Participant #2 (John Robbins): Daniel Murray said that Sylvanus Woods was a spy for the King, and that Paul Revere is not trustworthy. That confirms what we found with what [Participant #3] found.

Participant #3 (Philip Howe): It was Daniel Murray who said that it was hard to tell who fired the first shot because there were two shots at once.

Participant #2 (John Robbins): He is also suspiciously hanging out with the King’s Regiment. He is probably the spy, not Sylvanus Woods.

One of the biggest challenges I faced in designing “Reliving the Revolution” was thinking about how to reinforce the historic roles during the game play, and to use this to further engage the participants in the historic moment. I was limited by the game system: participants could not actively interact with NPCs as their roles; instead, I needed to design all of the testimonials, items, and documents beforehand. This meant that I needed to think ahead of time how to use language, tone, and style to reinforce to the participants that they were playing a specific historic role.

Despite my initial efforts with the testimonials, in the first trial of the Pilot study, many of the participants forgot that they were playing a role and felt that this feature should be emphasized further. Other participants felt that they were not playing a role per se, but applying a perspective as a filter on the information they were receiving. During the instructions, I handed out their individual character sheets (see Appendix X), but I did not continue to reinforce that they were a specific role throughout the instructions. The content of the game did not reinforce this enough, because they were not actually comparing the evidence in real-time with the other roles. In other

words, although the NPCs may have been providing the loyalist with different types of information than the African American Minuteman soldier, the game participants would not know this.

As a result, during the first trial's focus group discussion, one participant commented that she "lost track that I was a character ... [an NPC] said 'you are a bunch of bloodthirsty idiots, I can't believe you fired on us.' And I was like 'ohhhh, we are somebody.' It didn't really click, because I'm not a roleplayer." Another participant said, "I don't think it was until the end of the game that it sorta clicked 'oh yeah, we're supposed to be Philip Howe.'" With all of the frenetic evidence gathering and wandering around Lexington, the participants too easily forgot to consider that they are viewing the Battle from a particular point of view.

Other participants felt that the roles were very engaging and dynamic, and had fun performing them while interacting within their pair or with other pairs. They felt like the roles helped them understand other perspectives about the Battle. For example, one participant stated on the post-game survey that it helped him realize "That you can not just take one point of view when trying to understand and recreating historical events." Another said it was "interesting to learn the different characters' reactions to the players' roles;" similarly another participant felt that having a role was "engaging, I felt like I got a lot of information from other characters."

A few participants of the first Pilot study trial recommended that to strengthen the role playing aspect of the game, I should add more instructions about the individual roles, stressing to the

participants that they should actively inhabit these roles throughout the game. Said one participant, “I think that could be easily remedied by saying at the beginning, and telling us to remember who we are, think about who we are, and we would remember that as we walk around, because I actually think that the language that you use is great.” Thus, in the second trial of the Pilot study, I included more instructions about the role, and emphasized again and again its importance in reading and evaluating the testimonials. In the second trial, the participants seemed much more engaged with their role; for example, one pair playing Ann Hulton was taunting the pair of participants who were the Minutemen soldiers, and pretending to be angry about them wanting a revolution. The existence of roles encouraged creativity, performance, novelty, and greater social interactions, and also added humor and dramatic tension to the game.

Not everyone, however, felt connected to his/her historic role, even with the new instructions. One person commented that, “at the beginning, you got a role and I thought ‘oh this is really cool,’—I got the background and I tried to think of myself in the role. But then as the game went on, people and what they say to you is influenced [by who you are] but there wasn’t any much more about getting into that character or interacting as that character.” The game engine for “Reliving the Revolution” does not support adaptive NPCs—participants could not actually interact with the game world and the NPCs *as* their role, and concomitantly, the NPCs could not alter what they say depending on how the participant interacts with them. They could only imagine themselves acting like this role, because the content was static and not adaptive to the participants’ unique interactions.

Despite less engagement with the historic roles during Part I, the participants seemed to be avidly considering their individual historic roles during the debate portion of the game (Part II). Also interesting is that, while the participants did not articulate the importance of their role after the game, they strongly expressed it through their interactions during the game's debate. When offering evidence to support an argument, for example, each of the participants would consider their role as integration in their analysis and estimation of that piece of evidence. Often, when another participant was providing a piece of evidence, another person would ask them which role they played. For example, in one interaction during the debate, one participant (playing a loyalist) describes what an NPC, Margaret Winship, said to her role. Another participant piped in, "You are a loyalist? How was she described to you?" The roles heightened and deepened the level of interpretation, because it made the dialogue more targeted and. For example, instead of judging the testimonials as being directed toward a nebulous audience, participants could evaluate the NPCs' words in terms of how they are interacting with a specific historic figure.

In other ways, the roles and their perspectives pervaded the participants' arguments more deeply. One participant, playing a Minuteman soldier, was extremely moved by the personal diaries of other Minuteman soldiers that she collected. She felt that this type of evidence (a diary) trumped other types of documents, but also other roles' evidence; and her tone expressed a deep connection or personal allegiance to the Minutemen's perspective. After one of the participants argues that the Minutemen had more motivation to fire the first shot, this participant counters with, "we have a document from a personal diary of someone who was on the patriot side ... he swears that the regulars fired the first shot. Would he have lied in his diary?" Later in the debate,

even though most of the participants think a Minuteman fired the first shot, she stands by her original evidence. She discusses how many Minutemen were hit in their backs as they were running away and says, “I’m still affected by the testimony by the Minutemen, about the Minutemen running away ... because the story, at least from the primary sources we were given, seems very fraught, very compelling.” Interestingly, the participant seems to privilege the more subjective evidence, and tries to convey her role’s perspective to the other participants in the game.

Thus, assigning roles to the participants encouraged them to engage more deeply in the post-game discussion. The participants felt more invested because they had experienced the moment from a distinct point of view, and had gathered evidence accordingly. As such, they may have had differing opinions or pieces of evidence, and would need to remain engaged in the material to maintain their side of the story. “When disagreement is the key, participants with differing views must attempt to arrive at a single position, either by persuading those who disagree, or by coming to some sort of accommodation or compromise. By assigning students a specific stand on the issue or a role that has a likely view, the teacher can build more disagreement among students in the activity.”

Similarly, the participants may be more engaged in the game’s goals because they feel that other roles depend on them for information, since each role receives differing information. They needed to learn about the historic moment because they each had distinct perspectives, and would need to teach and learn from each other to put together all the pieces. Each team of

participants seemed motivated to gather evidence, and then to share it during the debate. Often participants would ask the others questions such as, “Did anyone else get to Paul Revere,” or “Did you hear anything about the trunk?” They would compare and corroborate evidence with the others, compelling them to collaborate and collectively seek out other perspectives.

The awareness that there were other historic roles in the game also made the participants more aware of their own role. For example, one participant who played the Minuteman soldier noted that, “Like when I met the slaves, I thought ‘oh, I wonder how this is different from what the slave role is getting ... I wonder how she is talking to me is different from how she is talking to him.” In the Redesign trial, one participant said that, “because every person who was a different role always got different responses from someone, it was good to see how they were treated.” Knowing that each role received different information made the participants more curious about the others, and compelled them to seek out other participants for their missing information.

Moreover, the roles helped develop a sense of belonging or a commonality between the two paired participants (who may be strangers or acquaintances prior to the game). Since the participants are sharing a role, they are also sharing a mindset for the game, which compels them to work closer together as a team. For example, in the following exchange between two students using the handheld to gather evidence around Lexington (during Part I of the game):

Participant #1 (reading aloud): “don’t fire, keep your ranks, surround them. The Lexington militia did not disperse, but still fired and started a series of scattered shots. I did not want to start a battle here, but after the shots were fired I had no choice. ... So he is probably lying, he probably fired the first shot.”

Participant #2: No, no, no. This is our guy, this is our friend. We are loyalists so we believe him.

The shared role is a built-in element of commonality between the participants, and also a way for them to initiate dialogue about the evidence they receive, further enhancing their learning. Since the participants may be more engaged if they are working as a team toward a common goal, suggesting that collaboration, roles, and engagement in the game may be interlinked, and may all deepen their learning. This is exactly the type of teamwork, problem-solving, and analysis of evidence that I hoped the game would support.

Redesign Results

In both the trials of the Pilot study, the participants playing the African American Minuteman role (Prince Estabrook) seemed more affected by their role, and were more likely to consider their role throughout the game. For example, one participant mentioned that dialogue such as “‘Slave, what are you doing here?’ brought us into the game.” Another participant enthusiastically commented that, “I’m a slave working in the Minuteman army so I can get my freedom. A lot of people wouldn’t talk to me because I’m a slave or they would talk condescending way, saying things like, ‘Slave! Do this, do that!’” The Prince Estabrook role may have been more engaging because the testimonials I composed for the role was much more targeted in terms of creating more nuanced relationships between the NPCs and a slave—I thought about each individual NPC, and how s/he would have treated a slave, instead of thinking broadly about how a Minuteman soldier would treat another Minuteman soldier, for instance. I used particular language, tone, and style to convey power relationships among the townspeople and soldiers. This made the role more dynamic—it wasn’t just “us vs. them.” This is echoed by one participant who played the slave, “Some people were very disrespectful and others were more open, because they assumed I had no power or connections.” His more nuanced slave role made him think more deeply about individual’s motives and biases toward him.

Those people who were playing the slave role also felt that it impeded their game play, because so many NPCs declined speaking to them, making them further feel the weight or burden of their role. For example, one participant commented that he “got really tired of being a slave during the game. Everyone was dissing us.”

Thus, in the redesign of the game, I tried to use these strategies to tweak the other three roles. First, I embedded the role's name more regularly in the testimonials (e.g., "Philip, talk to John Barker" instead of just "Talk to John Barker,") and providing more personal dialogue that forefronts the relationship between the role and the NPC. I also thought about what benefits and limitations each historic role might offer in terms of the game play, and tried to incorporate that more into the game play. I considered how I could create role-specific tasks or objectives, in addition to the overall main objective, that would further engage each of the participants in the game and their role. I wanted to redesign the roles so that they were even more interdependent, in that the participants needed to rely on each other to piece together clues and to gain a better picture of the moment. This meant revising the testimonials to better encourage the participants to check with other roles to see what they learned, and making evidence from different roles that could fit together to create a story of what happened at the Battle. Finally, I provided nametags with the name of the role and type of role for each participant.

In general, the participants in Redesign trial of the game seemed more aware of their role. For example, during the debate period, the participants were adept at summarizing to the others who they were and observe patterns of treatment by the other townspeople. They also provided hypotheses about why they were treated in certain ways. Said the participant, "We were Prince Estabrook, an African American slave, and the only African American in the Minuteman militia. The British treated us like lowlifes and didn't really like us, and the revolutionaries were kinda nice to us and kept telling us that if we fought for America, we fought for our freedom, and we would be free from slavery. ..." A participant playing Ann Hulton offered that "everyone was pretty nice to us ... it could be because we were upper class."

While one Redesign trial participant mentioned that she forgot about her role, most of the participants understood their roles and used role in order to evaluate each other's evidence. For example, in the following exchange, the participant playing Prince Estabrook explains his interactions with the British soldiers, and how that leads him to decide that the British fired the first shot:

Participant #1 (African American slave): Like whenever we found a British person, they were too busy to talk to people. Maybe they were only busy looking for something and doing something.

Participant #2 (Regular (British) soldier): Well that could have been you. You are a slave and a Minuteman, so I don't think they would have talked to you anyways. (looking through handheld) because a lot of British people talked to us because we were British. This [one British] guy said "those Lexington minuteman asked for it. The Minuteman were out for revenge. They should surrender."

Other Recommendations

One of the recommendations that came up during the Pilot study was using costumes as a way to more deeply embed the participants in their historic role and in the time period of 1775. My intuition was that costumes might be fun for younger students, but not self-conscious, acceptance-seeking adolescents. When I asked the participants in the Redesign trial to offer ideas about how to strengthen their role awareness, however, one participant said costumes. When I queried the group further about the use of costumes (such as whether the guys would have worn an apron if they were Ann Hulton), the group collectively decided that costumes were not an appropriate solution. Said one participant, "No, I had a wire draped around my neck, enough people were staring at me. I don't know if I would have worn a costume."

Another participant wanted to get a taste of all the roles for a slice of the game so that "you could see the event from all different points of view." In my original conception of the game, in the two prototypes, every participant inhabited each of the roles. Each participant would experience all of the roles, and would be able to compare and contrast each of them. After creating a prototype of the game, however, I decided instead to limit each person to one role each. I thought that inhabiting more than one role was too overwhelming; the participant could never fully integrate that perspective, because s/he knew he would have to switch again. With one role, each participant could focus on that individuals' socio-cultural lens for the entire game, and would be able to become fully immersed in that role. They would then be able to reflect on this role when they shared evidence and information with the other roles during the debate, and in turn, learn about the other roles' perspectives.

I was also afraid that if the participants switched to a new role, forget that they had switched, and be confused and frustrated. I wanted four distinct roles because this caused the participants in the

game to be interdependently linked to each other. Each participant had a responsibility for learning about their unique role, and they would have to depend on the other teammates to learn about their roles, in order to come up with a feasible hypothesis for who fired the first shot. Each participant needs to gather and evaluate enough evidence and make his/her own decisions about which evidence to share, so that they could help out the team as a whole. Since the students had different roles, this was a jumping off point for the debate. The students needed to articulate their evidence and share it with others, because the other roles had gathered different evidence. The interdependence of the roles encourages collaboration.

Another participant thought it would be good if there was a wider range of roles, and that you could choose a role, particularly one that “you don’t know much about.” Although, I feel that because this historic event is somewhat “foreign” to students, none of them will be very familiar, and it is better to assign them a role than let everyone choose the most popular one.

In all of the trials, some of the participants recommended that one way to strengthen their roles would be to allow them to interact with the NPCs with more freedom. In other words, they wanted to be able to actually perform their roles, and to choose what they could ask the NPCs, and then have those NPCs answer based on their actions. Although the participants realized the breadth of detail necessary for such a game. I could imagine including NPCs as evolving agents in later versions of the game, where NPCs alter their interactions based on who you are (your role) and what you say to them. Thus, while there are not yet any “virtual changes” in a person’s role, there can be social and physical evolutions of how the participants inhabit their virtual historical roles. The participants could “play” with their role in the real world, but not the virtual; they could experiment with their role socially or physically. For example, one participant commented that he “liked playing a role, I felt it was useful ... I felt like [my partner and I] played the role, we amused ourselves with it. We thought, “we’re Ann Hulton” and “we believe this person, and not that person.” At the same time, though, he did seem to have a particular allegiance to Ann Hulton: “We could have had any role and it would have been just as fun.” It seemed that having a role made the game more fun and engaging, because the participants were able to socially perform their role, invest in their role’s point of view, and imagine how he or she

may have acted. The role also provided a “filter” or “lens” through which they evaluated the evidence they received—further encouraging them to be in the mindset of the historic moment.

TELL ME A STORY/STORYTELLING/NARRATIVE ELEMENTS

“If you take the position that all things are possible, you will be astounded at what you can create.”
—Taurus Horoscope for December 11, 2003³⁰⁵

There’s nothing like a good story to engage an audience. The inclusion of “story” into a video game or multimedia environment greatly enhances the participants’ engagement with the experience. The history and mythology of the Battle of Lexington already casts a story over the game; the participant’s preconceived notions of what happened during the Battle comprise a meta-narrative for the experience. This master narrative is based on sources such as classroom teaching, textbooks, media representations, and American folklore. I wanted to break apart this meta-narrative and replace it with mini-narratives, the personal and intimate stories of the historic figures from April 19, 1775. By having each NPC express his/her own story, the game could engage more deeply the participant in the historic moment than would providing a litany of facts. Having the NPCs narrate his/her story in a distinct voice also helps express the idea that each NPC has a different perspective on what happened at the Battle. This fits into the Deconstructionist framework for historiography, which exposes the narrative elements of history, such as authorial background and intent. This approach is also appropriate for my pedagogical objectives. Making the testimonials like stories and making the game play consist of collecting and analyzing these “stories” further enhances the idea that there is an author, that each testimony is only one version of the truth, and each one is told from a specific point of view.

I based my writing of these stories on actual testimonials, written in diaries or records, further adding to their authenticity in terms of language, motive, tone, and content. I tried to create a balance between incorporating authentic words, phrases and ideas, and providing testimonials that were appropriate for the game play. (A script of the testimonials is Appendix XXIII and a summary of the testimonials is Appendix XXIV.)

Designing for Nonlinearity

³⁰⁵ From the Page-A-Day Calendar (Workman Publishing 2003)

How should I integrate these mini-stories into the game? I needed to consider whether this would be a strictly linear or nonlinear³⁰⁶ game, or a hybrid of the two. In my first prototype, I created a linear game play, where the path of the participant is constrained by the designer. Participants could only advance to the next spot if they picked up clues, solved a puzzle, spoke to a virtual historic figure, or found information in the actual physical site.³⁰⁷ In the next iteration, “Reliving the Revolution,” the participant chooses his/her own paths through the game. In this game, there is no clear beginning, middle and end, nor any consistent, delineated dramatic arc, which would engage each participant in the same way, and move them through Lexington and its history in an established path. I spatially predetermined the stories, in that they are located at a particular spot in Lexington, but they are placed in a particular arrangement temporally. The participant constructs the order of the stories, because he/she chooses how to navigate Lexington (and thus, the stories). Game players can choose to begin collecting the narrative anywhere, and the order of the narratives that they gather can take on many different permutations. The nonlinear structure of the game, in terms of accessing the stories, evokes temporal simultaneity—which I hoped would also teach the idea of multiple truths and possibilities. The nonlinearity also more closely mimics the work of a historian. No historian has a set linear path in which to gather evidence, s/he must navigate a vast archive of information.

But what is the participants’ experience with such an open-ended game and nonlinear narrative? In some ways, the participants can get the best of both “worlds.” They still enjoy the discovery or sense of accomplishment that comes from a more linear game, in that the triggering of a hot spot with the GPS-enabled handheld makes them feel like they are uncovering hidden virtual information. On the other hand, they can control how they want to explore Lexington and can access and evaluate the evidence at their own pace. Marsha Kinder asks, “how can we create engaging interactive narratives that provide an array of pleasures both emotional and intellectual,

³⁰⁶ By nonlinear, I mean that the game participant can interact with the NPCs and game items in any order, and they can go back to NPCs or pick up items whenever they want. They could return to NPCs to compare evidence and testimonies, they could alter and adapt their strategies as they hear from other participants.

³⁰⁷ For example, if they started on the Common, they would first meet an NPC who told them to find Buckman Tavern because that is where John Parker is located. When the participant found John Parker, they would receive their next clue for the next location, while also receiving an item or reward.

that don't have clear-cut beginnings or endings and are full of interruptions, and that still offer a satisfying sense of drama?"³⁰⁸

In my design, I need to consider the experience of the participant. I wanted to make the game realistic to history, in that you wouldn't have a proscribed order to the evidence you would gather if you were conducting a historiography. I sought to encourage the participants to create their own narratives of the game, based on how they traveled through the Lexington landscape. But, I also wanted to ensure that participants did not feel overwhelmed by the lack of linearity or added control over the game's navigation. One participant in the focus group echoed this tension by commenting that in other games, there is a "definite beginning and definite ending, that might make ["Reliving the Revolution"] more of a real game. But at the same time, you maybe lose the sense of being a true historian, whereas real historians have all these different random facts, and...they have to make an interpretation out of it." Balancing these two sides informed my design throughout the process.

In "Hot Spots, Avatars, and Narrative Fields Forever," Marsha Kinder describes cinematic precursors for what she calls "interactive narrative databases."³⁰⁹ She defines these as a work of digital media that is interactive, in that meaning is created through a cultural and symbolic exchange between the designer and participant, and enables the participant to choose "data (characters, images, sounds, events) from a series of databases or paradigms, which are combined to generate specific tales."³¹⁰ For example, films such as *Groundhog Day*, *Lola Rennt*, and *Clue* have pieces of an event that are assembled in various permutations. These films show that there are other alternative ways of telling a story, an ending, or a moment, and express what Kinder calls "the arbitrariness of the particular choices made."³¹¹ The repetition and variation suggest to the audience that these stories were constructed, but are not inevitable. Similarly, in "Reliving the Revolution," I wanted to provide the participants with the ability to construct and

³⁰⁸ Marsha Kinder. "Hot Spots, Avatars, and Narrative Fields Forever—Bunuel's Legacy for New Digital Media and Interactive Database Narrative," *Film Quarterly*, Vol. no 55, Issue no. 4, 2002, pg. 8.

³⁰⁹ Marsha Kinder. "Hot Spots, Avatars, and Narrative Fields Forever—Bunuel's Legacy for New Digital Media and Interactive Database Narrative," *Film Quarterly*, Vol. no 55, Issue no. 4, 2002.

³¹⁰ *Ibid.*, pg. 6.

³¹¹ *Ibid.*, pg. 8.

reconstruct historical narratives, the insight to understand that the meta-narratives or so-called authoritative narratives are not inevitable, and constant reminders to consider authorial intent of all documents and testimonials. The use of an interactive narrative database as a model for the game could potentially further express these ideas.

Therefore, I used Kinder's analysis of Luis Buñuel's cinema and interactive narrative databases to help me design my inclusion of the numerous testimonials or mini-stories, so to best balance game-like elements with the pedagogical goals. She describes three main strategies for creating this: hot spots, warp zones, and surrealistic jolts; avatars and semi-intelligent agents; and narrative fields and desiring machines. Kinder calls Buñuel's "incongruous details," such as a cow on a bed in *L'age D'or*, cinematic ruptures that allow the characters to enter a new narrative landscape, which provides a feeling of cohesion. Similarly, in "Reliving the Revolution," the participant is constantly being moved from the real to the virtual realm. The game uses the "hot spot" of a colorful graphic to make the participant aware that he or she is entering into the virtual realm of Lexington, and out of the present-day physical world. When a participant reaches a "hot spot," or a set of specific GPS coordinates in Lexington, it triggers the handheld to present an image of an NPC or game item (See Appendix XIX for an example of the graphic.) The novelty of watching the handheld suddenly present an image lends to feeling of "rupture" for the game participant. The participants very much enjoyed the aspect of the game, because they felt like it also "mimicked the process of discovery," as one participant commented. Another participant noted that, "the thing we had the most fun with on our team was 'oh we're getting closer, oh we found one,' the wandering and finding" of the hot spots.

In the second strategy, Kinder describes the avatars of electronic media, which she argues are objects that we program to "simulate human beings"³¹² and function "not as individuals but as subject positions, which are defined by history, culture, and genre and which are only

³¹² Marsha Kinder. "Hot Spots, Avatars, and Narrative Fields Forever—Bunuel's Legacy for New Digital Media and Interactive Database Narrative," *Film Quarterly*, Vol. no 55, Issue no. 4, 2002, pg. 11.

temporarily occupied by individual players....”³¹³ Characters are decentralized, and participants move in and out of their positions, or inhabit different positions.

In “Reliving the Revolution,” there are four distinct roles or “avatars” through which the participant plays the game. As discussed previously, although the roles have specific names and backgrounds, they are not presenting the individual dramas of the historic figure, but simulating the social position and/or historic perspective of their role. Thus, we can conceive of them as responses to questions such as, “What would a Minuteman see,” or “How would a female loyalist interact with the Lexington townspeople?” They enable the participant to access the mindset and lens of very beginning of the Revolutionary War.

Also, the game is decentralized in terms of these avatars in that there are multiple avatars, each with a distinct position. To emphasize the differences among the avatars, each of the stories that the NPCs relate to the roles is slightly or extremely different. Sometimes only the tone is different, other times the content of the story has been changed. The narrative and roles (or character) work together, just as they do in a film or play, to further engage participants in the game experience. This deepens the participants’ desire to earn, because he/she has to consider the position of his/her role and uncover why the story is being told in a particular way. (For example, see the testimonials at Appendix XXI). In other words, there are multiple configurations of each NPC’s story, depending on the relationship between the role and the NPC, further enhancing the depth of the game’s narrative. One participant, for example, commented that “the richness of the narrative is my favorite thing, how you brought all of these points of view together,” while another noted on the post-game survey that his favorite part was thinking about history in terms of stories or narratives told from a specific perspective.

In discussing the final strategy, Kinder describes Buñuel’s use of multiple narrative possibilities, which appear to be drawn from a limitless database.³¹⁴ In Buñuel’s work, writes Kinder, “we focus not on beginnings or endings but on what Peter Brooks calls the ‘expansive middle ... a

³¹³ Ibid. 11.

³¹⁴ Marsha Kinder. “Hot Spots, Avatars, and Narrative Fields Forever—Bunuel’s Legacy for New Digital Media and Interactive Database Narrative,” *Film Quarterly*, Vol. no 55, Issue no. 4, 2002, pg. 12.

field of force which we read *through*.”³¹⁵ The movement through this narrative field, in which connections between narrative possibilities are constantly created and destroyed, engages the audience. Kinder shows how Buñuel does not choose “one alternative from each database and then combin[e] them to create a conventional linear narrative,” but instead he presents several possibilities from one database.

An electronic media experience, such as a video game, that wants to capture a real historic moment, should make us believe that there are “multiple possible lives stemming from different choices.”³¹⁶ The game should be a virtual labyrinth that suggests that there are “realized alternative destinies.”³¹⁷ In other words, it asks us to “think of life as determined and yet infinite at the same time.”³¹⁸ In “Reliving the Revolution,” each NPC provides an alternative story for what happened at the Battle of Lexington. I constructed a database of possibilities from an actual database—the historic archive of the Battle—by writing what I thought would best represent the stories of 40 historic figures, based on primary and secondary sources. In the game, these stories are simultaneously presented as alternatives of what happened at the battle; the participant acquires them in a random, unpredictable order. Thus, in writing the stories, I needed to craft them so the order of acquisition would not matter.

The possibilities, or at least the order in which one retrieves the possibilities, feels limitless because the participant directs his/her own navigation through the landscape of stories. This expresses what I feel is another important facet to the interactive narrative database: agency. Janet Murray defines agency as, “the satisfying power to take meaningful actions and see the results of our decisions and choices.”³¹⁹ In the end of *Frankenstein*,³²⁰ Frankenstein’s monster is

³¹⁵ Marsha Kinder. “Hot Spots, Avatars, and Narrative Fields Forever—Bunuel’s Legacy for New Digital Media and Interactive Database Narrative,” *Film Quarterly*, Vol. no 55, Issue no. 4, 2002, pg. 12.

³¹⁶ Janet H. Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: MIT Press, 1997, pg. 136

³¹⁷ Ibid.

³¹⁸ Janet H. Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: MIT Press, 1997

³¹⁹ Janet H. Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: MIT Press, 1997, pg. 138.

³²⁰ Mary Shelley, *Frankenstein*, W.W. (Norton & Company: New York, 1818).

stuck in a labyrinth—confused, bewildered, and with hands reading out—not because he has too many paths, but because he has only one path. He has no place to go but toward death. Frankenstein’s creature has no agency or feeling that he has control of his destiny. This example helps us understand that the temptation and pleasure of inhabiting virtual worlds where we are able to traverse our bounded roles of everyday existence and travel down paths of our own choosing. In creating video games, we need to enable players to “construct many alternative lives for their characters....to traverse these realities, enacting choices, suffering happenstance, experiencing the finiteness of life and the infinity of imagination anew.”³²¹

I wanted to design a labyrinth of possibilities for the game players of “Reliving the Revolution”—to provide them with a sense of choice and agency, while retaining a feeling of core identity and destiny. On the one hand, allowing the participant to have agency over the way they read and evaluate the NPCs’ stories further engages them in creating their own, unique meta-story of what happened at the Battle of Lexington. Maintaining a sense of choice and agency is important, but too many choices may be overwhelming, frustrating, and distressful.³²²

Kinder would argue that a game’s interactivity is an illusion, because the designers set the rules of the game at the beginning. An infinite database is also an illusion, because the choices are constrained, even if it seems like the choices are limitless. All performances are “at least partly structured by the text,” thus even the performance of the game is controlled in part by the content I created.³²³ To balance the desire for control with the vastness of the narrative, I devised some constraints within “Reliving the Revolution.” First, the game is spatially limited, in that it only covers a portion of the Lexington Common and the surrounding area. Participants were not merely choosing from a large database of information, but a map of information, which they

³²¹ Janet H. Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: MIT Press, 1997, pg. 138.

³²² For example, see B. Schwartz, *The paradox of choice: why more is less*. (New York: Ecco, 2004), as recommended to me by Ed Dieterle and Chris Dede, who explained that he “dispels the common misconception that excessive amounts of choices will make us happier, providing evidence that the opposite is true and might lead to psychological distress.”

³²³ Marsha Kinder. “Hot Spots, Avatars, and Narrative Fields Forever—Bunuel’s Legacy for New Digital Media and Interactive Database Narrative,” *Film Quarterly*, Vol. no 55, Issue no. 4, 2002, pg. 4-5.

could navigate. Within the actual testimonials, I provided hints on where to go next (in terms of location) or with whom to speak next (based on what type of information they could offer).

The goal of the game—to figure out who fired the first shot of the Battle—also provided a structure to how the students would navigate the stories. For example, the participants would intentionally seek out certain pieces of evidence and stories from specific historic figures. For example, because one participant was the Minuteman soldier, John Robbins, she said she specifically looked for “other ones of her guys.” Other participants would seek out NPCs such as Solomon Brown or Paul Revere, because they were accused by other NPCs of being traitors or of firing the first shot. Also, the game has two separate time periods (Time 1 and Time 2, before and after the Battle), which forces some linearity and enables participant to feel that there is some progression of time. Many of the NPCs provide clues as to others who might have important evidence or testimonials. These subtle directions to specific NPCs adds to the linearity, in that participants may visit that NPC next, or find ways to navigate Lexington so they can speak to that figure. The participant, however, has the choice to decide whether to follow the advice of an NPC. This also adds to the types of complex decisions that the participants need to make during the game.

Despite these constraints, some participants still felt overwhelmed. One participant felt like it was “information overload...I feel like I couldn’t remember all of that stuff,” but that “You weren’t lacking for things to discover,” which made the experience more positive. Another participant felt that he would “rather it be overwhelming than underwhelming,” because it was more challenging and providing more novelty. Others liked the “sense of control” and the ability to “take your own pace” and navigate as they wished. One participant nicely summarized the problem of balancing the detail and pedagogical expectations with the game play,

“I loved the detail, but I was overwhelmed by it. I wanted to take more time to let it sink in...To me it was a push and pull between getting immersed in the detail, and needing to remember to look around me. And getting a little frustrated because I couldn’t always keep all the characters straight in my head. But on the other hand, that is also what makes it rich, because the richness of detail delivers the message that you want, that this is a complex thing, there are lots of points of view, and there was a ton of stuff going on” during that historic moment.

Other participants wanted a more linear approach to the collection of evidence. Some felt that because the game was open-ended, it did not feel as goal-oriented. They were unsure of their status in the game as it was progressing—there was less feedback to learn if they were playing the game correctly, such as collecting enough evidence. Participants wanted to feel as though there was more of a progression of events, rather than just Time 1 (before the Battle) and Time 2 (after the Battle).

To redesign the game, I decided to streamline the testimonials and evidence. I cut extraneous information, and made the evidence more explicit. I removed some of the NPCs so that there was less overlap and a more manageable number of total NPCs (See Appendix XXVII for more detail on this change). In my original design of the game, I tried to create 6 or 7 major narrative threads for the entire game, but not for each role. In my redesign, I decided to designate 2 or 3 specific narrative threads for each of the roles (some being shared with other roles), and then shaped the NPC stories and evidence to fit into these narratives. For example, the Minuteman soldier would find evidence that would suggest a town spy, an accidental misfiring of a gun, or a man on a crazy horse, as possibilities for who fired the first shot (See Appendix XXIV for a detail of the narrative threads for each historic role).

I wanted the participants to more easily and explicitly make connections among the stories and evidence. In the Pilot studies, one of the participants during the debate explored how based on her evidence, two major stories emerged of what happened at the Battle of Lexington. I thought that this worked well in terms of starting discussion and encouraging collaboration of evidence. I wanted to even more strongly support this type of debate by designating specific stories for each role.

Finally, in the redesign of the game, I considered whether I should make the game more linear. This might make the game less overwhelming, because there would be less possible choices of NPCs to attend to at a given time. This also would be more authentic in terms of the historic moment, whereas Regular (British) soldiers might start to arrive in succession, and it would heighten the tension that a battle was about to begin. Unfortunately, I was limited by the game

design software, in which the ability to create a linear progression (if you talk to one NPC, another one appears), was not working at the time I created and tested “Reliving the Revolution.” Future iterations of the game, however, should test out the possibility of rolling out the NPCs at different times, rather than having two set time periods (before and after the battle) to talk to NPCs.

Redesign Results

To provide some sense of progression or accomplishment (checkpoints), for the Redesign of the game I created role-specific objectives (in addition to the main objective of deciding who fired the first shot). By completing these objectives, each role would uncover a particularly integral piece of evidence that they could then use to share with the other roles (For a detail on the new objectives, please see Appendix XVIII). I hypothesized also that the addition of a mini-objective for each of the roles would direct the participants’ navigation of all of the material.

As observed in the Redesign trial, in general the participants seemed able to handle the vast information. Instead of feeling overwhelmed or frustrated, they seemed to thrive in the nonlinear environment and liked to “figure something out for [myself].” None of the participants in the Redesign mentioned feeling overwhelmed by the details; it seemed to appropriately challenge and motivate them to meet their game objectives. In the focus group, one participant remarked that the secret missions made the game more definite: “we knew what we had to do and we went and did it. Instead of just being ‘who fired the first shot,’ because that was a little broad.” The secret missions also helped propel the debate period. It provided concrete mini-questions for the participants to share and negotiate their information. Tackling the larger question was at first very unwieldy; after looking at the mini-questions, they became more comfortable with their evidence, and they were better able to back up their claims and provide counter arguments to other participants’ information. One participant in the RedesignI trial of the game noted that the goals and secret missions, especially, drew her into the game world. She even wanted more goals because she felt that “it would tie more things together” and provide more motivation to search for information.

The participants in the Redesign trial especially liked having agency or control over how they navigated the game world. Perhaps this is because younger participants enjoy the opportunity to use play to transgress boundaries during learning, since education is usually regimented.³²⁴ One participant liked that in this game, the results were not established—she needed to create the “game ending” herself. Through a self-directed construction of her learning, she was able to delve more deeply into the historic moment, as well as the game itself. “[this game] you had to put together, you had to research and then figure something out for yourself. It wasn’t like a set [answer] like ‘you have to click on this conclusion now.’ You have to come up with whatever.” Having that responsibility to perform³²⁵ motivated her to complete the game.

YOU LIKE TO MOVE IT?: KINESTHETIC/MOBILITY ELEMENTS

“You can see the past, but you cannot touch it.”
—*In the Mood for Love*³²⁶

Throughout the design of “Reliving the Revolution,” I constantly asked myself what makes this game different from say, a virtual Lexington game played on the desktop. How does playing a game on a mobile device enhance learning in a way that other types of digital games cannot? The possible answers became even more evident in my exploration of the fourth element: the kinesthetic and mobile affordances of handheld games.

In the Wong Kar-Wai film *In the Mood for Love*, the film takes the viewer through textured pieces of narrative. The director weaves together threads of the relationship between two people, in part locating each new strand with the costume of its female protagonist (Su Li-zhen Chan). These “fabricated” stories are both



³²⁴ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

³²⁵ Diana Oblinger, “The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, Vol. 8., 2004.

³²⁶ Directed by Wong Kar Wai, 2000. The last line in the film.

spatially- and temporally-defined by the different textures of Su Li-zhen Chan's outfits. While watching *In the Mood for Love*, we are a spectator of its stories, of its version of the past. We can see of the characters' pasts, we can "feel" their mood, and we can be "touched" by their stories. But we cannot actually feel or touch what we visually sense. With the texture of the protagonist's dress, the texture of the camera's movement, and the texture of the film's interiors, Wong Kar-Wai attempts to add texture to our experience of the film—to engage our haptic³²⁷ and kinesthetic³²⁸ sense as well as our visual. We feel as though we are moving through the film's stories, and we are more "moved." I argue that the film, by stirring more of our senses and haptically moving us through the film, engages us ore in the narrative and mis-en-scene.

There is pleasure in being able to move around a space, to locate oneself in a physical environment and understand a site through sight and touch. If we consider, for example, the preponderance of panoramas in cinema, depth of field in painting, and travel writing, these are all vicarious ways of enjoying another space and time and creating spatial narratives.³²⁹ How, then, do we make history more "felt," if we can't actually touch the past? How can we engage more senses than just the visual when we are learning history? An augmented reality game experience provides an opportunity to be further "in touch" with a historic moment and site.

In designing "Reliving the Revolution," I weave the stories of people's past into the landscape of the present. With this game, participants are able to glean fragments of a past moment and read diverse pieces of the history of a location. Artifacts and relics of this past still exist in the present—buildings that were there in 1775 are still there, except in a different form. Physical objects are also place markers for the past, such as the monuments that sit on either side of the Lexington Common and demarcate the line of the Minuteman soldiers during the Battle of

³²⁷ According to O'Neill, haptic perception refers to a "holistic way of understanding three-dimensional space. ..This holistic system of environmental perception goes far beyond visual spatial perception, and refers to a more complex geographical experience. It involves the integration of many senses, such as touch, positional awareness, balance, sound, movement, and the memory of previous experiences." (Maire Eithne O'Neill, "Corporeal Experience: A Haptic Way of Knowing," *Journal of Architectural Education*, September 2001, vol 55(1): pp 3-12.

³²⁸ Kinesthetic learning relates to learning while doing a physical activity; the kinesthetic sense is the physical sense of bodily movement and posture (according to Wikipedia, wikipedia.org)

³²⁹ Giuliana Bruno, *Atlas of Emotion*. (New York: Verso, 2002).

Lexington. While the game participants cannot actually access the past, they can access evidence and information from the past while experiencing a living, breathing site.

Participants need to wander around the Lexington Common to trigger the virtual information and to gather evidence that is still present in the physical environment. Often, the virtual information and the physical environment react to each other, which enhance the participants' engagement and learning. I designed the game so that the participants need to walk around and explore an actual, physical location, to complete the objectives of the game. All virtual information is attached to a specific site on Lexington Common, and its location could affect one's interpretation of the past and present.

The ability to apply historical inquiry skills in a real-world historical site adds to the authenticity of the game's tasks. Participants are evaluating "real" evidence in a "real" place, and attacking a "real" question based on a "real" battle, which encouraged them to practice and apply critical thinking skills. In this way, the game also encouraged contextual learning and supported a Situated Cognition model.

Spatial His(stories)

Because I place the virtual information at specific locations, the histories or stories of the game were necessarily bound to the space of Lexington. In this way, the stories cause what De Certeau calls a "spatial legislation since they determine the rights and divide up lands by 'act' or discourses about actions."³³⁰ In other words, the stories and their locations articulated social boundaries as well as physical boundaries. I also put slaves, females, and children in "domestic space" or locations near homes, whereas I placed the male soldiers in "battle space" on the Green and near Buckman Tavern. My hope is that this "virtual" delineation augmented and changed the way the participants view and interact with the physical landscape of Lexington. If the participants are in a Minuteman role, for example, I wanted them to feel encroached by the movement of British soldiers (Regulars) onto their land. When walking near the homes, I wanted the participants to feel as though they are invading domestic or private space. This would further

³³⁰ Michel de Certeau, *The Practice of Everyday Life*, (Los Angeles: University of California Press, 1984) pg. 122.

emphasize their own roles, as well as help them consider how geography and place can affect economic and political actions and processes.

The stories and histories in the game are seen as interlocked and interconnected geographically, as well as thematically and conceptually. For example, some of the NPCs' testimonials consist of directing the participant to another location ("Where is William Diamond? I need him to beat the drum call to arms at once! He is likely at Jonathan Harrington's house. Have you visited there yet?"); describing one's own location ("we are hiding behind the Stables"); or inspecting further a specific item or building in the physical or virtual world ("Mr. Revere and I had to rush back to retrieve John Hancock's trunk at Buckman Tavern. As we escaped with the trunk, we were only half a gunshot away from the Regulars!"). This further engages the participants, because they can more richly experience the interconnections between the physical and virtual worlds. Whereas in many instances the interaction between the virtual and physical world was powerful, in my observation of the game I felt that there could be even more interactions. Often, participants would become so immersed in the handheld's information that they would forget to look around. I redesigned the game to encourage even more interaction between the real and virtual (physical environment and the information cued on the PDA). For example, I tried to integrate into the testimonials more references to the physical landscape and historical locations. This would motivate the participants to search for clues or corroborate the evidence in the real world.

Thus, participants used their interactions between the physical and virtual worlds to develop their own historical narrative of what happened at the Battle of Lexington. Simultaneously, the participants create their own narrative of the game and the historic moment it recreates by their navigation of the town of Lexington. De Certeau argues that "every story is a travel story, a spatial practice."³³¹ By moving through the Lexington "game board," the participants write their own series of events in the Battle of Lexington moment. The open-endedness of the game enables the participant to uncover and discover his/her own narrative, which adds to the excitement of the game. The ability to construct these narratives is very much aided by the

³³¹ Michel de Certeau, *The Practice of Everyday Life*, (Los Angeles: University of California Press, 1984) pg. 115.

physical mobility of the participants, which in turn is enabled by the portability of the handheld computers. For example, one participant explains that her favorite moment in the game was:

“My favorite part of the game was when I found out that John Harrington had been shot in the game. It was neat because you met someone on the street who told you that [that he was dead] and then you ran into his wife who was like ‘Oh my god.’ And then you passed his house and you looked at the house and it has the actual plaque saying that this is where John Harrington died in his wife’s arms and it corresponded to the story. And then you saw John Harrington, who was dead and didn’t have anything to say, and it felt like the process of discovering that was what I was hoping I’d find in the game.”

The game puts the “fragments of stories”³³² available about the Battle of Lexington back into Lexington, by enabling participants to access the stories using a handheld computer. Instead of students discovering history only in books, archives, or museums, they find its stories in their original location. This helps the participants connect the people of history to their individual voices and where they were first spoken, giving the historic moment more depth and richness. Mobility and kinesthetic elements work with other game elements, such as narrative and collaboration, to further engage the participant in history inquiry and comprehension.

Location, Location, Location

Location itself also matters in terms of judging the veracity of evidence. Participants may need to judge the trustworthiness of evidence based on its location, or they may be inspired to look at something in the physical world because of something they see on their handheld. In other words, the location of the virtual information can affect the participants’ interpretation of the information, while also influencing their interpretation of the physical world.³³³ The physical locations of the NPCs may affect their testimonials in other ways, too. If an NPC is closer to other NPCs with similar evidence, they may be seen as more honest than other NPCs who are surrounded by others with contrasting views.

³³² Michel de Certeau, *The Practice of Everyday Life*, (Los Angeles: University of California Press, 1984), pg. 121

³³³ For example, one of the NPCs argues that he knows it was John Pitcairn who fired the first shot because he was only a short distance from the battle site. If the participant encounters this NPC at that distance from the battleground, this might further support his testimonial. Similarly, the participant might judge the evidence they receive as more suspicious if a historic figure (NPC) is farther away from the Lexington Green, or behind obstacles such as Buckman Tavern. On the other hand, if there is something in the physical environment that corroborates with a piece of evidence, the participant may be more likely to judge it as factual.

Location is also a touch point or point of reference for participants when they are sharing and exchanging information. This very strongly relates to the Situation Cognition model, which argues that learning is tied to the context in which it was found. During the debate, participants could recall information more easily because of its physical context. For example, the participants would point to different areas of the Common when explaining where they found information, or where a particular NPC was located or headed. While collecting evidence during Part I of the game, the pairs would use the map to find the locations of NPCs, and then point out the real world location to each other.

The connection between information and location also helped the participants mentally organize the evidence. Participants could easily visualize what information they still needed to gather because they could remember where they had already traversed. For example, in one pair's exchange during Part I (evidence collection) a participant reads aloud a testimonial, "Nathan Munroe was also fighting and went to the tavern," and says, "We need to get to the tavern that's where all our guys are." She then looks at the handheld to find the approximate location of the tavern, points to it in the real world, and the pair walks together across the Lexington Common toward it.

Being at the historic site also helped the participants conceptualize the battle, and encouraged them to use geography piece what happened at the Battle. Participants often provided evidence moored by its physical location. When each person expresses his/her narrative of how they think the moment happened, they spoke in terms of location and movement across Lexington's landscape. In one of the Pilot study debates, to orient their discourse about the battle, the participants first oriented the historic moment within the physical confines of Lexington. They deliberated over where the Minutemen stood during the battle, where the Regular soldiers arrived in Lexington, and where they headed afterward when they marched to Concord. This is akin to De Certeau's observation of "Oral descriptions of places, narrations concerning the home, stories

about the streets.”³³⁴ De Certeau writes that memories are personal and non-localizable;³³⁵ moreover, a shared location further enables participants to share their stories with each other.

Mobility Results

Most participants felt that the ability to wander around the site of Lexington and discover information at particular sites was the best aspect of the game. Almost every participant in the focus group enjoyed being at the site of Lexington because they felt that it “made history more real” or gave them a better sense of the “history of the site.” In my observations of Part I of the game (the collection of evidence), participants seemed very involved in searching for the “hot spots” in Lexington, wandering around the sites, and reading the evidence aloud. One participant noted that the walking around made the game “more engaging and more interactive,” and another said that the best part of the game was “getting to know a physical site. To me that is the excitement of the game.”

The ability to be outside in a group playing a game and exploring a site together also enabled more social interactions, which the participants felt added to their overall experience. The physical nature of the handheld game may also have increased the game’s collaborative potential—being together encouraged the participants to interact socially. Said one participant, “I liked the fact that it was outdoors, walking around the Lexington Commons. That was much more preferable than ... virtual Lexington. I think that the social aspect of being here together in Lexington ... made it much more enjoyable.” Participants walked in pairs, so they were physically proximal during Part I of the game, but they could also freely interact with other roles as they were collecting evidence.

Many of the participants also commented on how the ability to walk around Lexington was the most important distinguishing feature of “Reliving the Revolution,” as opposed to playing a virtual Lexington game at their desktop. Said one participant, “It helped me get a better sense of the historical site itself by actually being there. So students could get a sense of the historical site itself by walking around and seeing the places and imagining where these things took place. It is

³³⁴ Michel de Certeau, *The Practice of Everyday Life*, (Los Angeles: University of California Press, 1984), 120.

³³⁵ Michel de Certeau, *The Practice of Everyday Life*, (Los Angeles: University of California Press, 1984), p. 108.

still better than the substitute of a virtual game.” This comment is particularly interesting because it suggests that, even if participants have to imagine how Lexington looked in 1775, the ability to be in the actual site is more powerful and engaging than playing a more realistic rendering of 1775 Lexington at one’s desktop computer. This comment suggests the importance of the haptic and kinesthetic sense in learning and playing. However, participants noted that for students who are not near the actual site, the virtual Lexington would provide a way for them to experience the town.

Also, a few participants noted that the handhelds may have distracted them from more fully immersing themselves in the physical location of Lexington. For example, one participant would have preferred just focusing on the physical site, rather than alternating between the real and virtual worlds. Only one participant in the Pilot studies felt that he would have rather played a virtual Lexington—he found it difficult to imagine what Lexington was like in 1775, because he felt constantly pulled back into the modern world when crossing streets or hearing anachronistic noises. Participants in the Redesign trial, however, much preferred the ability to walk around using a handheld to sitting in a classroom. This suggests that while augmented reality games could be powerful learning experiences, some students may prefer and/or learn more easily using other types of distributed learning tools, such as MUVES.

A couple of the participants in the Redesign trial commented that they did not like having to walk around the Lexington Common to gather information, mainly because it was a very hot day. They did, however, concede that the walking was necessary so that they could explore the location of the Battle of Lexington while learning about it. See, for example, this exchange during the focus group session:

Participant 1: I guess it’s like those Civilization games, where you can talk to people and they will tell you different things.

Participant 2: But [Civilization] is not in the actual place.

Participant 1: I know that’s what was cool [about this game].

Participant 3: Yeah, that you are playing the game where it happened.

Participant 2: That you are actually in the place.

Participant 1: Except that we need motorized scooters so we didn’t have to walk.

Despite their dissatisfaction with walking, they did seem to find pleasure in moving around the site and discovering new information, especially as opposed to sitting in the classroom to learn the same information. One participant noted that looking for the “hot spots” contributed to her greater engagement in the game, “I think the thing that we had the most fun with on our team was ‘oh we’re getting closer, oh we found one,’ the wandering and finding and the density of items was actually pretty well placed. There weren’t so many so that you were getting slammed, but there were enough that you would hit them unexpectedly.”

Similarly, the participants in the Redesign trial especially enjoyed being able to actively walk around and learn, rather than sitting passively in a classroom. Said one participant that in this game he liked was that, “you aren’t sitting on your butt for 55 minutes.”

Participant 1: Yeah, if we sat in a classroom and did this and I would walk away and be like “Yeah, okay.”

Participant 2: But when you are actually moving around to do it...I think it’s definitely more interesting to do it this way than to sit in the classroom.

Results on Authenticity

The distribution of virtual information over the physical space of Lexington, combined with the portability of the handheld computer, encouraged the participants to explore real-world Lexington. The virtual map of Lexington, which is part of the game’s interface on the handheld computer, was also important, because it helped locate all of the information and provide an important visual bridge between the real and virtual worlds. This further suggests that “an activity that maps physical space and curricular space onto one another ... lends continuity to the experience,”³³⁶ and helps participants make stronger connections to the information. In my observations of the Pilot study trials, for example, the participants felt that they were deeply exploring a site and discovering its embedded historical information. The participants consistently treated the historical evidence they gathered as realistic, and the locations where they retrieved the information as plausible to where they might have accessed it if they were actually going back in time and re-experiencing Lexington in 1775. The participants seemed to

³³⁶ Walter Holland, Henry Jenkins, and Kurt Squire. “Theory By Design.” Chapter from an unpublished book, 2003. <http://ocw.mit.edu/NR/rdonlyres/Urban-Studies-and-Planning/11-127Computer-Modeling-for-Investigation-and-EducationSpring2003/7D28B2F8-B63A-48E5-A075-398AD2E5E3A1/0/theorydesign.pdf>.

treat the evidence seriously, and made informed hypotheses based on the evidence, partially because they viewed the historical problem of trying to understand who fired the first shot as authentic.

Similarly for the Redesign trial, the actual location of the Battle and interacting with actual historic figures, sites, and details helped the participants feel that the game was more authentic, and that the problems they were solving were more real. One participant said that what was educational about the game was that “It put you in the real place where everything happened. It gave you the real, actual people who were there, like the names, and their opinions.” By placing the information in its physical context, the participants were able to more deeply engage with the content and the historic moment. Said a participant about her favorite aspect of the game, “I like how there is the actual tavern, the actual monuments.” One participant felt that the game was more real and “intriguing” because he knew that it happened where he was standing, “at any point, you know you are standing where someone died.” This realization helped him connect the past events to his present location. The relationship between the virtual information and the physical objects compelled the participants to look more closely at the evidence and also the historic site. Said one participant in the Redesign II trial, “this [game] makes you actually look at stuff. Like ‘oh, that house over there was lived in by that famous [person].” Furthermore, sometimes physical landmarks were privileged as the most trustworthy. When the Redesign trial participants were deciding whether Captain Parker of the Minutemen was trustworthy, they noted that his words—not to fire unless fired upon—were etched into a rock, and therefore, they prioritized his story.

Interestingly, the “real” world was not always considered trustworthy, especially when it contradicted how the participants perceived the unwritten rules, values, and relationships of the virtual world, and how they identified their own roles and the allegiances of virtual others. For example, during the Redesign trial, there was a member of the Lexington Historic Society dressed up as a Minuteman soldier, greeting tourists stopping by the Lexington Common. I informed him of the purpose of the game, and I told him to offer his own opinion as to who fired the first shot, based on the participants’ role (which he could identify by their name tag). I told

the participants during the instructions that they could also speak to the real Minuteman soldier as part of the game. One of the pairs, the British soldier, asked the Minuteman soldier who fired the first shot, and he responded that it was a Minuteman soldier who shot from behind Buckman Tavern. The participants immediately disregarded the Minuteman's testimonial because it contradicted what they were receiving from other Minuteman soldiers, and because they felt that he was an untrustworthy source. Said one of the British soldier participants, "Why would he turn on his own people? He isn't trustworthy... we are throwing his evidence out." Thus, if the physical world corroborated what the participants were viewing in the virtual information, they would weigh that evidence much more heavily. If a piece of physical evidence contradicted how they viewed the virtual world, they would doubt the authority of the physical evidence.

CHAPTER SIX:

A FUTURE FOR HISTORY AR GAMES

"History by apprising them [students] of the past will enable them to judge of the future; it will avail them of the experience of other times and other nations; it will qualify them as judges of the actions and designs of men; it will enable them to know ambition under every disguise it may assume; and knowing it, to defeat its views."

—Thomas Jefferson³³⁷

In this thesis, I have focused on four design elements of "Reliving the Revolution." In this section, I evaluate my game in light of each of my pedagogical goals, and also discuss the most noteworthy results from the Pilot and Redesign trials.

EDUCATING WITH "RELIVING THE REVOLUTION"

(A) Acquire a Meaningful Understanding of Key Historical Themes and People

The game content of "Reliving the Revolution" included descriptions and accounts by actual historic figures, leaders, and participants of the Battle of Lexington. The participants particularly enjoyed learning about the Battle by reading real people's accounts. Embedded in these

³³⁷ Thomas Jefferson (1743–1826), U.S. president. *Notes on the State of Virginia* (1787), Query 14, p. 148, ed. William Peden (1954) as quoted in the National Center for History in the School's "Significance of History for the Educated Citizen," *National Standards for History*, Grades 5-12, 1996, (accessed at <http://nchs.ucla.edu/standards/dev-5-12a.html> on June 7, 2005 and James J. Carpenter, "Jefferson's Views on Education: Implications for Today's Social Studies." *The Social Studies*. July/August 2004. Carpenter argues that Jefferson deemed history as essential for citizenship in the United States, and that skills such as critical thinking, communication and tolerance were characteristics of a citizen.

accounts, and their locations around Lexington Common, were details on the battle, and the social, economic, geographic, and political forces shaping this event. For example, in the testimonial by William Diamond to the Prince Estabrook role (African American slave/Minuteman), he provides context for the battle: “Hello Prince! I have been practicing the battle calls on my new drum all winter. Captain Parker ordered me to call the other Minutemen to the Common because he heard news that the Regular troops are near! Do you think they are coming to capture Mr. Adams and Mr. Hancock?” In this testimonial, thus, the participant learns that William Diamond is the drummer of the Minutemen, that the Minutemen have been preparing for a few months, that the Regular soldier are arriving in Lexington, and that a possible reason for their arrival is to capture Adams and Hancock.

The results of the focus group for the Redesign trial suggested that the participants particularly enjoyed learning about the different people involved in the Revolutionary War by hearing their accounts and investigating their relationships among each other. For example, the following exchange from the Redesign trial:

Participant #1: This is hands-on. So we learn a lot more because you are actually involved in it, instead of just listening to someone babble on for fifty minutes.

Participant #2: Instead of just listening to statistics, the personal accounts give you their emotions and their take on things

Participant #1: Yeah, when they were like, “Get away from me!”

Participant #3: You learn a lot about the different people.

Participant #2: You can kinda see how people would have reacted to each other, which will help you later.

Participant #1: We had to take notes on what the people said, so we got an up front look at what their different viewpoints.

Participants also learned more about the historic site of the Battle of Lexington—as they were reading the personal accounts of the battle, they often were also looking at the sites referred to by the historic figure. For example, in the testimonial by Captain John Parker to the John Robbins role (Minuteman soldier), he says, “I deny ordering anyone to fire! I told my soldiers not to shoot, to keep their ranks, and to surround your men. As we approached you, there were two shots, perhaps from the direction of Buckman Tavern. Was there anyone near Buckman who would have done that?” The John Robbins role can retrieve this testimonial in a location across the street from Buckman Tavern, and next to a small monument on the Lexington Green, which

says a quote by Captain John Parker. Moreover, the interaction between the physical location and the virtual information provides greater context for the participant in terms of the event, as well as the historic site. The game, thus, pinpoints certain structures around Lexington Common and shows how those functioned during the Battle of Lexington.

The inclusion of socioeconomic status for each of the historic roles, for example, helped the Participants interpret their role's relationships with the virtual historic figures they met. For example, during the debate of the Redesign trial, one of the participants playing Ann Hulton said, "We were Ann Hulton. Everyone was pretty nice to us, they just told what they knew, it could be because we were upper class." Similarly, during the Pilot trial debate, one of the Participants playing the Prince Estabrook role explained that, "people talk to me from both sides...because I was a slave. Slaves were fighting on the American side because they were promised freedom and they were also fighting on the British side, so they were sorta playing both sides." This participant explained his interactions with the various virtual historic figures based on his position as a slave and its historical context.



The opportunity for multimodal learning—including text, images, and location to reinforce each other—seemed to help the participants better absorb, categorize, remember, and recall the information, as well as enjoy learning it. For example, one participant in the Redesign trial explains why he felt that this game helped him learn about the Revolutionary War better than how he learned in his history classroom:

"I re-learned U.S. History One, which is what I took sophomore year of high school, and it was a total waste of my time. And I just re-learned it in three hours, which is kinda scary. The course I took in sophomore year and the teacher didn't really know what she was doing, I think it was her first time teaching it. But what she said or what she taught was really that clear. But this recapped it and I relearned it and now I know more about history. ... the pictures, and the items [helped make it clearer]."

The interplay between the physical and virtual also seemed to help the participants navigate, remember, and integrate the content better. Each time the participants reached a new “hot spot,” they needed to stop, read the testimonial or inspect an item, and interpret the information and understand its relationship to other virtual information. Having a physical context for the virtual information helped during the debate when the participants were sharing information. For example, in the following exchange during the debate of the Pilot study trial #2:

Participant #1: (reading from handheld) There is this testimonial from Nathan Munroe which says “Slave, go back and check on my family at the Munroe House. ...”

Participant #2: Who was that?

Participant #1: That is Nathan Munroe who lived right over there (points to Munroe House). So that whole family was pretty involved. Captain Parker was the guy in charge. What order did Captain Parker give to have them run away? Anyone know about this?

Participant #3: What is his first name? (Pause, looking through handheld) He is the one who got shot in the leg. He ordered the minutemen to disperse and NOT to fire, but the Minutemen rushed furiously and killed ten of our party

Participant #1: So the minutemen were there, at the walls, while the British were coming up, and he says ok let’s scatter. And that’s when Munroe has a shot, and fires. But he just heard the shot and didn’t fire. He was just guessing.

Locating the virtual historic figures near the Munroe House, and having their testimonials refer to the Munroe House, helped the participants to understand, incorporate, and relate the information they learned in the game.

Participants were able to debate for approximately 30 minutes, using the rich details, observations, and experiences from the 1 hour of evidence collection and interpretation during Part 1 of the game. For example, in this exchange, the participants support their arguments with information from the game, while also evaluating that data based on who provided the testimonial:

Participant #1: William Diamond who is the drummer...said that Major Pitcairn fired first.

Participant #2: We heard from Nathan Munroe that Pitcairn tried to kill him. William Sutherland said that Pitcairn, he heard Pitcairn tell the troops not to shoot. Oh, you have that too.

Participant #3: That’s confirmed by Henry DeBerniere.

Participant #1: But he is an observer. He said that Pitcairn told the Lexington men not to fire.

Participant #2: He told the Lexington men?

Participant #1: he told the men to lay down their arms, give up and surrender and then the patriots not to fire.

Participant #2: But he told his own troops not to shoot?

Participant #1: He said you surrender to us. We didn't get that, that's not in there. Parker has that famous line, "Stand your ground..."

Participant #3: Does everyone sense of who is the spy?

Participant #2: We found one spy, Henry DeBerniere.

Participant #3/Participant #1: Oh really? We didn't have that.

Participant #1: We had Daniel Murray. There were two spies.

Although the debates were very detailed, the participants' arguments well-supported by research, and the participants' use of material very insightful—suggesting that the participants had gathered, interpreted, and digested a vast amount of material within an hour—their responses on the survey content questions did not reflect how much they learned. For example, many participants did not provide detailed explanations as to why the Revolutionary War was being fought. Often, the participants did not change their answers from the pre- to post-game survey. I think that this is a function not of the participants' experience of the game, but the survey's ability to properly capture the type of learning afforded by this game. A better instrument, it seems, is listening to the debate and observing how the participants interact with the information and interpret the evidence.

Although the participants enjoyed learning about the Battle of Lexington from specific historic figures' accounts, because the accounts were highly biased, this could also lead to misinformation or misinterpretation. For example, the distinct perspective or role on the Battle affected the participants' responses on the post-game survey. They answered the question to who fought in the Revolutionary War as if they were the role—for example, a British soldier said that it was the "rebels and the British Regulars" who were fighting against each other, rather than the American colonists and the British King's troops. While this suggests the power of their individual roles in playing the game, it also suggests that they may have erroneous information coming out of the game. Going forward, it would be important to have a short reflection session after the game (either in the classroom, or after the debate), and discuss the issue of biased and inaccurate information. Perhaps the participants could work on exercises where the four roles can directly compare the accounts from one historic figure, and decide what they feel is misleading,

or how it is biased. The teacher is integral in providing directed guidance and scaffolding for more exercises after the game.

(B) Build Knowledge of the Methods and Limitations of History

In many ways, the game play of “Reliving in Revolution” tried to mimic the activities of a historian, and to provide an opportunity for participants to interact with historic evidence and create their own interpretations and conclusions. Participants practiced historical methods by collecting evidence (walking around Lexington and gathering information using a handheld device), analyzing the evidence (discussing and interpreting the evidence with a partner, categorizing it on the note sheet, and sharing one’s interpretations during the debate), and making hypotheses (offering mini-hypotheses as the pairs collect evidence and make interpretations, creating a final collective hypothesis during the debate). In other words, they didn’t just collect data; they also interpreted it and related it to other data. Said one participant in the Redesign trial, comparing it to what she normally does in her middle school history class: “A history class is like data, but this was like data and then you had to interpret or analyze it on top of it.”

Throughout the debate, the participants would offer arguments that supported others’ hypotheses and also provided counter-arguments to others’ hypotheses. This is exemplified in an exchange during the debate of the Pilot study trial #1:

Participant #1: We are trying to find this [piece of evidence]...to back up our hypothesis that maybe a gun from the patriots accidentally went off, discharged and where that was.

Participant #2: How many shots?

Participant #3: It says one or two.

Participant #4: I think it would be only one shot, because if someone was firing a musket, they could only fire one shot at once if there was a misfire.

Participant #5: So something went off accidentally...

Participant #4: ...and then everyone went nuts.

Participant #1: And we were warned by people that were you the one that let your gun go off, be careful, people were accusing, I remember seeing someone say that they thought their gun went off accidentally.

Participant #5: But there were supplies in Concord and there was powder and guns and cannons so ...

Participant #2: But we have Captain Parker’s journal entry and Parker says that “I immediately ordered our troops not to fire, but the King’s troops rushed in and killed 8 of our own.”

Participant #3: And we have this thing that says.... Dr. Fiske says.... “We think Colonel Smith shot [Jonathan Harrington, Jr.]”

Integral to simulating “history” is the creation of an authentic learning environment. As I explained in the previous subsection, the participants were in the actual place where the Battle of Lexington occurred, they were viewing the actual structures that were integral to many figures’ testimonials, and they were reading detailed personal accounts of the Battle—each of which provided a distinct “blade” of the event. This feeling of authenticity underscored all of the game’s activities, and strengthened the connection between game play and historical methodology. Many of the participants felt that being at the site of the Battle was one of the most educational aspects of the game. Said one participant during the Redesign trial focus group, “[The game] put you in the real place where everything happened. It gave you the real, actual people who were there, like the names and their opinions.”

Having specific game objectives helped direct the participants’ learning of historic methodology. The participants were required to solve a complex historic problem—who fired the first shot—which also doubled as the game’s main goal. In the Redesign trial, the participants also needed to approach smaller objectives—the role-specific secret missions—which helped them break down and compartmentalize the larger historic problem. For example, a participant from the Redesign trial said that the “secret missions kinda orient you to figure out a certain thing.” Echoing this, one participant from the Redesign trial thought that the question of “who fired the first shot” was too broad, and felt like even more secret missions would make the game “more definite.” Each of these mini-objectives helped them better understand one or more of the hypotheses about who fired the first shot (See Appendix XVIII for a list of the mini-objectives).

To solve the game’s objectives, thus, participants needed to apply historical thinking, such as identifying biases in the evidence, questioning authorial intent, and considering the limitations of their evidence collection. The game’s built-in constraints also affected the participants’ understanding of the constraints of historic methodology. For example, resources such as time and people were limited. The participants only had an hour to gather and interpret the evidence—which meant that they could only access part of an entire database of information. Throughout

the game, they needed to each work with a partner to decide how they would navigate Lexington and the game's information. One participant during the Redesign trial noted that she would have liked knowing exactly how much time was left so that she could figure out how many more people should could talk to, and which ones she should speak to first. A few of the participants during the Pilot study trials actually noted that they wished there was some type of countdown or clock on their PDA interface to remind them of the time, but also to increase the perceived pressure of the environment.

Moreover, the participants' view of the evidence was limited. The participants could only access one-quarter of the total information, based on their role. During the Redesign trial, for example, the participants needed to rely on each other to solve one of their secret missions. The participants playing the British soldier needed to ask the participants playing the Minuteman what was in the trunk that Paul Revere was carrying. During Part I of the game, the British soldier participants specifically asked the Minuteman participants to speak to Paul Revere. One of those British soldier participants later noted in the focus group that she enjoyed "talking to the other groups. Since there were certain people and only certain characters could talk to them, we had to ask them for help." Another participant echoed her sentiment, saying that "Because every person who was a different role always got different responses from someone, so it was good to see how they were treated."

As a result, the participants began to realize the limits of interpreting the past without all of the evidence. Many participants wished that they had even more time to gather information, and they each acknowledged that they didn't have enough data to feel 100% confident in their decision.

This is suggested by the following exchange in the debate of the Pilot trial #1:

Participant #1: He was seen hanging out with the King's troops and was suspicious

Participant #2: I would say that there are so many suspicious characters, and I would probably support the hypothesis that on that day, it was an accidental shot. If I had to stand up for any hypothesis....

Participant #4: Under normal circumstances...

Participant #2: I would need more evidence.

Participant #3: I don't think we talked to enough people who weren't biased. I think everyone we talked to was on the loyalist side.

Participant #2: Although if you think about it, you'll never find an unbiased source. Everyone has their own...

Participant #3: But there is something more.

Participant #2: Like a double confirmation happening for us.

This feeling of insufficient evidence also concurred with the participants also questioning the validity of creating a definitive narrative for what happened, as exemplified in the following exchange during the debate of the Redesign trial:

Participant #1: How do we know for sure. I feel like we don't have enough evidence. Even with all of us finding different stuff, finding different things, pieces of evidence, how do we know who fired the first shot? Of course if you are loyal to British...you are going to say, "Oh the minutemen fired the first shot" and if you are loyal to America and you are fighting the British, you are going to say, "the British fired the first shot." So how do you know?

Participant #2: It's a case of "they started it." You can't really believe anyone. Unless you had a video camera there.

....

Participant #3: Everyone is biased, but everyone was on different sides, but the fact that we came to the same conclusion from every side, like we had British, slaves, people on...we came together and all agreed on one thing from all the different viewpoints...kinda makes sense.

Participant #1: But with the spies, and all of what they had on the other side, you really don't know. Because the spies could be there just to find stuff and report back to them, and you could also have the drunk guys from Buckman Tavern that fired the first shot. You have no clue.

Participant#4: Well there are so many things to factor in, you will never really know.

Providing the participants with a sense of responsibility helped motivate them to complete the game and act like historians. By imbuing them with the task of "acting like a historian," and "solve a mystery from the past" (as expressed during their instructions), the participants felt that their opinions mattered. The participants had control over their navigation of the game world and historic database. Said one participant, "I liked the sense of control over the learning experience that one has, you had the ability to take your own pace and navigate through [the game and Lexington], thinking 'oh, I forgot about this, let me go back and check that out.'" This encouraged the participants to first collect the evidence, but then to also question what they received, and make their own, novel claims about the past.

Because many participants are accustomed to history education that provides one master narrative of the past, placing them in a safe game environment enables them to more easily break apart these narratives and play with their own theories of who fired the first shot. The

participants' sense of entitlement to make their own interpretations and novel narratives is reflected in one participant's statement that "Reliving the Revolution" is even different from other games. She said, "Because ... you had to research and then figure something out for yourself. It wasn't like a set like 'you have to click on this conclusion now.' You have to come up with whatever." On the one hand, having no set answers can be overwhelming, because there are too many possibilities and not enough constraints. On the other hand, the game can be liberating because it encourages participants to create their own game endings, and motivating, because of the game's original underlying assumption that the participant are even capable of devising their own endings.

(C) Confront Multiple Perspectives and Mainstream Interpretations of the Past

Throughout the game, the participants experience the Battle of Lexington and interact with the virtual historic figures and items from a unique perspective. During the second part of the game, the participants share, compare, and evaluate their own and others' perspectives. Thus, the game play, such as the inclusion of roles, the collective debate, and the role-specific information, all support the participants' consideration of other views on the Battle of Lexington. In the focus group of the Redesign trial, for example, a participant noted that reading the various historic figures' testimonials "gives you a larger point of view about what happened." Said another participant in the Pilot study, "I learned about all the different sides. Normally you would just think of the American soldiers and the British soldiers, slaves, the wives, the people at the bar, the Minutemen, there are people frustrated here for personal reasons, patriotic reasons,.... you get a sense of the different roles of that time period." Another participant echoed this, saying that "In the [first survey] you are asked who fought in the Revolutionary War, well it's the British vs. the Americans. Then you realize it's not just the British and the Americans, it's the British army against the rebels, slaves, and everyone has their own agenda." After the game, the participants began to have a more complex, nuanced understanding of the various points of view of the historic moment of the Battle of Lexington. They did not just interpret the tensions involved in the Battle as a simple dichotomy, but as a more multidimensional issue with "many different factors" involved, multiple perspectives or blades.

As I mentioned in the last subsection, the participants had the opportunity to begin to unpack master narratives and construct their own interpretations of the past. One of the reasons for this was because they were in a game environment, but it was also because the game play supported the acknowledgement of alternative representations of the past. Right from the beginning, I invited critiques of the master narrative. In the introduction of the game, I imbued the participants with the responsibility to create their own version of the past—to figure out what really happened during the Battle of Lexington. By not using textbooks or other traditional pedagogical methods to share the various perspectives and information, but a game environment that the participant could self-navigate, also encouraged alternative views. Moreover, since the participant receives multiple strands of stories of what could have happened, that are simultaneously accessible, the participant is more likely to consider alternatives.

Also, the variety of views on the Battle of Lexington—learning about it from many different types of people and reading very distinct accounts—also motivated the participants to weigh multiple views and then to make their own constructions of the past. Because they heard so many versions of the past, and because they were reading personal (and sometimes very obviously biased) accounts, they began to accept that there are many ways to look at a historic event, and that some are more compelling than others.

By authentically practicing historic interpretation, they began to also see themselves as valid interpreters and conveyers of a past moment. They intentionally would seek out other perspectives, as in the case of the British soldier participants asking the Minutemen participants about the contents of the trunk. Right from the start of the game, after I introduced this “history mystery,” they each wanted to figure out for themselves who fired the first shot. Said one participant, “Once you got that first testimonial, you just want to keep on going to find out who it actually is.”

Once the participants were more aware of other roles and that the other roles are receiving different evidence, they were more attuned to appraising the evidence in light of their role. For example, in the Pilot study, one participant noted that when she met virtual historic figures who

were slaves, she thought, “oh, I wonder how this is different from what the slave role is getting ... I wonder how she is talking to me is different from how she is talking to them.” The game also motivated them to seek out other roles’ opinions on a historic figure or consider other ways of looking at evidence. For example, the following exchanged took place during the debate of the Pilot study trial:

Minuteman 1: What is interesting is that you are a loyalist woman. Who did you get to talk to?

Loyalist 1: Essential loyalists, soldiers in the king’s troops and the drummer William Diamond. They were all essentially blaming it on the rebels, the minuteman.

British Soldier 1: Did any of you talk to Margaret Winship?

Slave 1: Yes, we did. In the first part she said stay away from me slave, she was mean to us. In the second part,

Loyalist 1: we talked to her in the beginning, and she had seen Daniel Murray talking with the members of the King’s regiments by the schoolhouse.

British Soldier 1: You are a loyalist? How was she described to you? Oh, she said it was probably some drunken Lexington townsmen and shot at.

Minuteman 1: Daniel Murray said that Sylvanus Woods was a spy for the King, and that Paul Revere is not trustworthy. That confirms what we found with what [British Soldier 1] found.

British Soldier 1: It was Daniel Murray who said that it was hard to tell who fired the first shot because there were two shots at once.

Minuteman 1: He is also suspiciously hanging out with the King’s Regiment.

Thus, the participants compare evidence based on each of their roles, and collectively evaluate each testimonial with regard to which virtual historic figure offered it and his/her relationship to the role to whom s/he is providing it.

The debate helped the participants not only consider multiple perspectives and practice historical interpretation, but to also reflect on the process by which they arrived at their conclusions. For example, during the debate of the Redesign trial, one participant offered a hypothesis, and then went through her justification for coming to that conclusion, while other participants proffered their own arguments and supporting evidence:

Participant #1 (British soldier): There wasn’t one piece, but it was the mentioning of one name over and over again. Like you can never really trust one firsthand account, because of course they are going to be biased by their side. But if you get like four or five people mentioning Edward Mitchell. It kinda leads you to believe that he did something. So that’s what I think, that is what convinced us, that we got one name over and over again.

Participant #2 (Slave): Like whenever we found a British person, they were too busy to talk to people, they were only busy looking for something and doing something.

Participant #1 (British soldier): Well that could have been you. You are a slave and a Minuteman, so I don’t think they would have talked to you anyways.

(looking through handheld) because a lot of British people talked to us because we were British. This guy said, “Those Lexington minuteman asked for it. The Minuteman were out for revenge. They should surrender.”

Participant #3 (British soldier): We found a hat that had been marched on. So that probably means that... the British were in pursuit, that they probably came here looking for a fight, they were willing to pursue it.

Participant #4 (Loyalist): They were prepared to pursue it.

Finally, the game encouraged the participants to reflect on their interpretations of the event, but to also think more deeply about their preconceived notions about the Battle of Lexington and history in general. As I described in the last section, the participants began to become more aware of all the subtle variations in views, and the spectrum of agendas for the various townspeople and soldiers. During the focus group of the Redesign trial, the participants began to reflect more on what textbooks offer as opposed to hearing the people’s views of the Battle.

Participant #1: The textbooks always focus on one side, and with this you got both sides of the story.

Participant #2: In America, we have American textbooks and they are written by Americans, so of course you always get that portrayal of the British as being the bad guys and I’m sure the British kids when they learn about this, it’s completely different. It’s either that the Americans are the bad guys, and like of course it’s going to be different depending on what side your country is on. The same with Iraq, people are going to in years to come when we read about that in textbooks it is going to be different and it’s like how Saddam Hussein took things out of textbooks that made him look bad in Iraq. Everything is controlled by some higher powers so of course it’s going to be biased.

In this exchange, the participants begin to take their more multifaceted understanding of the Battle of Lexington issue, and relate to other situations and even global social problems and complexities.

Is This a Game?

An important point of discussion during the focus groups of the Pilot Study trials was whether “Reliving the Revolution” is a game. Said one participant, “It didn’t feel like a game, it felt like a tool, like an experience, a tour kind of thing. It was an interactive experience, ... but I don’t think of it as a video game.” Another felt like it was different than a video game because it was more active, “I think video games are more passive. If this was just a virtual Lexington, and you were

sitting at a computer screen typing things in, this was much more active, you were walking around, talking to people, and picking up clues.”

Interestingly, none of the participants in the Redesign trials questioned whether “Reliving the Revolution” was a game, despite feeling that it wasn’t like any other game they had played. They compared “Reliving the Revolution” to other games, such as Civilization, the Sims, and Carmen Sandiego; or even other media to show how this was more game-like or educational. Said one participant, “like if you had put us in a room with cards that you could flip up, it wouldn’t have been as good. Because this makes you actually look at stuff. Like, ‘oh, that house over there was lived in by that famous [person].”

One possible reason for the Redesign participants’ greater acceptance of “Reliving the Revolution” as a game is that they have played a greater variety of video and digital games, and as NeoMillennial learners, are more adaptable to new technologies and experiences. They are more open to the potential for new types of digital games and, because they have a greater breadth of experience with previous games, can see relationships and points of similarities between “Reliving the Revolution” and other games they have played before.

Another reason that they accepted this as a game is that I couched this as a game during the instructions, and as younger participants, they were less likely to want to question my label on the experience. Finally, one other possibility is that the addition of the mini-objectives in “Reliving the Revolution” made the experience more game-like. One of the Pilot study participants had mentioned that “It didn’t feel like a video game because there was no clear goal. I didn’t have to kill anyone, and I didn’t get points, ... it’s more on your own terms.” By adding the “secret missions” or role-specific mini-objectives, the participants felt like they had more defined tasks and clearer goals, and thus, were more accepting of naming this a game.

And finally, why might it matter if “Reliving the Revolution” is considered a game, a simulation, or an interactive experience? What drawbacks or benefits can the nomenclature bring to the

overall learning—how is learning affected by such a label? What can games add versus a simulation in the learning of historical methodology?

TECHNICAL (AND OTHER) DIFFICULTIES

One of the underlying questions throughout the creation of “Reliving the Revolution” is what is gained by learning about history and historical methods by using AR games. Part of this question is whether the benefits of this type of educational experience outweigh the possible drawbacks, and how the drawbacks affect both the learning and the immersion in the game environment.

In each of the game trials, the only technical problem with “Reliving the Revolution” was the accuracy of the GPS devices. The devices were very unstable—they would begin to work, and then fail throughout if there were clouds or trees, or if the participants walked too quickly. As part of the instructions, and throughout the game, I helped the participants troubleshoot with the GPS devices so that the GPS could properly trigger the “hot spots” (virtual historic figures or game items). Each of the participants stated on the post-game survey that the GPS was the most frustrating aspect of the game.

The technology should be “transparent” in that it should not be a distraction from or overshadow the meat of the experience; it should support but not detract from the overall experience. Instead, in the game trials, the GPS device instability caused the participants to disengage with the learning environment. The need to go back and forth between the game play and technical troubleshooting made the overall experience more frustrating and incongruous. Often, the technical difficulties limited the participants’ ability to play the game freely: “My least favorite part of the game was that we had technical difficulties ... so we couldn’t navigate through the game in the way that we wanted to.” Similarly, one participant questioned whether the potential for technical problems was worth the possible benefits of being at the Battle of Lexington location: “the technological problems that were encountered throughout were the most distracting thing about the experience, and it made me question whether we should be there.”

If technology is opaque, does this necessarily mean that we should not test it out or use it in our classrooms? I think that it was beneficial to begin to test out aspects of game play and content, to better understand how to use AR to support engaging learning. Although the technology was frustrating at times, the participants were able to successfully complete the game, and participate in a lively debate. They each enthusiastically spoke about the game, and felt that they had learned more than they would have in a more traditional format. Said one of the participants in the Redesign trial, “I think it’s definitely more interesting to do it this way than to sit in the classroom.”

Another possible drawback of the game was the location, in that to play the game, participants often had to cross the street and avoid traffic. This could have been jarring for the participant, in that they constantly had to imagine themselves in a historic moment, only to be pulled out by reminders of modern stimuli. One Pilot study participant found it difficult to navigate between the past and present world, and would have preferred learning about the moment from a 3-D representation of Lexington, rather than being there. He said during the focus group, “what I didn’t like was the big street that I had to cross and I kept having to imagine and then I had to keep getting out of the world.” All the other participants, however, seemed to find the location one of the top benefits of the game, and did not mention the traffic as a disengaging element. Moreover, the fact that “Reliving the Revolution” compelled a participant to try to imagine 1775 Lexington may have been a positive learning experience for him, though it did not make for as engaging a game.

Finally, the other possible drawback of the game, and historical interpretation in general, is that there is no one right answer. In most games, there is an objective that each participant must complete, and if they do so successfully, they will win the game. Salen and Zimmerman argue that “a game’s goal is often the largest single element that drives the pleasure of a player”³³⁸ and then that “players need to be rewarded, that they need to accomplish tasks and feel satisfaction as they play.”³³⁹ In “Reliving the Revolution,” however, there is no one clear right answer. The

³³⁸ Katie Salen and Eric Zimmerman, *Rules of Play*, Cambridge, MA: MIT Press, 2004, pg. 344.

³³⁹ *Ibid.*, 345.

participants provide a final conclusion as to who fired the first shot, based on their evidence and their interactions with other roles during the debate. For example, during the Pilot study, one participant explained, “I liked that there was no clear ‘you’ve won’ or ‘game accomplished’ or ‘game over’ but we had to discuss afterward. I liked that. Kinda that feeling of ‘are we done?’ or ‘are we not?’ and then having to talk about it later.” The problem was that although the game’s openendedness was authentic in terms of mimicking a historian’s actions, it was not necessarily appropriate for a game environment.

Thus, some of the participants did not feel like they completely resolved the game’s objectives because they felt their “final” decision was tentative and contingent. I feel, though, that the wariness of the participants to make an inconvertible statement about who fired the first shot reflects their growing appreciation of the limits of historical methods, and their consideration of multiple views and possibilities of what could have happened. This, however, was sometimes frustrating for the participant as “game player” and possibly as a learner. For example, at the end of the debate, the participants each wanted to know the “right answer” to who fired the first shot. I did not, however, have one possible answer for them. When I said that it was still a mystery, the participants seemed humorously dissatisfied, as if they felt someone had played a practical joke on them. Interestingly, the participants in the Redesign trial invited me to provide my opinion on the events of the Battle. When I offered my take, the participants questioned it and provided evidence that contradicted what I proposed.

While the “resolution” of the game ties into my pedagogical objectives, it may be in opposition to providing a participant with a satisfying game experience. A successful completion of the game relied on the process of constructing the final conclusion, rather than the conclusion itself. After I explained that the origin of the first shot is still a mystery, and that historians still debate this today, some participants were more intrigued, while others felt a little “cheated.” The ending of the game felt anti-climatic for some participants, because they did not figure out the correct answer; however, the purpose of the game was to teach the participants to approach history not as one master narrative, but as simultaneous possibilities or interpretations of what happened in the past.

TRANSPARENCY OF DESIGN

“A game is a particular way of looking at something, anything.”

—Clark C. Abt³⁴⁰

In Kurt Squire’s dissertation on Civilization III, he writes about “lifting up the hood” of the game, and working with the participants to perceive the game mechanisms—making transparent what the game designer had in mind. Squire writes, “The point of this exercise, to expose them to the properties of the model in order to make the game transparent and thereby make experimenting with the game both more fun and more pedagogically productive (e.g. Starr, 1994) seemed to be lost on the class.”³⁴¹ He observed that this was too overwhelming for the participants; despite what media theorists such as Sherry Turkle said about the importance of transparency, the numerous possibilities for rules and choices were too confusing.

Likewise, in each of my game trials, each of the participants “suspended their disbelief” while playing the game. In other words, the participants accepted the game as an authentic representation of historic evidence. They seemed to act as though this was *the* database of personal accounts—that this game presented, for example, exactly what the historic figures really would have said to each of the roles. Despite knowing implicitly that this was only a game (and that a designer would have written all of the testimonials and inspections), the participants acted as if the game information was authentic.

If something was flawed in the evidence, the participants did not attribute it as a fault of the designer. Instead, it was used to question the authority of the virtual historic figure. Even if there was a minor error in the evidence, interestingly, the participants did not blame the designer; instead, they used the error to question the intentions of virtual historic figure providing the evidence. For example, in the Pilot study trial #1 debate, one of the participants was expressing a discrepancy between Captain Parker’s testimonial and the document he provided.

Participant #1: Yeah he just said that. We did talk to Captain John Parker and that was pretty critical.

³⁴⁰ Clark C. Abt as quoted in Katie Salen and Eric Zimmerman, *Rules of Play*, Cambridge, MA: MIT Press, 2004.

³⁴¹ Kurt Squire, “Replaying History” (doctoral dissertation), accessed at <http://website.education.wisc.edu/kdsquire/dissertation.html>.

Participant #2: Jonas Parker?

Participant #1: No, John Parker. He was at the tavern. We interviewed him over there at the second half (points) We didn't get to him in the first half. He said that the Regulars fired first. When we talked to John Parker, his document said only 8 men were killed, not 10 in his testimonial. So that is suspicious. William Diamond works for Parker, he's not that trustworthy.

Instead of blaming the game designer for a consistency error or typo, the participants question the trustworthiness of Captain Parker, as well as his associates. Despite knowing that this was "only a game," the participants accepted the game as an authentic.

When designing the game, I often wrote a personal account keeping in mind a subsequent interpretation of the account. As a designer, I was always thinking about the possible ways the audience would perceive each of my choices. Because the participants took the accounts as authentic to the historic moment, and the game environment was open-ended and collaborative, this also meant that sometimes the participants would construct interpretations that I had not originally intended. For example, in the following exchange, the participants collectively try to interpret a piece of evidence about Edward Mitchell and its context in the Battle of Lexington.

Participant #1: It's not just the name of Mitchell, such as Gould and Pitcairn. So the people that were able to speak to the British easier, did you have any evidence from Gould? What was his opinion?

Participant #2: Solomon's comment was (reading from handheld) "you should try Edward Mitchell for treason. His gun and his attitude are the reason for this battle." *His gun.*

Participant #1: It is the reason, but the reason may be that they did not surrender. He might have said "surrender" and they did not surrender and go away, so that started it.

Participant #2: That may be the reason he fired the first shot. Both sides are to blame. Both sides seemed to get the order to provoke the other people into firing the first shot. Who is to blame is different from who fired the first shot.

Participant #3: But it's also the idea that Solomon Brown may only know the name of Mitchell. If you are making a statement to the other side, you want to hold up their highest leader to be tried for treason. You don't want to just point out the slackee right there.

Participant #2: You may hold up the highest leader for not controlling his men, not his gun going off.

Participant #3: But then again, you are in the aftermath of a battle, and he is talking to someone who is on the other side, they may not get into the legalistic language.

Participant #4: The British troops were very disciplined. In those days military formation was very important. They would march in very strict lines, whereas the revolutionaries were scattered around and hiding behind different things
British were much less likely to go off or something like that. But if you've got one of them that could just start the battle by just firing, then all hell would just break loose. So it might Solomon brown, my guy was on the minuteman side. It doesn't seem likely because the british, it was not what they were here to do. They were trying to go to Concord.

The participants integrate their outside knowledge, their understanding of the Battle, and each other's arguments to then interpret one piece of evidence. Moreover, explains Gee, members of an affinity group often "bring special intensive knowledge gained from their outside experiences and various sociocultural affiliations...to the group's endeavors."³⁴² This suggests that the game creates a temporary or proto-affinity group or community of practice (as defined by Gee and Dede)—a group of people who bond during a "common endeavor" or goal, communicate using a shared cultural language, teach each other knowledge, and identify themselves as engaged in practice toward that goal. The formation of such a group, argues Gee, is "built into a good video game."³⁴³

A Suspension of Belief?

One reason for the participant's "suspension of disbelief" during the game may be because of the legacy of the textbook, and the status of the classroom and teachers. The participants trusted that I, as an educator, would provide them with accurate information, at least in terms of them being actual testimonials that were created by real historic figures. Another reason for this may be that the game seems more authentic because it takes place in the actual location of the Battle of Lexington, and because the virtual historic figures and their testimonials are based on actual people from the past, and their words and whereabouts during the event. Participants may also not be used to questioning the mechanics of a game—trying to understand how it was designed, or reflect on the design choices that were used—and using that to meet the internal objectives of the game.

On the other hand, this could also be a function of games, or media in general, and the way in which media engages the audience. Such media seeks to obfuscate its filter and frame, the mechanics of its reproduction, its representativeness, and announces itself as unmediated. David Jay Bolter describes the "transparent interface" as "one that erases itself, so that the user is no

³⁴² James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

³⁴³ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

longer aware of confronting a medium, but instead stands in an immediate relationship to the contents of that medium.”³⁴⁴

One of my main objectives for “Reliving the Revolution” was creating a game that captivates or immerses a player into its world. How much, however, does this engagement conceal what is “under the hood” of the game and hide the notion that the game itself is my own representation of the past, my carefully constructed simulation of a historic social system? This question is particularly pertinent for a game that strives to teach its players to “look under the hoods” of the information they receive. The “suspension of disbelief” of the game might allow learners to more easily take on new identities and beliefs. After all, learning requires the “taking on a new identity and forming bridge’s from ones old identities to the new one”³⁴⁵ or ones. Then, does “Reliving the Revolution” help make learners more open to new concepts, while also being more immune to reflecting on the learning vehicle itself?

Perhaps it is not a passive “suspension of disbelief,” but rather active critical immersion; a selectively permeable transparency, that is necessary as game participants, and learners. The game players accept the terms of the activity, and evaluate the exercise without letting it overshadow their participation in the experience. In fact, one of the participants admitted during the focus group that she was trying to uncover my motives as a designer. Said one participant, “For me the sign of a good game, which I think your game exhibited, was that I couldn’t guess [what the designer was trying to do]. And so it made me feel that you were several steps ahead of me. Which you obviously were, but there was no way for me to know what you wanted.” The game was perhaps too multifaceted to stick one’s head completely under the hood and interpret all its parts, but that made the desire to lift it up little by little no less great.

BLADES (AND LEAVES) OF GRASS

THE prairie-grass dividing—its special odor breathing,
I demand of it the spiritual corresponding,
Demand the most copious and close companionship of men,

³⁴⁴ David Jay Bolter and Richard Grusin, *Remediation: Understanding New Media*, (Cambridge, MA: MIT Press, 2002), p 23-24.

³⁴⁵ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

Demand the blades to rise of words, acts, beings,
Those of the open atmosphere, coarse, sunlit, fresh, nutritious,
Those that go their own gait, erect, stepping with freedom and command—leading, not following,
Those with a never-quell'd audacity—those with sweet and lusty flesh, clear of taint,
Those that look carelessly in the faces of Presidents and Governors, as to say, Who are you?
Those of earth-born passion, simple, never-constrain'd, never obedient,
Those of inland America.

—Walt Whitman³⁴⁶

How can we reform history education? In this thesis, I explored one possibility for using emerging multimedia to teach participants how to think critically about history. The results of my initial and iterative tests suggest that an AR game such as “Reliving the Revolution” can engage learners in a historic moment and in the practice of history, if it is designed appropriately. The game motivated discovery and enthusiasm; collaboration and teamwork; problem-solving, interpretation and analysis; and reflection. The participants enjoyed being in the actual place of the Battle of Lexington—the mobile technology afforded them the opportunity to find and incorporate virtual information in a real-world context. The game felt novel and authentic, and the participants felt special, as though they were imbued with a unique responsibility. They took this “serious game”³⁴⁷ seriously—they embraced its challenges and critically immersed themselves in the game as such. Accordingly, the participants acted in their historic roles, roles as game players, and roles as learners. Through the various characteristics of the game: its support of play, the trying on of new identities, motivation for a common goal, social interactions, and the sense of responsibility, the participants were more open to reflect on new perspectives and their own beliefs and values, and create bridges between them.³⁴⁸

As a designer, it is a challenge to properly balance all of the individual elements of the game to make a compelling, educational learning environment. Throughout this thesis, I tried to explicate very clearly and in great detail the rationale for each of my design choices, and then review them in light of four relevant game elements. I articulated what I thought as I considered the design problem and then how I created what I believed to be the most appropriate solution. The final

³⁴⁶ Walt Whitman, *Leaves of Grass*. (Philadelphia: David McKay, [c1900]; Bartleby.com, 1999).

www.bartleby.com/142/.

³⁴⁷ A term used to denote games that teach particularly skills or concepts; the serious games initiative supports the use games in education, training, health and public policy. For more information, see <http://www.seriousgames.org/>.

³⁴⁸ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

version of my game is the sum total of all of these choices, and this thesis present only one of many possibilities for each design question. Each gaming experience and design process is unique, however, and none of my design choices are proscriptive—they are not each the only way to create a game. In other words, I hope this thesis will serve as a guide for *how* to think, rather than simply *what* to think—to serve as a framework for those designers, educators, and researchers who are considering the best ways to think though the creation of their own engaging educational AR games.

Forward Thinking

Going forward, I plan to continue to refine and streamline the testimonials so that they are concise, yet detailed; challenging but not overwhelming. I also want to mold each role's evidence so that there are more opportunities for inter-role interactions and more reliance on other roles to decipher one's own. I also hope to add more graphical primary sources in the form of documents, to further emphasize the historic roles, and to continue to sharpen the mini-objectives so that they are more appropriate for the role. I want to integrate some interface changes, such as making the map clearer, and incorporating a time countdown into the interface so there is a visual reminder that the time is limited. Finally, I want to examine further whether there should be two clear time periods (before and after the Battle), or if there should be a slower progression of the appearance of NPCs on the Lexington "game board." Should I have more interactions with NPCs triggering the appearance of other NPCs (making the game more linear), or should the game continue to be non-linear? As I continue to design the game, I will also test "Reliving the Revolution" with Participants, to ensure that I have a diverse range of learners.

Larger-scale changes to the underlying AR game engine would also be beneficial to test for educational purposes. As suggested by my experience with the design and the results of my game trials, the game could be changed so the participants could decide how they wanted to interact with the virtual historic figures. For example, that the participants could choose questions to ask the virtual figures, and then the figures could answer accordingly (such as a dialogue tree). This is similar to a game such as *Deus Ex*, discussed in Gee's *What Video Games Have to Teach Us About Learning and Literacy*, where he writes that the game "carries out conversations by giving

the player a choice among several different things to say.”³⁴⁹ Another next generation change is designing the game so that the virtual figures’s relationships with the various game participants evolved based on the participants’ interactions with others. Also, altering the beginning of the game so that the instructions are embedded into the game play is a possibility—that would mean the game itself is adept at teaching the participants how to play it.

There are also other elements of the game that are important avenues for research. Future studies should investigate the AR learning environment in this type of history education as compared to using similar content and pedagogical goals in a different type of medium, such as a MUVE. How do learners interact differently with a virtual “Lexington” as opposed to actual being in Lexington, MA? What types of concepts become more or less salient, and how do social interactions change? Which types of learners would best benefit from AR games versus other types of experiences or learning environments?

“Reliving the Revolution” is also flexible in terms of how it is used in a classroom or other set of learners. Multiple sets of students could use the game simultaneously. If a class had 32 students, for example, four groups of eight participants could play the game. It would be beneficial to test how these larger groups of participants would use the game, and what their interactions would be like. Also, it would be interesting to split a classroom in half, so that one part is “in the field” gathering the data, while the other half searches through books and the Internet to find supplemental information, or to know how to guide the “field” gatherers. This is similar to the set up with “Can You See Me Now,”³⁵⁰ where some of the participants were at the computer receiving certain types of information, and they were guiding via phone the participants on the street, who were gathering other types of information, all to find



³⁴⁹ James Gee, *What Video Games Have to Teach Us About Learning and Literacy*, (New York, NY: Palgrave MacMillan, 2003).

³⁵⁰ For more information about Can You See Me Now, see Martin Flintham et al. “Where On-Line Meets On-The-Streets: Experiences with Mobile Mixed Reality Games.” *CHI 2003*, 2003. and Steve Benford, et al., “Coping with Uncertainty in a Location-Based Game” in *Pervasive Computing*, IEEE, July-September, 2003.

a hidden person. There are also many classroom exercises that teachers could conduct prior and/or after the game, such as having students write a diary about their experience in their roles, or creating a detailed comparison of specific pieces of evidence across the four roles and explaining why and how it was different. Finally, it would be important to test the game's effects longitudinally—to see how students' attitudes change over time, and to look at the effect on students' perceptions of history and their use of historical methodology.

From Game Participant to Participants in a Democracy

My hope is that educators incorporate AR games into their classroom, but that they also use this thesis to invite their students to create or modify AR games. Students could create a game that takes place in a local and personally meaningful site (historic or not). They could work together to research historic figures and write testimonials for a history game. Or, they could use the game to convey site-specific stories about local buildings, factories, landmarks, people, houses, or natural phenomena. By thinking through the process of creating such a game, the students will learn more deeply not only the content, but how to shape the content to make it appropriate for the medium. “We need to rethink the goals of media education so that young people can come to think of themselves as cultural producers and participants and not simply as consumers, critical or otherwise.”³⁵¹ By becoming creators of the medium, they also will be able to reflect better on their assumptions, as well as the assumptions of this and other media.

My hope is that educators create other activities and pedagogical approaches that teach the critical thinking of history, and does it in an engaging way. As I wrote previously, I proposed “Reliving the Revolution” as only one possibility for a broader history curricula that integrates the frameworks and methodologies necessary for understanding and evaluating complex social problems. Those learners can then take this paradigm and apply it to other disciplines—they will identify biases in newspapers, consider authorial intent in an essay, privilege information on one web page versus another, and incorporate other perspectives on a scientific mystery.

³⁵¹ Henry Jenkins, *Convergence Culture*, New York: NYU Press. (forthcoming, draft), 2005.

My hope is that activities like “Reliving the Revolution” engage learners not only participants in a game, but also as more active participants in society. As Jefferson suggested during America’s infancy, history is integral to citizenship³⁵²—and this has only become more important as America becomes more economically, socially, and culturally varied. By participating in open discussion of diverse opinions, people learn how to create ways to support the needs of all its country’s peoples.³⁵³ By understanding the past, people can better evaluate the future; by listening to multiple perspectives, people will be empowered to better understand the situation, and better equipped to defend their freedoms.³⁵⁴ We should search for different views, different blades of grass, and also embrace ourselves as one blade of many. And thus, we should “demand the blades to rise of words, acts, beings”³⁵⁵ and ask ourselves, each other, and our society, “Who are you?”³⁵⁶

³⁵² James J. Carpenter, “Jefferson’s Views on Education: Implications for Today’s Social Studies.” *The Social Studies*. July/August 2004.

³⁵³ Athena Liss. “Review: Whose America? Culture Wars in the Public Schools,” *Social Education*. 68(3):238, 2002.

³⁵⁴ As discussed throughout James J. Carpenter, “Jefferson’s Views on Education: Implications for Today’s Social Studies.” *The Social Studies*. July/August 2004.

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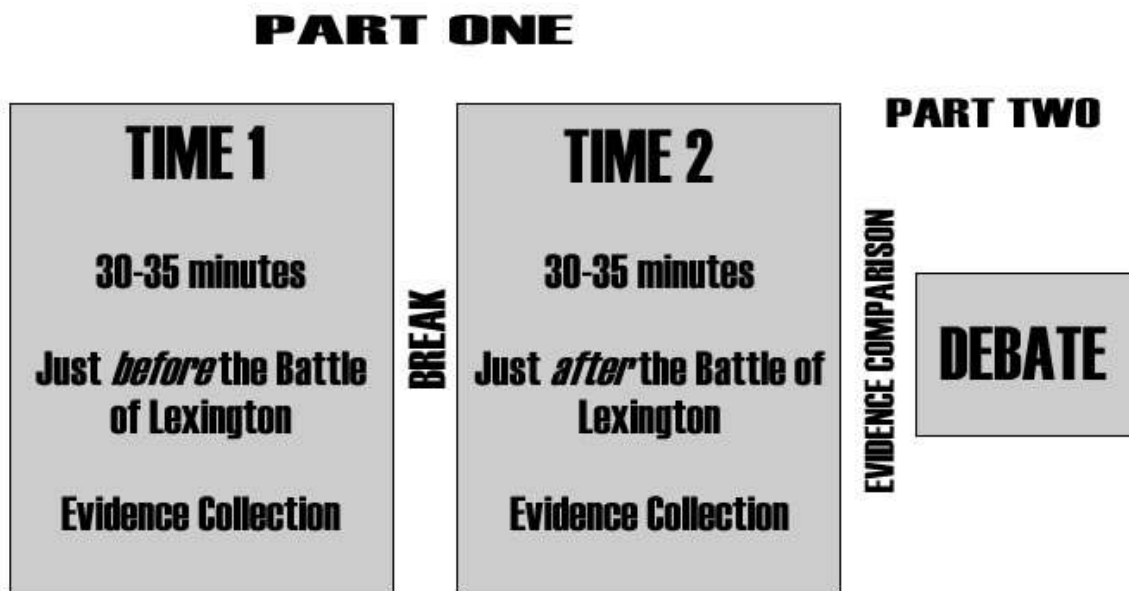
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APPENDIX I: GAME SCHEMATIC



APPENDIX II: PARTICIPATORY SIMULATIONS

Tit for Tat

In this handheld version of “the prisoner’s dilemma,” the participants need to “meet” (i.e., sync their handhelds) every other participant three times in a row. Each time before a participant meets another, s/he needs to choose whether s/he will cooperate or defect. In the version of the game that I observed, the points were meted as follows: If both participants cooperate, they each get three points; if they both defect, they each get one point; if one defects and the other person cooperates, the defector gets six points. The goal of the game was for each participant to try to get as many points as they could, and to test out different strategies for gaining points. Since participants needed to meet the others three times, they had to choose wisely. Thus, there are three components to this game: a) choosing whether to cooperate or defect in each “meet”; b) actually “meeting”; and c) discovering how many points you earned after each “meet.” Although the version of this game was individualistic in terms of earning points, the game could be collaborative in nature. For example, one way would be by making the goal of the game to maximize the amount of points earned by the entire group of participants.

Sugar and Spice

In “Sugar and Spice,” participants are either spice producers (and thus, sugar consumers) or sugar producers (and thus, spice consumers). Participants watch on their handheld device as their level of spice or sugar decreases or increases depending on what they are producing or consuming. A participant “dies” when s/he runs out of sugar or spice. Each participant needs to continually buy and sell sugar and spice to each other to remain “alive.” To trade with other participants, they need to sync their handhelds to another person and exchange spice and sugar.

Live Long and Prosper

Live Long and Prosper is a problem-solving game that requires a group of participants to work together to understand a genetic reproduction simulation. Each participant begins with a handheld, which represents one person. Each person has three pairs of DNA: the strands can be dark, patterned, or light. As time progresses, the person ages, and can possibly die. The object of the game is to keep “mating” (synching handhelds) with others before your person “dies,” and to figure out what each of the pairs of DNA represents (In terms of phenotype characteristics, such as time of death, gender, or rapidity of aging). If the two handhelds can “mate,” then each handheld will generate an offspring with the appropriate next set of three genes. If a person “dies,” the participant can restart with a new person with a new genotype. The participants work together not only to mate, but to create tactics and test out hypotheses to figure out what each of the DNA pairs means.

For more information about these participatory simulations, or to download them, please see <http://education.mit.edu/pda/>.

Appendix III: Initial Proposal

Heard Around the World

March 1, 2004

I. MISSION

I want to use mobile technology to teach critical thinking and the use of multiple perspectives in the study of history.

II. OBJECTIVES

In an ever-changing present of multiple truths and reconfigured histories, people need to be critical thinkers. They need to actively pursue and evaluate their own interpretations of what happened and what is happening, rather than passively accept viewpoints from textbooks or so-called official sources. People need to learn to be arbiters of their own truths.

Recent historians have argued that a reconstructionist approach to history is essential (e.g., Munslow, White, LaCapra, Foucault), and, concomitantly, educators have tried to incorporate the idea that studying multiple perspectives and reflecting on one's own position in history, are necessary in historiography (Wilton 1999).

I propose to create an interactive, multimedia program, "Heard Around the World," that allows students to experience a historical moment from multiple, diverse, and reflexive perspectives. While some history curricula have been revised to consider other points of view, particularly in higher education (Wilton 1999), it is difficult to teach students how to manage these differing views. Also, there are fewer examples of how elementary and secondary school curricula have been altered.

A hands-on, interactive educational experience will be valuable in showing students how to be critical thinkers. Research has shown that hands-on programs are particularly engaging—they allow history to be experienced rather than just studied. For example, in Dewey's *Experience and Education* (1938), he discusses the importance of exploration and experience in learning, and suggests that students should "learn history in a way that helps them better understand the present" and that they should "participate in the direction and shape their education is going to take." Furthermore, "an activity that maps physical space and curricular space onto one another... lends continuity to the experience" (Holland, et al. 2003).

I feel that not only will "Heard Around the World" teach students to consider different perspectives when reconstructing historical moments, but it will encourage them to think critically about sources of information and multiple truths in all disciplines. This type of learning is essential in helping students become thinkers. Moreover, this program will motivate students to search for their own answers, think independently, and evaluate the information they receive.

III. CONTENT

The program will use PDAs (personal digital assistants) to recreate historically accurate, but fictionalized reenactments of a historical moment. Mobile technology, such as PDAs, allow for a compelling blend of digital and physical environments. It encourages "instant access, anywhere, to Web-based information and specifically tailored apps for education, along with lightning-fast communications in and out of the classroom" (Holland et al. 2003).

Participants will carry PDAs and explore the actual space that the historical moment took place. Participants can follow multiple, unique characters' paths as they explore this historical moment, in effect, "retrace each character's footsteps." The PDAs will provide varying content depending on the participants' location, such as audio, video, photographs, and text. This content will tell a story, told from the point of view of a particular character. Research has shown that incorporating music and video, and less reliance on textbook, in the teaching of history, is very successful (Formalt 2002).

Research has also suggested the importance of learning local history, and using local moments to teach historical concepts (Formalt 2002). Boston's rich historical landscape makes it a perfect backdrop for experiential learning. Thus, I have decided to focus on the moment leading up to the controversial "Shot heard around the world" that initiated the Battle of Lexington, starting the Revolutionary War. I will tell the story of this moment from the points of view of historically accurate, but fictional characters such as: a redcoat, a minuteman soldier, a Loyalist blacksmith, a Tory female farmer, a neutral Indian, and a child. Each of these characters will narrate a unique journey through the historical moment in the actual space that it took place: the Lexington town square.

Afterward, the program will encourage the participants to come together and reflect on each character's perspectives and the differing views of a historical moment. By reflecting on the process of reconstructing a historical moment, learners can gain a deeper understanding of their role in interpreting history. For example, Seymour Papert argues through reflection of an activity, people create deeper internal connections (1991). Also, research has shown that peer-to-peer teaching and sharing reinforces the mastery of concepts (Koschmann 1996).

IV. AUDIENCE

Initially, with the program would target students from Boston-area schools. I hope to work with a particular class to create and test out the pilot program, and then alter the design based on their feedback. In designing the program, I will first focus on a particular age group (e.g., fifth, sixth, and seventh graders). Later, I will tweak the program for different age groups and levels. Eventually, the program could be broadened to attract families, tourists, and visitors to Lexington's historic sites.

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Appendix IV: Research on the Battle of Lexington

My first step was to research the Battle of Lexington and the events of the Revolutionary War. I needed to gain a deep understanding of the battle before I could put together an accurate portrayal of the perspectives and to create a believable recreation of the moment for the participants. I searched for real figures from history who would have diverse perspectives and tried to find primary sources of accounts from people who were in Lexington right before and/or after the Battle. I began the project with little knowledge of the battle or its context; my understanding of the tensions and viewpoints involved in the Battle was spotty, and often erroneous. My role as both a designer and a learner helped me discern the gaps in knowledge (in terms of detail and big picture) about the Battle, and what types of information I need to convey. Watching the famous Battle of Lexington reenactment on April 19, and reviewing a video of the reenactment, helped me better visualize the moment and think about how to properly translate it to this medium. It inspired me to think how to represent the drama of the event.

I also spent a lot of time familiarizing myself with the physical environment of Lexington center. Seeing it through the lens of a camera helped me envision how the PDA might augment and alter the experience of the participants of this program. I tried to imagine myself walking in the footsteps of the different historic figures—what they would have seen and how they would have looked at the various sites. During my visits, I pretended that I was seeing Lexington as it was during the 1770s. I went on the Lexington Historic Society’s tour of the Buckman Tavern and spoke to the guides, who took me on a private tour of Lexington’s major sites. This helped me envision the town as it had been, and he helped me connect the locations of events and sites with the social relationships embodied in these sites. By examining what was engaging about my walking and historic tours of Lexington, I was able to consider how to incorporate the “tour”-like elements into the game.

Traveling to Lexington and looking at it through various lenses helped me see not only how the historic figures viewed the Battle, but also how participants, arriving at Lexington for possibly the first time, would react to the physical environment. The game elements needed to quickly orient and familiarize the participants with the town’s layout, while also encouraging them to discover the different aspects of the environment. As I visited Lexington and libraries, I collected experiences and information and assembled a large database of images, video footage, websites, audio, music, books, and articles from which to create the game. In total, this research helped me understand the important themes, processes, people, events, and questions surrounding the Battle of Lexington, and thus, what I wanted to convey in the game to authentically represent a historic moment.

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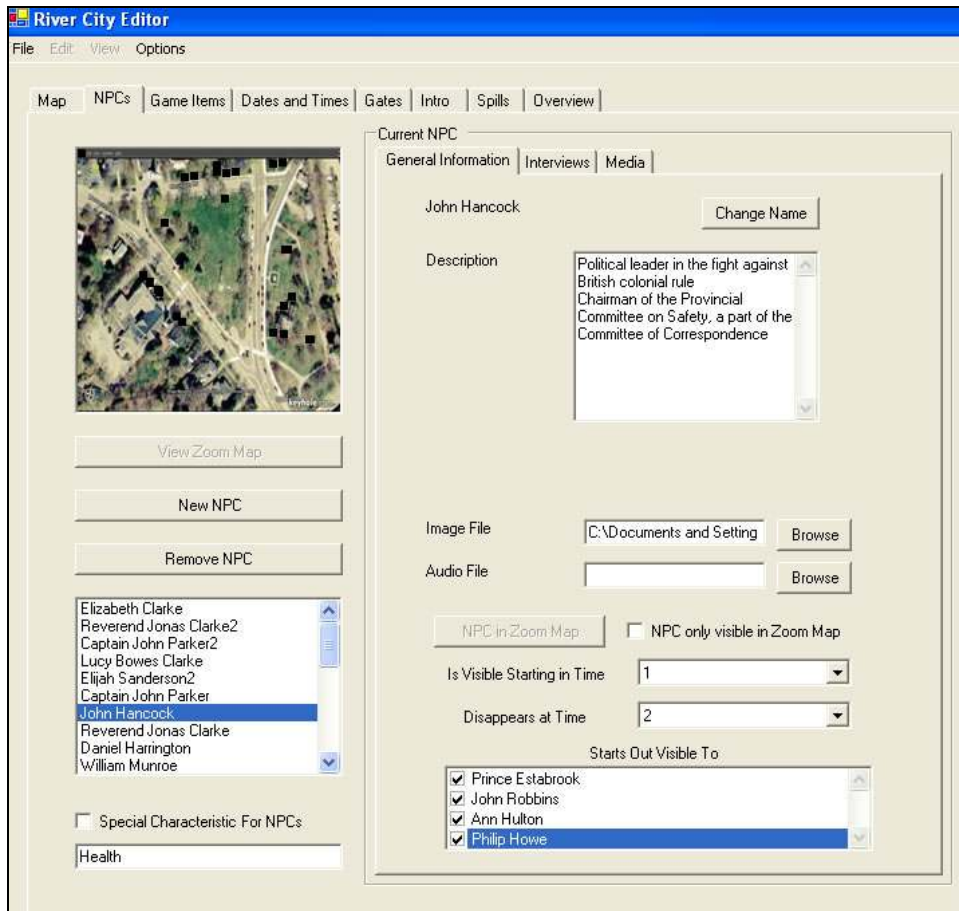
Appendix V: Specifications of the RiverCity AR Editor system

The game designer can do the following with the RiverCity AR Editor system:

- (1) Can define multiple roles, which each get different information
- (2) Can create NPCs and Game Items
 - Altered so that NPCs and Game Items can appear and disappear at different times
- (3) Can specify different game times or periods
- (4) Can provide “spill” information (not necessary for “Reliving the Revolution”)
- (5) Need a graphic for each NPC
- (6) NPCs can provide a document in the form of an HTML page
- (7) Audio and video capabilities not yet incorporated
- (8) Can designate health of each of the NPCs (not necessary for “Reliving the Revolution”)
- (9) At a hot spot, the game designer can program one of the following actions:
 - (A) **Interact with an NPC.** The NPC provides a text-based testimonial. The NPC may or may not provide a document. This document is in HTML form, so it can include images and/or text.
 - (B) **Collect/analyze a game item**
 - (C) **Take a reading or analysis of a “hot spot”:** in terms of its environmental factors (not necessary for “Reliving the Revolution”)
 - (D) **Pick up a dead bird** (not necessary for “Reliving the Revolution”)

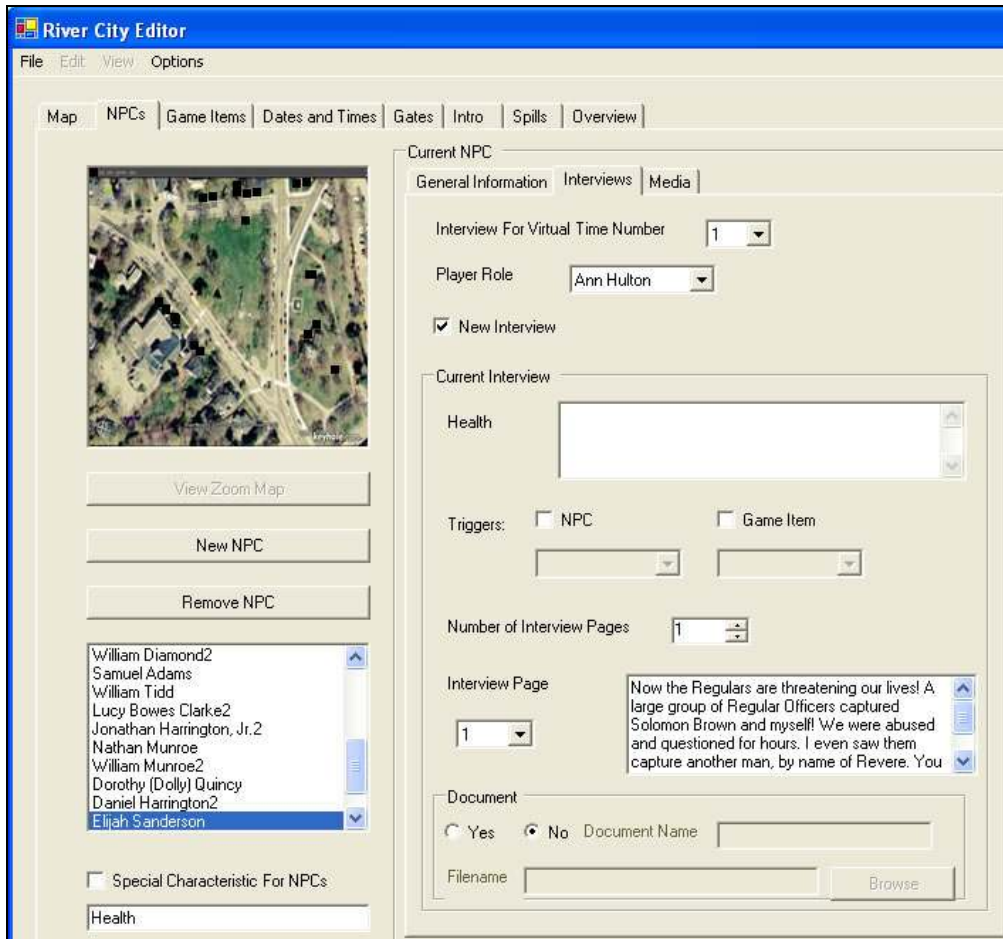
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For example, in the following screenshot of the Editor interface, you can create a “New NPC,” and check off which roles the NPC speaks to, create a description for the NPC, and decide when the NPC is visible and then not visible in the game. You can also place a dot on the map to designate where the NPC will be found in Lexington.



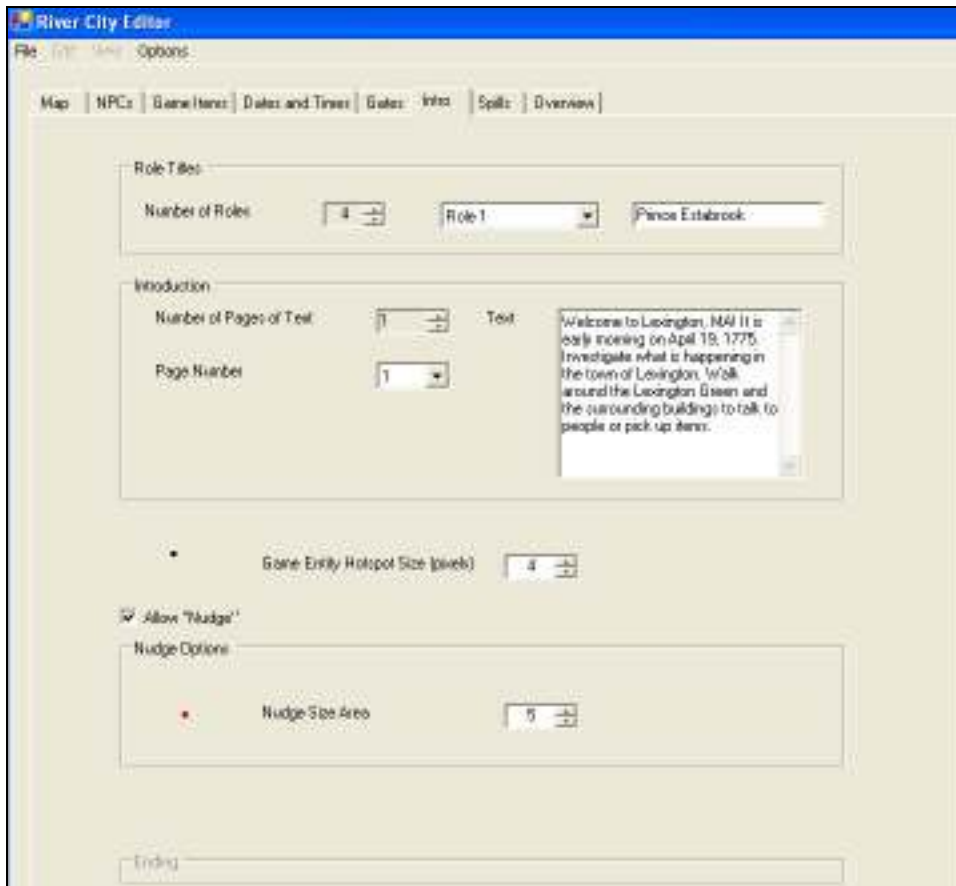
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This screenshot shows how you can create the specific interview for each role. View below how this interview is for Elijah Sanderson, for the role Ann Hulton. You can also upload a document and designate how many pages (or screens) the interview will be.



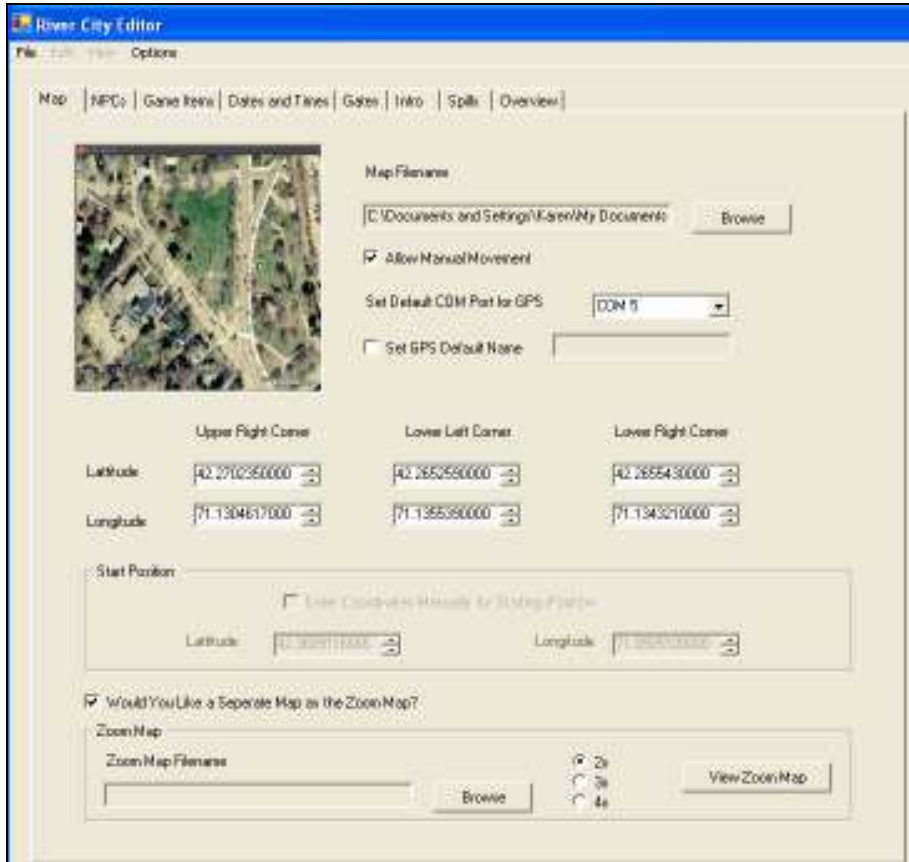
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This screenshot shows how you can designate the number of roles (4), and name each of the Roles (see here that it is Role 1 and Prince Estabrook). Also, you can incorporate the Introductory text, and designate the size of the hot spots as well as the nudge factor (how many pixels away the program will still automatically nudge you to trigger the hot spot).



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In this screenshot, you can designate the map that you want to upload, which will be used as the map for the game interface. You also mark the latitude and longitude of the four corners of the location of the game (the game board).



Appendix VI: Chart of Game Elements

	PROTOTYPE	PILOT	REDESIGN
Locative technology	Self-triggered	GPS	GPS
Game infrastructure	Flash/PowerPoint	XML/.NET (RiverCityAR Engine)	XML/.NET (RiverCityAR Engine)
Narrator?	Yes	No	No
Instructions?	Via narrator	In-person instructions by educator	In-person instructions by educator
# of time periods	One long period	Two	Two
Linearity?	No	Yes/some constraints	Yes/even more constraints
Goal	To end the tour/find role-specific objects	Who fired the first shot at the Battle of Lexington?	Who fired the first shot and two role-specific mini-goals
# of roles played	All four	One out of four	One out of four
Pairs?	No; play solo	Play one role as a pair	Play one role as a pair
Collaborative?	Not until the end (debate)	During Part One, in pairs; during Part Two as a group	More collaboration throughout
Length of game	~60 min + debate	~80 min + debate	~80 min + debate
Game play	Find building, site, or object and press button to advance in the game	Search for location-based NPCs and game items triggered by GPS	Search for location-based NPCs and game items triggered by GPS

Appendix VII: Summary of the Changes Between the Pilot and the Redesign Version

Summary of the Changes Between the Pilot and the Redesign Version	
Goals	1. Inclusion of mini-objectives (2 for each role), called "Secret Missions"
Game content	2. Streamline the content so it more closely serves the learning objectives 3. Focus on 4-5 stories of "what happened" for each role 4. Take out some extraneous or lengthy textual information from evidence 5. Include more graphics in documents
Roles	6. Roles more interrelated, need to rely more on each other 7. Emphasize roles more in game content
Instructions	8. Lengthen time between Part One and Part Two 9. Emphasize roles more in instructions 10. Encourage inter-role collaboration more in instructions

Appendix VIII: Instructions

(Images of selected pages from the instruction packet)

Objectives >>>

- >>Go back in time and relive the moment before and after the Battle of Lexington (April 19, 1775)
- >>Take on the role of one of four historic figures (see role description handout)
- >>Gather information from “hot spots” on and around the Lexington Common
 - >>This is a GPS-based game, so your location triggers the handheld
- >>Travel back to the present and share your information with the other roles. Together, you will decide:
 - >>What really happened at the Battle of Lexington?
 - >>Who fired the first shot at the Battle of Lexington?

4 roles >>>

>>**Prince Estabrook:** African American slave/Minuteman soldier

>>**John Robbins:** White/free Minuteman soldier

>>**Ann Hulton:** Loyalist

>>**Philip Howe:** Soldier in King’s troops (British)

Character Sheet
Name: Prince Estabrook
Job: Farm field worker
Class: Slave
Politics: Patriot/Loyalist

Character Sheet
Name: John Robbins
Job: Miller
Class: Middle
Politics: Patriot

Character Sheet
Name: Ann Hulton
Job: Soldier, King's Regiment, Light Infantry
Class: Lower
Politics: Loyalist/Quaker

Game hot spots >>>



You can access 2 kinds of information at the "hot spots":

1. NPCs (Non-playing characters) (purple squares)
 - >> Approximately 40 historic figures
 - >> Not every NPC is present for every role
 - >> If present, the NPC will provide a testimonial
 - >> The NPC may provide a document, which opens in a browser
 - >> The NPC may give different testimonials/documents depending on your role
2. Game items (yellow triangles)
 - >> You can inspect items and receive a text-based description of it

Game periods>>>

>> Two time periods:

Time period 1: 30 minutes before the Battle of Lexington

[[BREAK]]

Time period 2: 30 minutes after the Battle of Lexington

[[DISCUSSION]]

>> NPCs provide different information from time period 1 to time period 2.

GPS>>>

>>>Specific locations will trigger an NPC or game item, based on GPS

>>>A small nudge factor is built in, so that if you are close, it will trigger the NPC or game item

>>>Sometimes clouds or trees can affect the GPS, if you are having trouble, ask me.

<<< Locations

Houses

Daniel Harrington House
Jonathan Harrington House
Hancock-Clarke House
Munroe House

On Common

Meetinghouse
Old Belfry
Schoolhouse
Minuteman Line

Near Common

Stable
Ruckman Tavern (front, back)
Horse Shed
Near Belfry

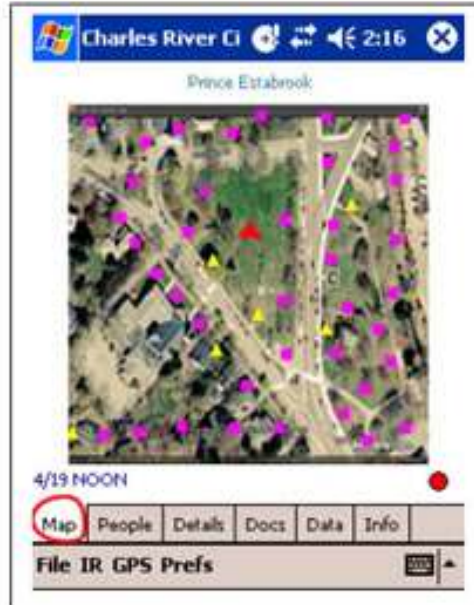
Using the handheld>>>

>>>Click the start button with your stylus to enter the game



Using the handheld>>>

>>Clicking on the Map Tab shows the map of Lexington, which indicates your location (the red triangle) and the location of the hot spots (items and NPCs)



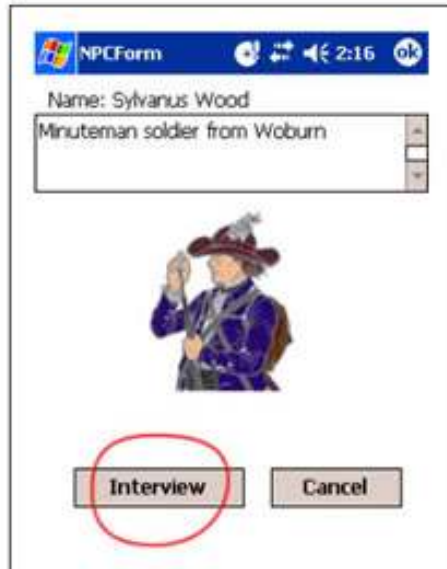
Using the handheld>>>

>>Clicking on the Docs tab brings up all of the documents you have collected thus far. By clicking on "View," you can view the document.



Using the handheld>>>

>>When you walk to the location of an NPC, the handheld will be triggered, and it will show a screen like this. Click on “Interview” to interview the NPC.



Using the handheld>>>

>>When you walk to the location of an item, the handheld will be triggered, and it will show a screen like this. Click on “Inspect item” to get a description of the item.



Appendix IX: Additional Instructions for the Redesign Trial (PROVIDED VERBALLY)

1. Remember that you are playing a role
2. Feel free to talk to the other pairs during the game. You can interact with them throughout the entire game!
3. Be careful crossing the street!!!
4. If you have questions on the GPS, just ask me. Make sure that the antenna receiver is facing upward and that you aren't under a bunch of trees or clouds.
5. Time 1= before the Battle of Lexington and before the first shot; Time 2=after the Battle of Lexington and after the first shot.
6. The NPCs change location from time one to time twp
7. In time 1, you are trying to figure out who you trust and who you don't trust.
8. In time 2, you are figuring out who fired the first shot, based on what you learned in time 1.
9. You only get 35 minutes for time 1 and 35 minutes for time 2
10. Don't feel like you need to gather evidence. Take your time. It's better to really understand what you find than to get too much evidence.
11. If you get stuck between two NPCs or items, just walk quickly away from both of them and it should work.
12. Take a break between Time 1 and Time 2 to look over your evidence.
13. You have mini-objectives to help you out. You don't need to answer them, but it may help you figure out who fired the first shot.

British Side

King's Troops
Royal Regiment
Loyalist

Colonist/American side

Lexington men/militia
Minutemen
Whigs
Patriots

Appendix X: Character Sheets

Character Sheet

Name: Prince Estabrook
Job: Farm field worker
Class: Slave
Politics: Patriot/Uncertain

You are the only African-American soldier in the group of Lexington militiamen known as the Minuteman. As a Minuteman, you are ready to fight at a minute's notice, and have been training and practicing all winter. You are also a slave, and you hope to gain your personal freedom by fighting for America's freedom from Britain. You are known as being kind and courageous, and you are well-liked by the children in the area—they love playing games with you and think of you as a friend. You are also well-known among the fellow slaves in Lexington; they see you as a role model. Some of the white Minutemen soldiers and Lexington townspeople consider you as their equal, but most of them still do not completely trust you. Despite this, you are tenacious in your fight for your freedom from slavery, even if you are uncertain whether you should be fighting for America's freedom from the British.

Character Sheet

Name: John Robbins
Job: Miller
Class: Middle
Politics: Patriot

You are a Miller, which means you work at the mills to grind wheat and corn to make flour for the bakers in town. You are also a soldier in the group of Lexington militiamen known as the Minuteman. As a Minuteman, you are ready to fight at a minute's notice, and have been training and practicing all winter. You are stoic, strong, and devout; you grew up in Lexington and are extremely loyal to the town and its people. You seek out the town's leaders for spiritual and political guidance. You deeply respect your fellow Minutemen and they also seek you out for advice or share their opinions.

You met a few of the Patriot leaders recently and attended a few meetings of the Massachusetts Provincial Congress, a secret and illegal colonist organization led by John Hancock, which has been creating secret communication networks, militias, and military stores, among the towns in the colonies. Their goal is to strengthen the resistance against the British, so that they can begin the fight for independence for the American colonies. As a result of your involvement, you have become even more certain of the Patriot cause, and you will fight for America's freedom from Britain at any cost.

Character Sheet

Name: Ann Hulton
Class: Upper
Politics: Loyalist

Though you have lived in the colonies for a few years, you are still very loyal to your home country—Britain. You are also very loyal to your brother, Henry Hulton, who is the Commissioner of Customs at Boston for the British. There has been a lot of colonist resentment against Henry because of the financial policies he is required to enforce. Three times in the past year, you and your family have been forced to flee mobs for safety because the colonists were angry at these policies.

You are afraid of continued persecution of your family and an organized colonist uprising. You have heard that some of the colonists, called Patriots, have been forming secret governments and militias to fight against the King. You think of these “Patriots” as rebels, and you are appalled that they are plotting against their own relatives and friends in Britain. You want the colonies to stay under King George’s rule because you feel like they will keep the colonies secure and prosperous. You have been hearing stories about how the Patriots are capturing the King’s soldiers and torturing them. You are afraid for you and your family’s livelihood in the colonies, and are considering traveling back to Britain.

Character Sheet

Name: Philip Howe
Job: Soldier, King’s Regiment, Light Infantry
Class: Lower
Politics: Loyalist/Uncertain

You are a member of the King George’s troops, and you are stationed in the American colonies. Your duty is to maintain order and enforce the British rule in the American colonies. Your parents died when you were a teenager, leaving you with no money. So, like some other soldiers in the King’s troops, you chose military service over poverty.

While in the service, you have seen many of your fellow soldiers defect by running away, and seen some of them caught and punished. You have also seen a lot of them succumb to illnesses like typhus and diphtheria because of poor water supplies, living conditions, and hunger. Some of the American colonists resent you being stationed in their towns, and they often curse at you and your fellow soldiers, thinking of you as a rough and uneducated. They call you the “Regulars.” You, however, think of the other soldiers in your troop as close friends, honest men that you bond with in this often hostile environment. You agree that the colonies should be run by the British government, but you do not want to cause any bloodshed. However, you will defend your fellow soldiers—your friends—if it comes to it.

While it is difficult to remain in the service, you are an obedient soldier and you are respectful to your leaders. They are severe taskmasters, but they value your opinion and diligence. Recently, you and hundreds of other soldiers were sent on a new mission by General Gage, the leader of the British forces in the colonies. You started at Boston, and now you are marching toward Lexington and Concord. You have been walking through the water and mud for miles, without food or sleep, but you still do not know why.

Appendix XI: Pre-Activity Survey

Pre-Activity Survey

Place numbered sticker here:

Age:

Gender:

Grade/year in school:

Part I

1. Do you have a handheld computer or PDA (personal digital assistant), such as a Palm Pilot or PocketPC (please circle one): **Yes No**
2. How familiar are you with handheld computers or PDAs (personal digital assistants) (please circle one):
Not familiar (never used) Somewhat familiar Often (use often)
3. Do you play video games (on a computer, or on a console like PlayStation 2, GameCube, or Xbox) (please circle one):
Never play Play video games sometimes Play video games often
4. Have you ever played a game on a handheld computer (such as a Gameboy or a Palm Pilot) (please circle one): **Yes No**
5. Have you ever played any of the following history or geography-based games? (please circle as many as apply)
Civilization I/Civilization II/Civilization III
Where in History is Carmen Sandiego/Where in the World is Carmen Sandiego?/Where in the USA is Carmen Sandiego?
Oregon Trail
Rise of Nations
Age of Empire
Revolutions
Risk
Others: _____
6. Have you studied the Revolutionary War in school? (please circle one): **Yes No**

Part II

7. Please rate the following statements on a scale from 1 to 5 (please circle one):

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I think learning history is fun		1	2	3	4	5
b. History is one of my favorite school subjects		1	2	3	4	5
c. History has nothing to do with me		1	2	3	4	5
d. History is boring		1	2	3	4	5
e. History is about events		1	2	3	4	5
f. History is about people		1	2	3	4	5
g. I think learning geography is fun		1	2	3	4	5
i. Video games are educational		1	2	3	4	5
j. I enjoy playing video games		1	2	3	4	5
k. I have more fun when I play games with friends than by myself		1	2	3	4	5
l. There is more than one side to every story		1	2	3	4	5
m. I like hearing stories		1	2	3	4	5
n. I like to play games outside		1	2	3	4	5
o. I like to play role-playing games		1	2	3	4	5

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p. I trust what I read in newspapers		1	2	3	4	5
q. I trust what I read in textbooks		1	2	3	4	5
r. I trust what I read on the Internet		1	2	3	4	5

Appendix XII: Post-Activity Survey

Post-Activity Survey

Place numbered sticker here:

Part I

1. What was your role in the game (please circle one):

Prince Estabrook (African-American Slave/Minuteman)

John Robbins (White Minuteman)

Ann Hulton (loyalist, townspeople)

Philip Howe (Soldier, King's regiment, light infantry)

2. What did you like best about the activity:

3. What did you like least about the activity:

4. What, if anything, do you think you learned from this activity?

5. What was it like playing your role?:

6. What was it like playing the game in the town of Lexington?:

Part II

7. How much do you agree with the following statements (using a scale from 1 to 5) (please circle only one answer for each):

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I thought the game was fun		1	2	3	4	5
b. I thought the game helped me learn about historic people		1	2	3	4	5
c. I thought the game helped me learn about a historic site		1	2	3	4	5
d. I thought the game was engaging		1	2	3	4	5
e. I thought the game helped me understand other people's points of view		1	2	3	4	5
f. I thought the game helped me learn more about the Battle of Lexington		1	2	3	4	5
g. The game was very frustrating		1	2	3	4	5
h. I had trouble using the handheld		1	2	3	4	5
i. I liked the town of Lexington		1	2	3	4	5
j. I like history more after playing this game		1	2	3	4	5
k. There is more than one side to		1	2	3	4	5

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every story						
l. I learned more about gathering evidence		1	2	3	4	5
m. I liked playing my role		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
n. The game was realistic		1	2	3	4	5
o. I enjoyed playing the game in a group		1	2	3	4	5
p. I feel like I made important contributions to the group		1	2	3	4	5
q. The game was too long		1	2	3	4	5
r. The game was boring		1	2	3	4	5
s. The game was overwhelming		1	2	3	4	5
t. The game was challenging		1	2	3	4	5
u. The game was too easy		1	2	3	4	5

Part III

8. Please rate the following statements on a scale from 1 to 5 (please circle one):

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I think learning history is fun		1	2	3	4	5
b. History has nothing to do with me		1	2	3	4	5
c. History is boring		1	2	3	4	5
d. History is about events		1	2	3	4	5
e. History is about people		1	2	3	4	5
f. I think learning geography is fun		1	2	3	4	5
g. Video games are educational		1	2	3	4	5
h. I enjoy playing video games		1	2	3	4	5
i. I have more fun when I play games with friends than by myself		1	2	3	4	5
j. I like to play games outside		1	2	3	4	5
k. I like to play role-playing games		1	2	3	4	5

Part IV

9. What problems, if any, did you have while playing the game?

10. If you could change one thing about the game, what would it be?

11. What information, if provided, do you think would have helped you play the game better?

12. Is this activity different from the ways you usually learn history? How so?

13. Did it help you understand history better? How so?

Appendix XIII: Interview Guide

Interview Guide

(Questions for a 15-minute focus group after the game with the participants, after they have completed the post-activity survey)

Possible questions to start a short discussion:

What was your favorite part of the game? Why?

What was your least favorite part of the game?

What, if anything, did you find frustrating about the game?

What, if anything, did you feel you learned from playing this game?

Did the game help you think about history in new or different ways?

What did you like or not like about your role? What was it like playing your role?

Would you have preferred playing a different role than the one you got? Which one? Why?

When writing a history paper, what types of sources would you prefer to use? Textbooks? Primary sources (diaries, editorials, testimonials)? Newspapers?

What are some strategies you can use to decide which sources to trust or not to trust?

Do you always trust what you are reading in a newspaper?

Do you think video games are a good way to learn?

Do you want to play more games on a handheld computer?

What other kinds of things do you think you could learn using a handheld computer?

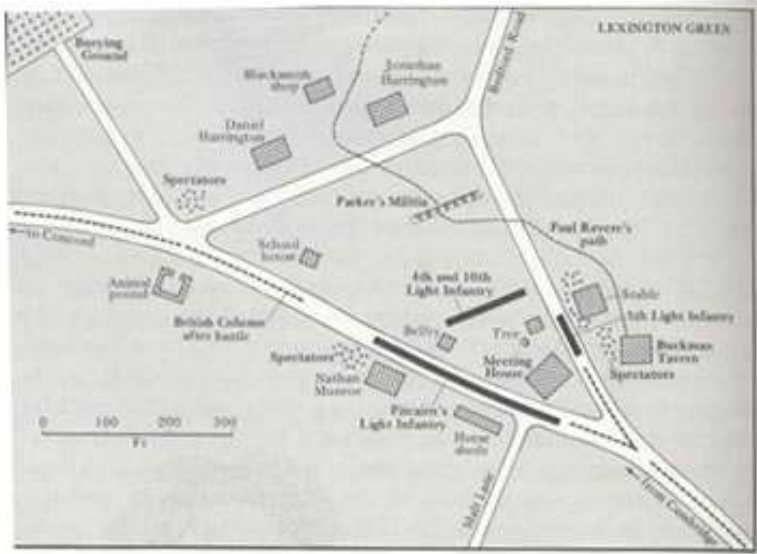
Were you engaged while playing the game? What drew you into the game?

Appendix XIV: Notes Spreadsheet

A portion of the notes spreadsheet given out to each of the pairs of participants:

	Description	Loyalty	Location	Connections to Other NPCs	Notes
Daniel Murray					
Edward Mitchell					
Edward Thornton Gould					
Francis Smith					
Henry de Berniere					
Jeremy Lister					
Jesse Adair					
John Barker					
Margaret Winship					

Appendix XV: Maps of Lexington



Map of Lexington at the time of the Battle of Lexington

Map of Lexington for "Reliving the Revolution"



Appendix XVI: Events Leading Up to Lexington

The following is a concise overview of the events leading up to the Battle of Lexington, based on multiple historic sources:

The Battle of Lexington occurred in the early morning of April 19, 1775, beginning the Revolutionary War, in which many colonists fought for independence from Britain. In the months prior to the war, however, not everyone in the colonies wanted independence. At this time, about a third of the colonists were still loyal to Britain—they were called Loyalists or Tories. About a third of the colonists supported the revolutionaries; they were called Patriots. A third of the colonists were neutral. Following a number of acts and taxes levied by the British government, the Patriots began to respond with protests, such as the Boston Tea Party of 1773. Patriot leaders began organizing groups of soldiers for war, and collecting supplies like guns and ammunition in places like Concord, Massachusetts.

In April of 1775, British General Thomas Gage sent troops to Concord to locate the colonist's arsenal. At the same time, Paul Revere learned of the British plan, and made his fateful trip to warn people in Lexington and Concord. In the early morning of April 19, 1775, the members of the Lexington militia, called Minutemen, gathered after hearing the warning bell on the Lexington common. The hundreds of British soldiers arrived at the Lexington common at around 4:30 a.m. on their way to Concord, and were met by a band of Minutemen. An unknown source began firing, which initiated the first battle between the British troops and the colonists.

Appendix XVII: Role-Specific Hypotheses Built Into the Game

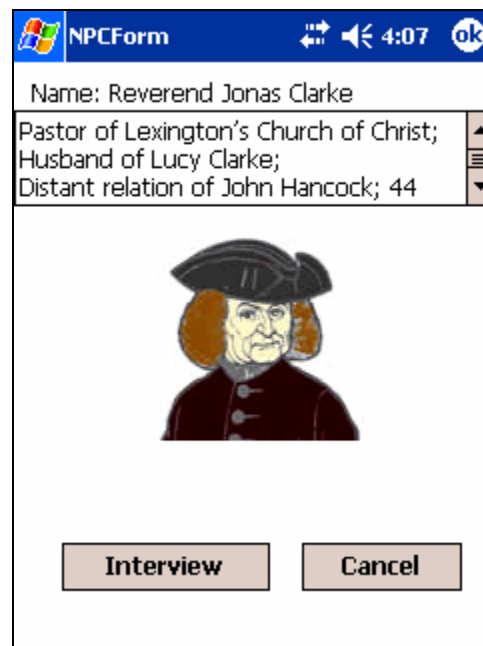
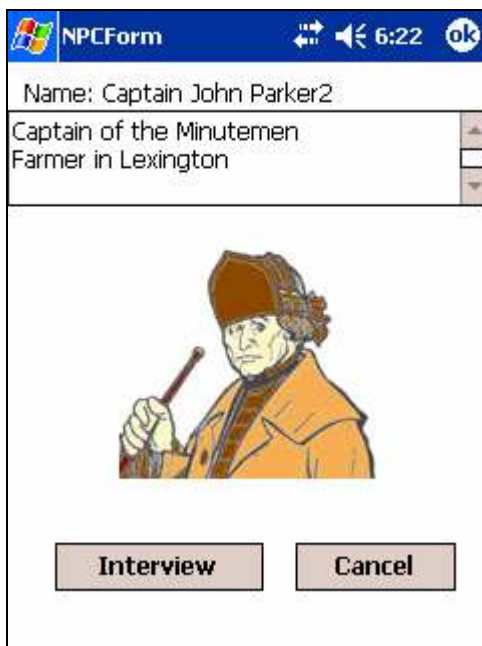
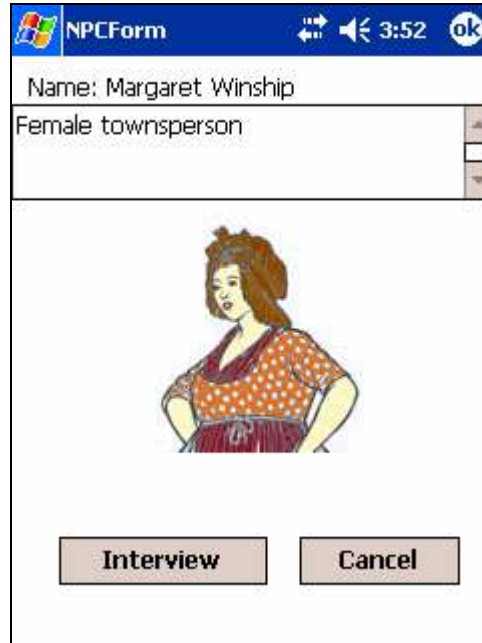
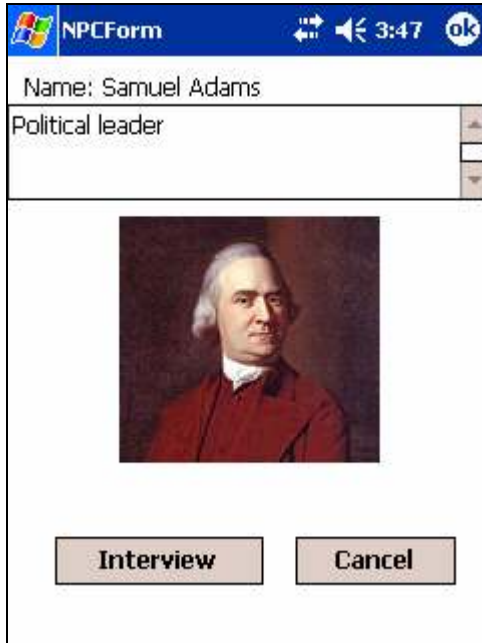
Prince Estabrook (African American Slave/Minuteman)	John Robbins (White/Free Minuteman)	Ann Hulton (Loyalist/Townsperson)	Philip Howe (British (Regular) soldier)
Accident (gun misfired)	Accident (gun misfired)	Minuteman are coming out of Buckman Tavern drunk	Minuteman are coming out of Buckman Tavern drunk
Edward Mitchell (British)	A British soldier on a horse (William Sutherland)	One of the captured Minutemen as revenge for being captured earlier in the day	Two shots fired at same time
Two shots fired at same time	A woman behind a wall (Anna Munroe)	Minuteman soldier shooting from the wall behind Buckman Tavern	Minuteman soldier shooting from the wall behind Buckman Tavern
Disgruntled loyalist in town	A British spy	Adams/Hancock	Adams/Hancock
British (Regular) soldier defected (and used shot as a distraction)	British leader (Gould/Pitcairn)	British (Regular) soldier defected (and used shot as a distraction)	British (Regular) soldier defected (and used shot as a distraction)
Slave wanting to fight against owner			Slave behind Buckman Tavern wall

Appendix XVIII: Role-Specific Mini-Objectives or “Secret Missions”

Prince Estabrook (African American Slave/Minuteman)	John Robbins (White/Free Minuteman)	Ann Hulton (Loyalist/Townsperson)	Philip Howe (British (Regular) soldier)
Which woman secretly had a musket gun?	Were the British (Regular) soldiers happy about being in the army? How do you know?	Who were the secret visitors in the Hancock-Clarke house?	Why are the British Regulars coming to Lexington this morning?
Who are the secret spies in the town of Lexington? Who are they working for?	Which men were captured by the Regular soldiers, when they were traveling to Concord?	Who was the Regular officer on the “crazy horse”?	What is in the trunk?

Appendix XIX: Examples of Screenshots of NPCs

Examples of Screens When Participant “Discovers” a Historic Figure
--The screen provides name, image and a brief description of the historic figure



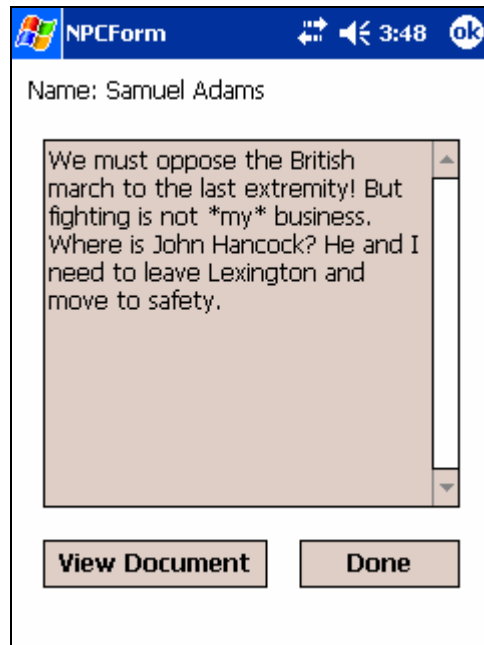
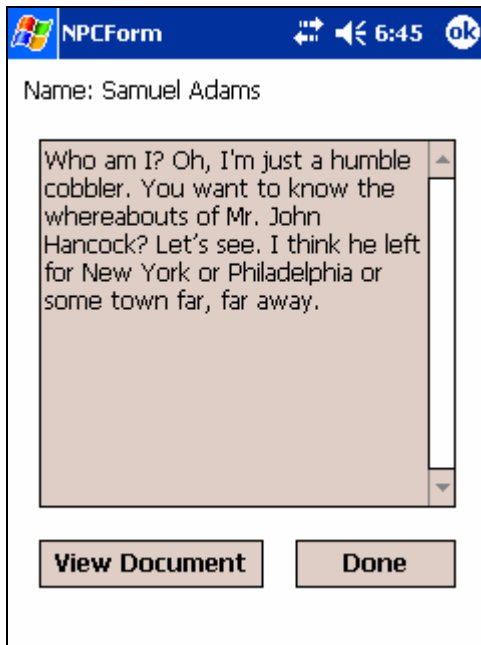
Examples of Screens When Participant Clicks on “Interview”

--The screen shows a role-specific testimonial

Examples from Time Period One (Before the Battle):

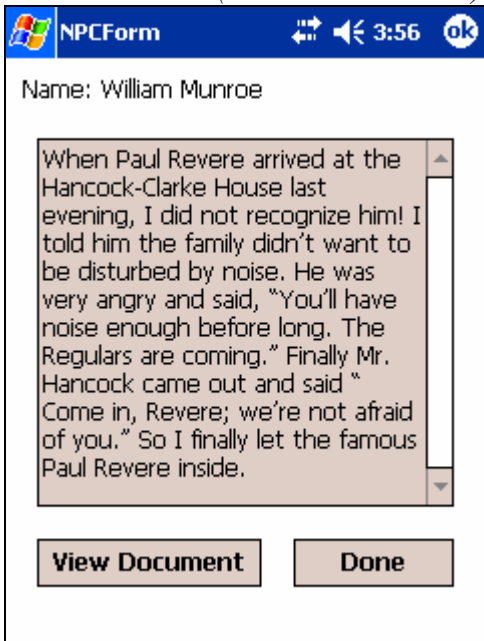
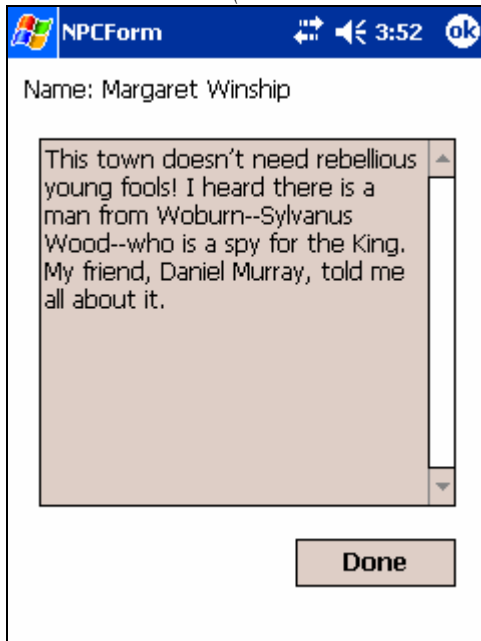
To Philip Howe (British Soldier)

To John Robbins (Minuteman Soldier)



To John Robbins (Minuteman Soldier)

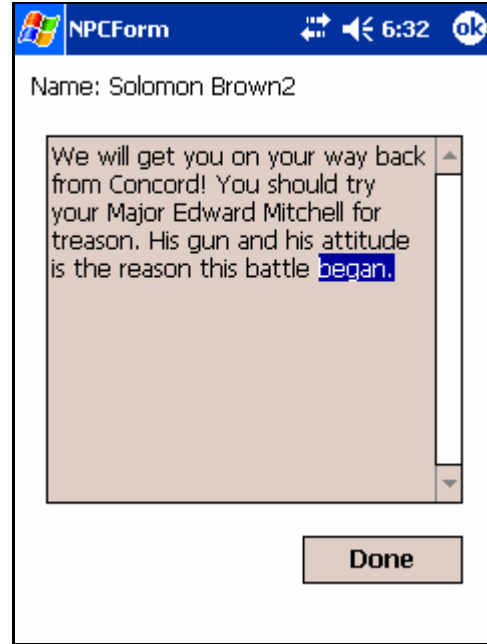
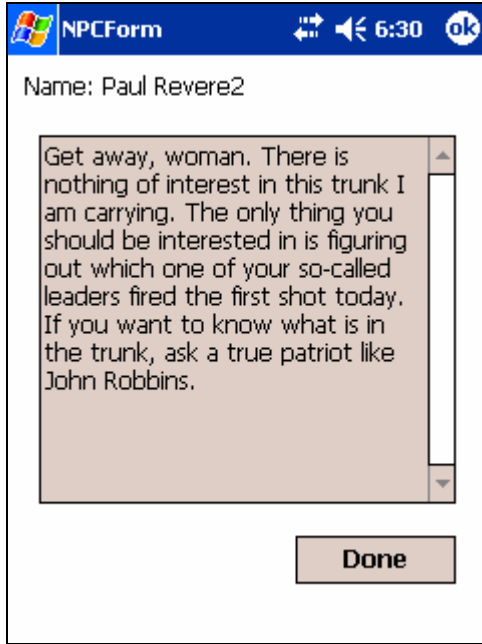
To John Robbins (Minuteman Soldier)



Examples from Time Period Two (After the Battle):

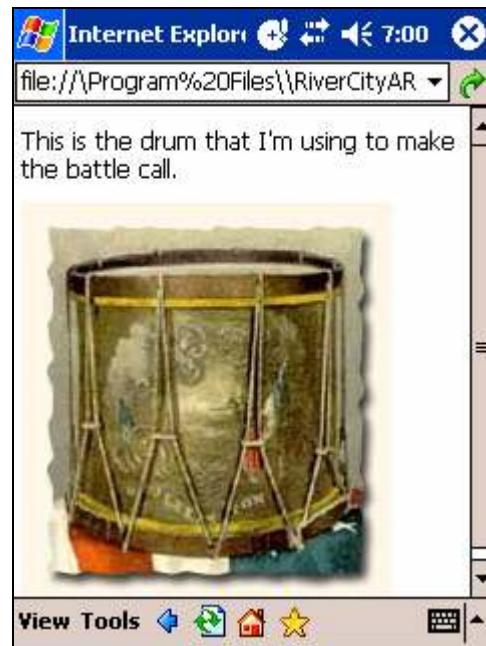
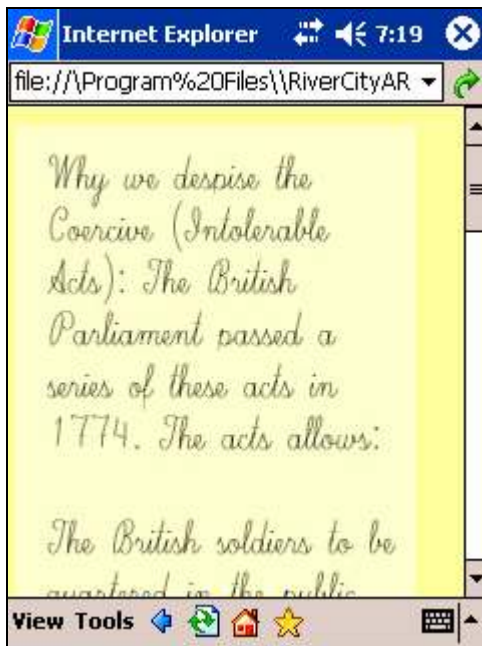
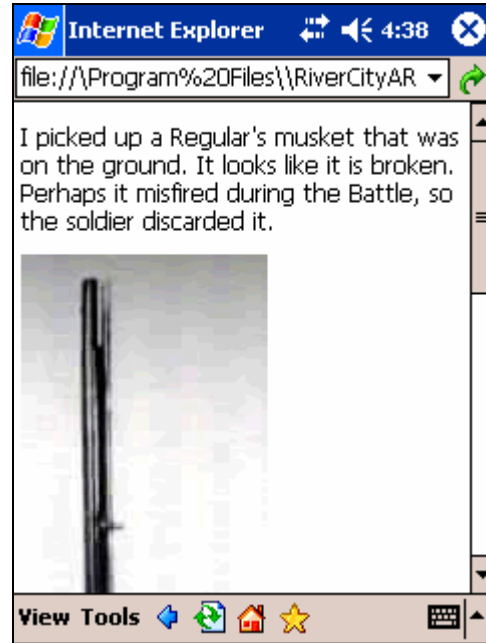
To Ann Hulton (Loyalist)

To Philip Howe (British Soldier)



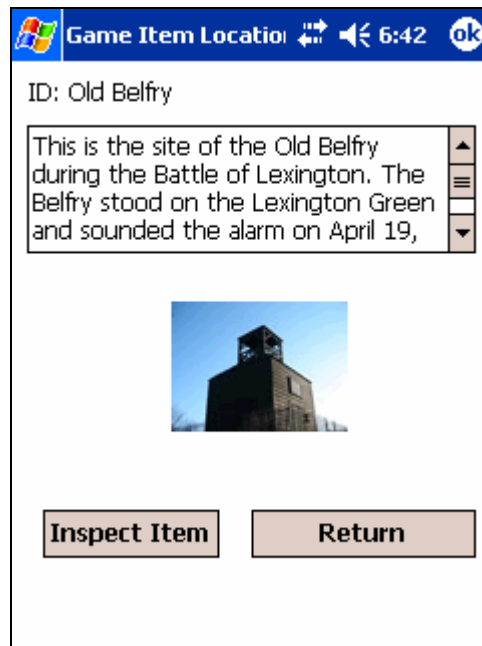
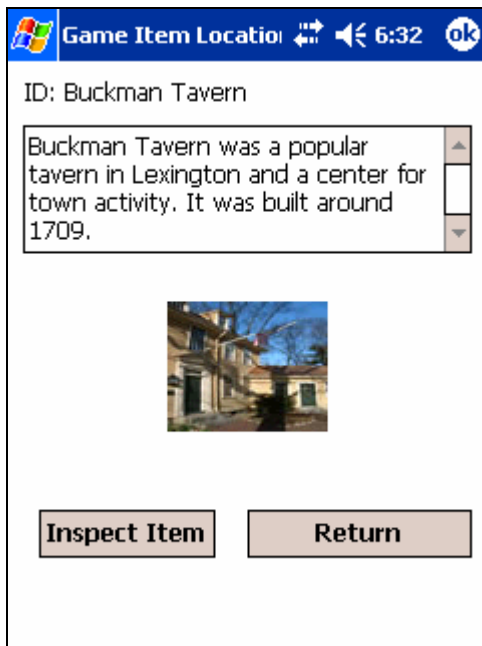
Examples of Screens When Participant Clicks on “View Document”

--The screen loads an HTML document with text and/or image(s)



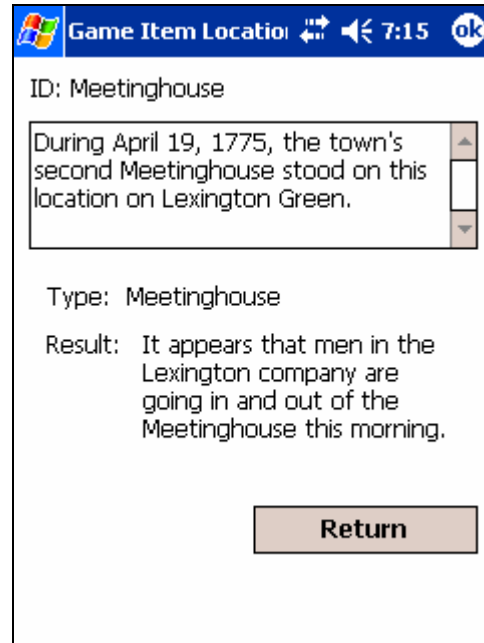
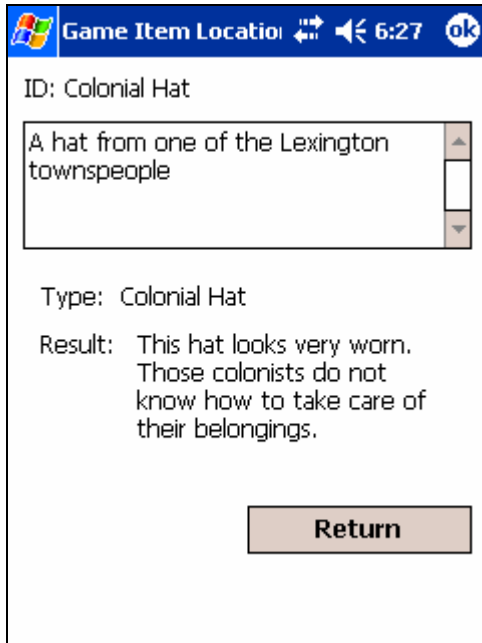
Appendix XX: Examples of Screenshots of Items

Examples of First Screens When Participant “Discovers” a Game Item
--The screen provides title, photo and a description of the item



Examples of Screens When Participant Clicks on “Inspect Item”

--The screen provides the item title, description of the item, and a result of the inspection of the item



Appendix XXI: Examples of Testimonials

Example 1

Testimonial in First Iteration:

Anna Smith Munroe

(Hiding with her three children

33 years old

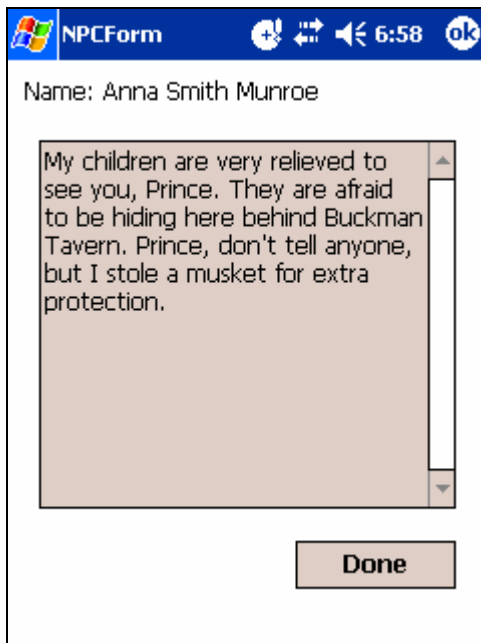
Wife of Sergeant William Munroe)

To Prince Estabrook (African American Slave/Minuteman Soldier):

My children are very relieved to see you. They are afraid hiding here behind the Tavern.

Testimonial in Later Iteration:

To Prince Estabrook:



EXAMPLE 2:

Testimonial in First Iteration:

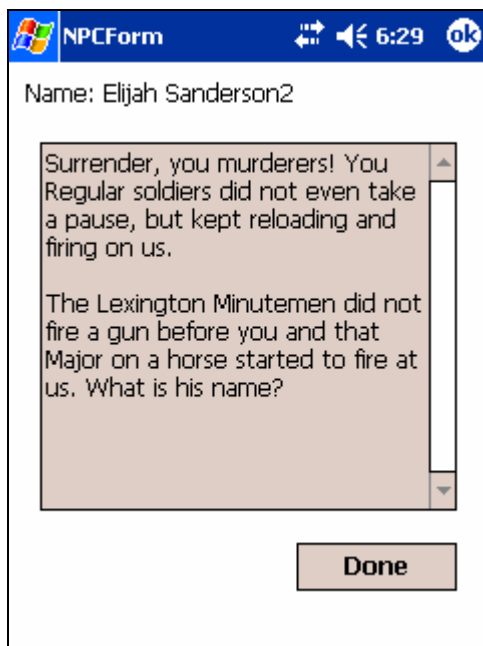
Elijah Sanderson
(Cabinet maker
Minuteman)

To Philip Howe (Regular Soldier):

Surrender, you murderers!

Testimonial in Later Iteration:

To Philip Howe:



EXAMPLE 3:

Testimonial in First Iteration:

Jesse Adair

(Lieutenant, Regular
Hard-charging young Irish Marine)

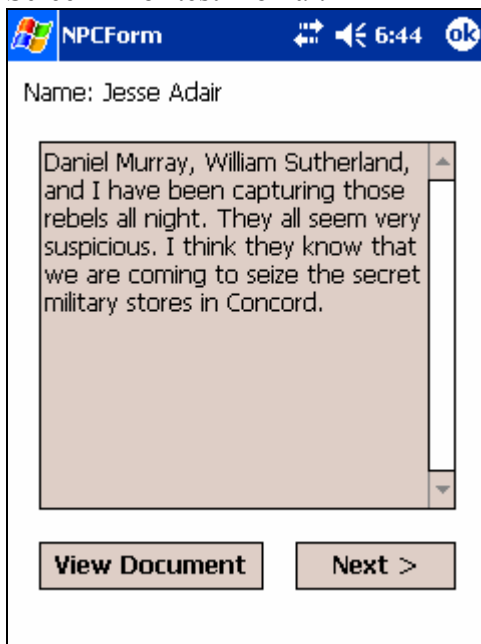
To Philip Howe (Regular Soldier):

Daniel Murray, William Sutherland and I have been capturing those rebels all night. They all seem very suspicious. I think they know that we are coming to seize the stores in Concord.

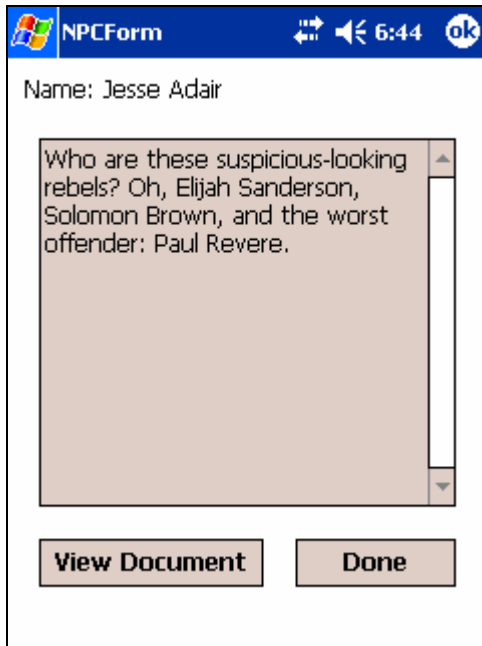
Testimonial in Later Iteration:

To Philip Howe:

Screen #1 of testimonial:



Screen #2 of testimonial:



Appendix XXII: Summary of NPCs

SUMMARY OF NPCS				
NPC name	Description	Loyalty	Location 1	Location 2
Abraham Diderot	African American slave	Loyalist	Near Dan Harrington House	Dan Harrington house
Anna Smith Munroe	Wife of Sergeant William Munroe; 33 years old; hiding with her three small children	Patriot	Stables	Stables
Benjamin Wellington	Minuteman soldier; the first man to carry milk from Boston all the way back to Lexington.	Patriot	Near Schoolhouse	Meetinghouse
Captain John Parker	Captain of the Minutemen; Farmer in Lexington	Patriot	Buckman Tavern	Near Parker monument
Daniel Harrington	Blacksmith of Lexington/Clerk of the Minutemen Company/Son-in-law of Ensign Robert Munroe/Brother-in-law of William Tidd	Patriot	Dan Harrington House	Dan Harrington house
Daniel Murray	New Englander	Loyalist/Spy for British	Behind Buckman Tavern	Meetinghouse
Dorothy (Dolly) Quincy	Fiancée of John Hancock	Patriot	Near church	Near church
Dr. Fiske	Lexington doctor; Father of Ruth Fiske Harrington	Patriot	NOT IN LEXINGTON	Near Dan Harrington House

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Edward Mitchell	Major of the 5th Foot of the King's Troops	British/Regular	Dan Harrington House	North side of the Common
Edward Thornton Gould	Regular Lieutenant for the King's Troops; a young man	British/Regular	Near Old Belfry	Near Dan Harrington House
Elijah Sanderson	Lexington town cabinet maker Minuteman soldier	Patriot	Near Buckman Tavern	Behind Buckman Tavern
Elizabeth Clarke	Daughter of Reverend Jonas Clarke and Lucy Clarke; 12-year-old girl	Patriot	Near church	Near church
Elroy Hatchett*	Regular Lieutenant, The King's Own Regiment	British/Regular	Meetinghouse	Center of the Common
Francis Smith	Colonel of the King's troops, leader of the expedition	British/Regular	NOT IN LEXINGTON	Center of the Common
Frederick MacKenzie	Lieutenant for the King's troops (23rd Royal Welch Fusiliers); Cool-headed, sharp-eyed	British/Regular	Near New Belfry	Schoolhouse
Henry DeBerniere	Lexington spectator/British spy	British/Regular	Northwest corner of Common	North side of the Common
James Robertson*	Slave for the blacksmith (Daniel Harrington)	Patriot	Near Dan Harrington House	Near Dan Harrington House

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Jeremy Lister	Ensign, King's troops	British/Regular	Near New Belfry	West side of Common, near Schoolhouse
Jesse Adair	Lieutenant, King's troops; Hard-charging young Irish Marine	British/Regular	North side of Common	Stables
John Bateman	Regular Lieutenant of the King's Troops	Regular/British	Schoolhouse	Schoolhouse
John Hancock	Political leader	Patriot	Behind Buckman Tavern	NOT IN LEXINGTON
John Lowell	Personal Secretary of John Hancock	Patriot	Common center	Stables
John Pitcairn	Major of the King's troops	British/Regular	NOT IN LEXINGTON	Center of the Common
Jonas Parker	FATALLY WOUNDED, Oldest Minuteman soldier; Father of Jonas Jr; cousin of Captain John Parker	Patriot	Common near Schoolhouse	Common near Schoolhouse
Jonathan Harrington, Jr.	FATALLY WOUNDED; SHOT IN THE BACK; Wife is Ruth Fiske Harrington; Son-in-law of Dr. Fiske; 30 Years Old	Patriot/Neutral	Jonathan Harrington House	Jonathan Harrington House
Lucy Bowes Clarke	Wife of Reverend Jonas Clarke; 39 years old	Patriot	Near church	Near church

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Lydia Mulliken*	Young Lexington townswoman	Loyalist	NE corner of Common	Buckman South
Margaret Winship*	Female townspeople	Loyalist	Behind Buckman Tavern	South of Common
Mary Asbury*	African American slave for the Munroe house	Neutral	Munroe House	Munroe House
Molly Munroe	Daughter of Nathan Munroe; Niece of William Munroe	Patriot	Munroe House	Munroe House
Nathan Munroe	Minuteman soldier, Lexington town member; Son of Marrett Munroe; Brother of William Munroe	Patriot	Near South of Common	Old Belfry
Paul Revere	40 years old; Boston silversmith	Patriot	Behind Buckman Tavern	Behind Buckman Tavern
Reverend Jonas Clarke	Pastor of Lexington's Church of Christ; Husband of Lucy Clarke; Distant relation of John Hancock; 44 years old	Patriot	Near the church	Near the church
Ruth Fiske Harrington	Wife of Jonathan Harrington, Jr./Daughter of Dr. Fiske	Patriot	NOT IN LEXINGTON	Jonathan Harrington House
Samuel Adams	Political leader	Patriot	North corner of Common	NOT IN LEXINGTON

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Solomon Brown	Minuteman soldier; 18 years old	Patriot	Near Buckman Tavern	Buckman
Sylvanus Wood	Minuteman soldier from Woburn	Patriot	Upper North East side of Common	Near Buckman Tavern
Thomas Fessenden	Lexington spectator/townsperson	Loyalist/Neutral	South of Buckman Tavern	Near South of Common
Thomas Munroe	Son of Anna Smith Munroe and William Munroe	Neutral	Stables	Near stables
William Diamond	Drummer for Minutemen/16 years old	Patriot	Near Stables	North side of the Common
William Munroe	Orderly Sergeant of the Minutemen; Husband of Anna Munroe	Patriot	Behind Buckman Tavern	Near new Belfry
William Sutherland	Soldier, The King's Own Regiment, 38th Foot	British/Regular	Munroe House	Near stables
William Tidd	Lieutenant of the Minutemen; Brother-in-law of Daniel Harrington	Patriot	NOT IN LEXINGTON	Near stables

Most NPCs are based on real historic figures. An * denotes an NPC based on a composite of historic figures or an imagined figure.

Appendix XXIII: Game Testimonials Script

GAME SCRIPT (PRINCE ESTABROOK/SLAVE/MINUTEMAN ROLE)			
NPC name	Description	Prince 1	Prince 2
Abraham Diderot	African American slave	Why are you helping out those white men? I wouldn't trust them. Do you really think they are going to grant you freedom for helping out the Minutemen? You have a better chance of getting killed!	Prince, why are you protecting the men of Lexington? They do not deserve our help. You should be helping the loyalists, not those darn patriots!
Anna Smith Munroe	Wife of Sergeant William Munroe; 33 years old; hiding with her three small children	My children are very relieved to see you, Prince. They are afraid to be hiding here behind Buckman Tavern. Prince, don't tell anyone, but I stole a musket for extra protection.	Are the Regulars gone? Is it safe to go back to Buckman Tavern? I've been watching Redcoats on horseback chasing after Minutemen. I'm afraid for my family, but I'm not afraid to defend myself with this musket.
Benjamin Wellington	Minuteman soldier; the first man to carry milk from Boston all the way back to Lexington.	Slave, tell the Minutemen over at Buckman Tavern that there are more guns over here, hidden. But warn them to be quiet, because the Meetinghouse is surrounded by Regulars! A troop of them captured me early this morning on my way to Concord.	Just like I told the Minuteman, John Robbins, the first shots were from the pistols of one of the Regular officers, who was mounted on a horse. He was only 30 yards away, and I clearly saw one of the Regular officers fire at us.

<p>Captain John Parker</p>	<p>Captain of the Minutemen; Farmer in Lexington</p>	<p>I sent almost all the Minutemen home, and now a messenger tells me that there are over 700 Regulars coming, and they are only a mile and a quarter away! They could be here in twenty minutes.--- Where is William Diamond? I need him to beat the drum call to arms at once! He is likely at Jonathan Harrington's house. Have you visited there yet?</p>	<p>The Regular troops approached us on the Common and I immediately ordered the Minutemen to disperse and not to fire. The Regular troops rushed in furiously, fired upon us, and killed ten of our party, without receiving any provocation from us. Now help me to Buckman Tavern to get some bandages. One of the Regulars shot me in the leg!</p>
<p>Daniel Harrington</p>	<p>Blacksmith of Lexington/Clerk of the Minutemen Company/Son-in-law of Ensign Robert Munroe/Brother-in-law of William Tidd</p>	<p>Prince Estabrook, you will earn your freedom if you serve in the Minuteman company. Be careful with your gun--we have been having problems with them misfiring.</p>	<p>I hear there is a British spy in town, working for General Gage. He is giving misleading information to the Lexington men. Perhaps he fired the first shots!</p>
<p>Daniel Murray</p>	<p>New Englander</p>	<p>Slave! Why are you listening to those Minutemen? Don't you see that they are breaking the law? You really think they are going to set you free when this is over?</p>	<p>I can't believe they put a *slave* in the militia. You rebels are really asking for it! What did you think the Regulars were going to do when you started to fire at them? I think that Adams fellow told someone to start fighting!</p>

<p>Dorothy (Dolly) Quincy</p>	<p>Fiancée of John Hancock</p>	<p>It appears that there will be some trouble in Lexington! My fiancée, Mr. Hancock, was up all night, cleaning his gun and sword and putting his accoutrements in order. He is determined to get a gun at the Meetinghouse and fight alongside the other men. It seems like he is begging for a fight!</p>	<p>We watched the fighting from inside, but we only saw a lot of smoke from all the shots. Now we are taking care of all the injured men. One, whose head was only grazed by a ball, insisted that he was dead, but the other, who was shot through the arm, behaved much better! It seems like there are only Lexington men who were wounded.</p>
<p>Dr. Fiske</p>	<p>Lexington doctor; Father of Ruth Fiske Harrington</p>		<p>Go find Captain Parker and tell him that Jonathan Harrington was wounded. He keeps mumbling something about Edward Mitchell. Do you think Major Mitchell shot him?</p>
<p>Edward Mitchell</p>	<p>Major of the 5th Foot of the King's Troops</p>	<p>Get away from me slave! I've had enough of you insolent rebels! We have been capturing villains all night, like Paul Revere and Solomon Brown, who have been spreading false news across the countryside.</p>	<p>Get away from me, and get that damn belfry to stop ringing while you're at it. You men are just a bunch of drunken scoundrels, who will fire at anything that gets in your way.</p>

<p>Edward Thornton Gould</p>	<p>Regular Lieutenant for the King's Troops; a young man</p>	<p>Mind your place, slave.</p>	<p>Move aside, slave. We are marching on to Concord! I don't have time to stop and talk to you.</p>
<p>Elijah Sanderson</p>	<p>Lexington town cabinet maker Minuteman soldier</p>	<p>Mr. Solomon Brown and I were captured by dozens of Regular officers last night! One named Edward Mitchell put his pistol to my breast and told me, if I resisted, I was a dead man. We were abused and questioned for hours about the magazine in Concord! We waded through the swamp, through the mud and water, to arrive in Lexington to warn the others before the Regular officers arrived here.</p>	<p>I narrowly escaped with my life. One of the Regular officers, maybe a major, said "damn them—we will have them," and then they all started to fire on us. The Minutemen did not fire a gun before the Regulars started firing at them first.</p>
<p>Elizabeth Clarke</p>	<p>Daughter of Reverend Jonas Clarke and Lucy Clarke; 12-year-old girl</p>	<p>Hello, Prince! You seem tired today. There are all these strange visitors in town. Do not tell Mother, but I stayed up last night, listening to them talk to Father. The older visitor, named Mr. Adams, is always hitting the table and chattering on about a "revolution," while the well-dressed man, Mr. Hancock, seems more concerned with a delivery of fish! But it seems like both of them want a battle to happen here in Lexington.</p>	<p>Prince! Did you see what happened? I was inside and I watched the Regular troops marching off the Common toward Concord. Mother has been busy watching over the other children. Miss Dolly Quincy, with her cloak and bonnet on, was going round with Father to hide money, watches, and food. I heard Father say that the Regulars started a war today! But I think it was the phantom soldier. Have you seen him?</p>

<p>Elroy Hatchett</p>	<p>Regular Lieutenant, The King's Own Regiment</p>	<p>Get out of my way. I did not walk all the way from Boston to speak to the likes of you.</p>	<p>You are a slave? Why were *you* fighting with the Lexington Minutemen? Well, you can tell them that they brought this on themselves. They started by firing one or two shots at us. We did not have a choice but to rush them and fire back.---This battle was no accident! The Minutemen seemed like they were out for revenge!</p>
<p>Francis Smith</p>	<p>Colonel of the King's troops, leader of the expedition</p>		<p>You people are deluded, but we did not mean to harm you. I was just arriving when the battle began, but I thought I heard two shots go off at the same time. Maybe both sides are at fault.</p>
<p>Frederick MacKenzie</p>	<p>Lieutenant for the King's troops (23rd Royal Welch Fusiliers); Cool-headed, sharp-eyed</p>	<p>Even you, slave, have a weapon in your hand. Why are all the men in Lexington armed? It seems like the Minutemen are itching for a fight.</p>	<p>Get away slave! You and the rest of the rebels started this fight. I'm sure that the first shot came from the Lexington townspeople who fired from behind the wall of Buckman Tavern. Maybe it was one of you slaves!</p>
<p>Henry DeBerniere</p>	<p>Lexington spectator/British spy</p>	<p>Hello, friend. Tell me about your artillery and provisions in Concord. I hear there is a magazine of powder and cartridges hidden there. Is it true? You can trust me.</p>	<p>It was clear from where I stood during the battle that Major Pitcairn did not want to fire on the Lexington men. He just wanted the militia to "lay down their arms," not start a battle!--In fact, maybe *you* saw the Lexington men firing at Major Pitcairn!!</p>

<p>James Robertson</p>	<p>Slave for the blacksmith (Daniel Harrington)</p>	<p>Prince, Regular officers have been discovered riding up and down the road to Concord, capturing the Lexington men! Now I keep hearing the Regulars are coming to town this morning! I thought the British Regulars were like family to the men in this town. Do you think the men here are really going to attack them?</p>	<p>Did the Regulars hit you? From inside Daniel Harrington's house, I couldn't see who fired. But I heard not one shot, but two shots in the beginning. ---Maybe no one fired at all. Those guns are so shoddy, perhaps they went off accidentally! After the first gun shots, I looked through the window and saw one of the Regular officers on a horse pursuing Mr. Daniel Harrington! Mr. Harrington jumped over a fence to hide.</p>
<p>Jeremy Lister</p>	<p>Ensign, King's troops</p>	<p>Are you on the side of the rebels? Then begone!</p>	<p>You men are savages! How dare you greet the King's troops with gunfire! If you spoke to John Robbins, you would find that I told him who fired the first shot.</p>
<p>Jesse Adair</p>	<p>Lieutenant, King's troops; Hard-charging young Irish Marine</p>	<p>I'm not trying to give you any trouble, slave, I just want to ask a few questions. Do you know if there any secret military stores in Concord? Are there men named Adams or Hancock hiding in this town?</p>	<p>Even you colored men are looking for a fight! Major Pitcairn says that you and your Lexington Minutemen were shooting from behind a wall near Buckman Tavern, and I believe him.</p>

<p>John Bateman</p>	<p>Regular Lieutenant of the King's Troops</p>	<p>You think your life is hard? Try being a soldier for the British infantry. We are paid almost nothing, but we had to join, because there is so much unemployment in England. I didn't have a craft or a trade and I had no other place else to go. ---If you ask me, these British soldiers will do anything to escape. I think they would even start a war as a diversion so they could sneak away!</p>	<p>Move out of the way, slave! We are headed to Concord now. Edward Mitchell told me that he saw Lexingtonian Solomon Brown firing at us like a madman! I think he was angry because we caught him sneaking down the road to Concord yesterday.</p>
<p>John Hancock</p>	<p>Political leader</p>	<p>Hello, slave. That's right! I am the famed John Hancock of the Boston Hancocks. I am ready to go to the Meetinghouse, take a gun, and fight alongside the rest of the Minutemen. But Sam Adams won't let me.</p>	
<p>John Lowell</p>	<p>Personal Secretary of John Hancock</p>	<p>Begone, slave. I am looking for the stubborn John Hancock. It looks like you won't be able to earn your freedom today because there won't be a fight. I hear that the Regulars are not even coming.</p>	<p>Out of my way, slave! Mr. Revere and I are carrying John Hancock's trunk. Hancock left it at Buckman Tavern, so we rushed back to retrieve it. It's filled with papers and proceedings of the Provincial Assembly, the secret Whig organization. If the Regulars find it, we'll all end up in the gallows!</p>

<p>John Pitcairn</p>	<p>Major of the King's troops</p>		<p>I did not want to start a battle here, slave. My orders were to disarm the Lexington militia, not to fire at them. Colonel Smith told me that when he was arriving here, he heard two shots fire at the same time.</p>
<p>Jonas Parker</p>	<p>Oldest Minuteman soldier; Father of Jonas Jr; cousin of Captain John Parker</p>	<p>No matter what the circumstances, I will never run from those Regulars. Fighting at my side is my son, Jonas Jr. At my feet is a hat full of flints and musket balls. Those Regulars should be afraid!---I tried out my musket yesterday and it misfired a few times, so those Regulars better be careful!</p>	<p>FATALLY WOUNDED</p>
<p>Jonathan Harrington, Jr.</p>	<p>FATALLY WOUNDED; SHOT IN THE BACK; Wife is Ruth Fiske Harrington; Son-in-law of Dr. Fiske; 30 Years Old</p>	<p>Prince, I'm glad that you joined the Minutemen. I don't want to fight, because I still feel loyalty to King George III, but I do want to defend our town. I don't agree, however, with those two visiting radicals, the crafty Adams and fussy Hancock. Have you seen them yet?</p>	<p>.....</p>

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<p>Lucy Bowes Clarke</p>	<p>Wife of Reverend Jonas Clarke; 39 years old</p>	<p>I don't have time for dilly-dallying. I have 12 children to attend to, and I have all these secret visitors in our home down the road (the Hancock-Clarke House). If you ask me, I think those visitors will bring nothing but trouble.---I overheard Jonas saying that the Regular soldiers are coming to capture the secret visitors. Good riddance! No, no. I don't mean that, but I hope the Regulars don't decide to capture us, too.</p>	<p>Are you injured? I have been giving men onions to eat to stop their wounds from bleeding. If you go to Buckman Tavern, help Mr. Revere carry some important trunk they were all babbling about.</p>
<p>Lydia Mulliken</p>	<p>Young Lexington townswoman</p>	<p>What are you looking at, slave? Get back to work.</p>	<p>You should be ashamed for helping the violent Whigs and Patriots stage their rebellion.</p>
<p>Margaret Winship</p>	<p>Female townsperson</p>	<p>Stay away from me, Slave.</p>	<p>Didn't you hear me before? Stay away from me, slave.</p>

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<p>Mary Asbury</p>	<p>African American slave for the Munroe house</p>	<p>Hello, Prince. I overheard Mr. Nathan Munroe talking about two men who were captured by some Regular officers last night! He said they are over at Buckman Tavern, planning for the arrival of the King's troops! Do you think the troops are coming to Lexington?---Also, I hear there is a secret spy in town. But it's not Sylvanus Woods. He's a good Patriot from Woburn.</p>	<p>Prince, were you hurt in the battle? I was watching through the window of the Munroe House, and I saw the redcoat soldiers firing and running toward the house. I was afraid they would come inside here and shoot us! --- Were the Regulars after a man named Revere? I heard the Munroes say that Paul Revere was carrying a trunk with papers about the revolution.</p>
<p>Molly Munroe</p>	<p>Daughter of Nathan Munroe; Niece of William Munroe</p>	<p>Hello, Prince! I'm not scared of a few Regular soldiers! Father took out his guns and showed them to me. Uncle William Munroe went to guard Reverend Clarke and the secret visitors. All the men are gathered in Buckman Tavern. I wish I could go there, too.</p>	<p>Prince, I looked through the window and saw one of the redcoats on a horse, chasing after my father! Is he okay? Please check on him at the Tavern!</p>
<p>Nathan Munroe</p>	<p>Minuteman soldier, Lexington town member; Son of Marrett Munroe; Brother of William Munroe</p>	<p>I do not have any time to speak to *you*, slave! Here, deliver this note to one of the "real" Minuteman soldiers.</p>	<p>Slave, go back and check on my family at the Munroe House? I am worried that some of these angry loyalist folks in town are telling my family lies about the Minutemen.---Slave, go back and check on my family at the Munroe House?</p>

<p>Paul Revere</p>	<p>40 years old; Boston silversmith</p>	<p>Do you know who I am, slave? I rode all the way from Boston to Reverend Clarke's house last night to warn Mr. Hancock and Mr. Adams of the suspicious activity of the Regulars. I am afraid they are coming to raid the military stores in Concord and to seize Hancock and Adams as well!--Do you know a man by the name of Daniel or Murray? I think he might be a spy.</p>	<p>From the chamber window of Buckman's Tavern, I looked out and saw the Regular troops coming up the Lexington Road. Lowell and I made haste and passed through a crowd of fifty or sixty Minutemen, most of whom were walking toward the Green. I could not see what happened on the Green, though, because I was trying to hide behind Buckman with the trunk.</p>
<p>Reverend Jonas Clarke</p>	<p>Pastor of Lexington's Church of Christ; Husband of Lucy Clarke; Distant relation of John Hancock; 44 years old</p>	<p>All forms of government originate from the people. You are fighting for your freedom from slavery, and we are fighting for our freedom from King George. I urge you to fight alongside your fellow Lexingtonians. You are part of the elite force, the Minutemen, who are ready to fight at a minute's notice.</p>	<p>Where courage, valour, or fortitude has reason for its basis, it allows men to face the greatest dangers, to stand the severest shocks, to meet undaunted and serene the charge of the most formidable enemy and all the horrors of war. Now is the time to face the enemy.</p>
<p>Ruth Fiske Harrington</p>	<p>Wife of Jonathan Harrington, Jr./Daughter of Dr. Fiske</p>		<p>Help! My husband, Jonathan, is wounded! Those horrible Redcoats shot him while he was running away.</p>

<p>Samuel Adams</p>	<p>Political leader</p>	<p>O, what a glorious morning for America. General Gage's troops are moving across the Charles River. We think he is after the military stores in Concord, and will destroy this town on the way! We must oppose their march to the last extremity! ---But fighting is not *my* business. I need to leave Lexington and move to safety. Send for my carriage, slave, and find John Hancock. I think he is talking to Captain Parker over at Buckman Tavern.</p>	
<p>Solomon Brown</p>	<p>Minuteman soldier; 18 years old</p>	<p>Have you seen my horse? Mr. Elijah Sanderson and I were taken prisoner by the Regulars and they turned my horse loose. They all had guns and said there are hundreds more Regulars are on their way!</p>	<p>It is deadly outside! See my ripped coat? Major Mitchell of the Regulars wants me dead! He saw me and he began firing! Pay no mind to me, though. Others have been injured far worse. I fought back and fired shots from behind that wall near Buckman Tavern.</p>
<p>Sylvanus Wood</p>	<p>Minuteman soldier from Woburn</p>	<p>I heard the Lexington bell ring from three miles away. Thank goodness Isaac Stone gave your town the belfy. It looks like there are some suspicious-looking men whispering around it now.</p>	<p>Slave, were you wounded? You are bleeding! Did you see that Regular officer on the crazy horse chasing the Minutemen? I think he was the one who fired the first shot.</p>

<p>Thomas Fessenden</p>	<p>Lexington spectator/townsperson</p>	<p>I don't know if I should trust you slaves to protect our town. Do you even know how to use a gun?</p>	<p>Did you use your gun properly? These shoddy guns may go off without you even knowing it!</p>
<p>Thomas Munroe</p>	<p>Son of Anna Smith Munroe and William Munroe</p>	<p>Hello, Prince! Mother seems very nervous. She keeps talking about Sylvanus Woods. He told father that the Regulars are near Lexington. I wonder how he knows that. Maybe he is a spy.</p>	<p>I heard a lot of noise and shouting when the Regulars marched onto the Common. Then we heard gunshots from far away, from the other side of the Common. The shots seemed to get closer and closer! Mother held me tightly and cursed the Regulars. She said they are to blame.</p>
<p>William Diamond</p>	<p>Drummer for Minutemen/16 years old</p>	<p>Hello Prince! I have been practicing the battle calls on my new drum all winter. Captain Parker ordered me to call the other Minutemen to the Common because he heard news that the Regular troops are near! Do you think they are coming to capture Mr. Adams and Mr. Hancock?</p>	<p>It felt like we were outnumbered 70 to 700! Captain Parker told me to keep playing the drums until the Redcoats retreated. The battle is over, but I will keep beating my drums until the smell of gunpowder leaves the Common. ---Prince, don't tell anyone, but I think I saw one of our soldiers' guns go off accidentally. Perhaps that is what started all the chaos!</p>
<p>William Munroe</p>	<p>Orderly Sergeant of the Minutemen; Husband of Anna Munroe</p>	<p>Hello, Prince. My son, Thomas, tells me that you are a very kind man. I guess you are quite popular with the children! My family is hiding by the stables until the danger is gone.</p>	<p>You are bleeding, slave! Go see Lucy Clarke near Nathan's house. She will welcome you and heal your wounds. Once you feel better, check on my wife, Anna, at the stables.---You are bleeding, slave! Go see Lucy Clarke near Nathan's house. She will welcome you and heal your wounds. Once you feel better, check on my wife, Anna, at the stables.</p>

William Sutherland	Soldier, The King's Own Regiment, 38th Foot	Give up your weapons, slave! You, Benjamin Wellington, and Paul Revere—you're all villains!	You cowardly slave! I don't have time to talk to you anyway. I am still trying to calm down my horse.
William Tidd	Lieutenant of the Minutemen; Brother-in-law of Daniel Harrington		

GAME SCRIPT (JOHN ROBBINS/FREE MINUTEMAN ROLE)			
NPC name	Description	John 1	John 2
Abraham Diderot	African American slave		I wouldn't trust those other slaves. They are just repeating whatever their master says.
Anna Smith Munroe	Wife of Sergeant William Munroe; 33 years old; hiding with her three small children	My children and I are hiding in the woods here until the Regulars leave town. Solomon Brown told my husband, William Munroe, that the Regulars are near Lexington! Now Solomon is walking around Buckman Tavern, telling his story to the other Minutemen.	Are the Regulars gone? Is it safe to go back to Buckman Tavern? I saw Regulars mounted on horses running after the Minutemen! The Redcoats looked like they were ready to go into homes and start shooting families!
Benjamin Wellington	Minuteman soldier; the first man to carry milk from Boston all the way back to Lexington.	Hello, friend. Tell the Minutemen over at Buckman Tavern that there are more guns here in the Meetinghouse. But warn them to be quiet, because it is surrounded by Regulars! Lieutenant Sutherland of the King's troops thinks there is something suspicious going on. Let's not give him any more reasons.	The first shot was from the pistol of a Regular officer mounted on a horse. He was only 30 yards away from me, so I clearly saw one of the officers fire at us.

<p>Captain John Parker</p>	<p>Captain of the Minutemen; Farmer in Lexington</p>	<p>Hello, John!! I have made Buckman Tavern the headquarters for the Minutemen. I was also informed that hundreds of Regular soldiers are marching from Boston to take over the magazine at Concord! ---If you are equipped with a musket, follow me; and if you are not equipped, go into the Meetinghouse and furnish yourself with a gun. Then join the company across the road on the Common.---Be careful, though. A number of Regular officers have been riding up and down the road to Lexington, stopping and insulting people as they pass on the road. Mr. Paul Revere told me all about it.</p>	<p>The Regular troops approached us on the Common and I immediately ordered the Minutemen to disperse and not to fire. The Regular troops rushed in furiously, fired upon us, and killed ten of our party, without receiving any provocation from us.</p>
<p>Daniel Harrington</p>	<p>Blacksmith of Lexington/Clerk of the Minutemen Company/Son-in-law of Ensign Robert Munroe/Brother-in-law of William Tidd</p>	<p>William Tidd, Ensign Robert Munroe, William Munroe, Solomon Brown, William Diamond, Jonathan Harrington, Jr., Prince Estabrook, Jonas Parker.... What is your name? John Robbins? I will get to you soon. I'm almost done with the roll call for the Minutemen soldiers.</p>	<p>Jonathan Harrington was wounded badly in the skirmish. His wife, Ruth, is tending to him now. John, did you hear that there was a British spy who fired the first shots today!</p>
<p>Daniel Murray</p>	<p>New Englander</p>	<p>Are their secret military stores in Concord? Are John Hancock and Samuel Adams staying here? Are the Minutemen planning an attack on the King's troops? Why am I asking? Oh, I'm just curious.--- There is a mysterious man by the name of Revere who does not seem trustworthy.</p>	<p>You rebels are asking for it! What did you think the Regulars were going to do when you started to fire at them? I think that Adams fellow told someone to start fighting, or perhaps it was one of the men behind Buckman Tavern!</p>

<p>Dorothy (Dolly) Quincy</p>	<p>Fiancée of John Hancock</p>	<p>A man named Paul Revere arrived at the Reverend's house late last night, and was whispering with my fiancée, Mr. Hancock. I overheard Mr. Revere saying that he was captured by the Regulars last night, and that they were arriving in Lexington soon. I would be worried, but it seems like my fiancée wants a fight to start here!</p>	<p>We watched the fighting from inside, but we only saw a lot of smoke from all the shots. We have been taking care of the injured men--all of whom seem to be from Lexington! One, whose head was only grazed by a ball, insisted that he was dead, but the other, who was shot through the arm, behaved better.</p>
<p>Dr. Fiske</p>	<p>Lexington doctor; Father of Ruth Fiske Harrington</p>		<p>Jonathan Harrington is wounded very badly. He keeps mumbling something about a major Mitchell and a Colonel Smith. I hurried over to the Common when I heard the shots, and when I arrived, it seemed like Colonel Smith was standing back and letting his men slaughter us!</p>
<p>Edward Mitchell</p>	<p>Major of the 5th Foot of the King's Troops</p>	<p>Tread wisely, scoundrel. I already have taken some prisoners, and I won't hesitate to make you one as well. I demand some answers, and I demand the truth. Last night, Paul Revere and Elijah Sanderson and others were leaking information about your mission. Maybe you shouldn't trust them.</p>	<p>Your fellow men were coming out of Buckman Tavern all morning. They couldn't walk straight, they had so much drink in them! They likely didn't even know who they were firing at when they fired the first shots! ---Oh, and that Paul Revere? The hero? He wasn't even helping you fight! I saw him running away with some trunk like a coward. I wouldn't trust those scoundrels.</p>
<p>Edward Thornton Gould</p>	<p>Regular Lieutenant for the King's Troops; a young man</p>	<p>I am in the advance army, commanded by Colonel Smith. Under orders of General Gage, the infantry has come to seize the arms. Disperse and let us through to Concord and you won't be harmed.</p>	<p>Your seventy men cannot stop us from marching to Concord to seize the military stores there! Your men would all be alive if you had not tried to stop us. How dare you show up today with muskets!</p>

<p>Elijah Sanderson</p>	<p>Lexington town cabinet maker Minuteman soldier</p>	<p>Last evening I saw some Regulars loitering near town, so I got my musket and went to Buckman Tavern to share the news. Solomon Brown and I left to follow the Regular officers and were captured by nine of them! One, named Edward Mitchell, put his pistol to my breast and told me that if I resisted, I was a dead man. They questioned us about Hancock and Adams and the magazine in Concord. ---After many hours, they finally set us free. We waded through the swamp, through the mud and water, to arrive in Lexington to warn the others before the Regular officers arrived.</p>	<p>Several Regular officers were in the front line, I think five. The commanding major had a pistol in his hand, and ordered the Minutemen to disperse. The words he said were very harsh; I cannot remember them exactly. Then, the Regulars did not take a pause, but reloaded again as soon as possible and continued to fire on us. The Lexington men did not fire a gun before the Regulars started firing at them!</p>
<p>Elizabeth Clarke</p>	<p>Daughter of Reverend Jonas Clarke and Lucy Clarke; 12-year-old girl</p>		
<p>Elroy Hatchett</p>	<p>Regular Lieutenant, The King's Own Regiment</p>	<p>You think *you* are a real soldier? Life is much harsher for a member of the King's Own Regiment, like myself.</p>	<p>When my fellow soldiers quietly approached you, your men fired one or two shots at us! Only after we heard your shots did we rush in upon your men. After we fired, we sent you running to the woods!-- This battle was no accident! The Minutemen seemed like they were out for revenge!</p>
<p>Francis Smith</p>	<p>Colonel of the King's troops, leader of the expedition</p>		<p>I arrived in Lexington moments after the battle began. Trust me that I did not want violence to take place here. I was desirous of putting a stop to further slaughter of your men, so I gave the orders to end the fighting.</p>

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<p>Frederick MacKenzie</p>	<p>Lieutenant for the King's troops (23rd Royal Welch Fusiliers); Cool-headed, sharp-eyed</p>	<p>It seems like every man in your town has a short stick or a bludgeon in his hand. Why do all the men here in Lexington look like they want to attack us?</p>	<p>I am surprised by your resolve. I can no longer think of the colonists as just a mob of country farmers. Now I think of them as a mob of rebels! I'm sure that the first shot came from the Lexington townsman who was standing behind the corner of Buckman Tavern. Maybe it was even a woman. Who was standing there earlier?</p>
<p>Henry DeBerniere</p>	<p>Lexington spectator/British spy</p>	<p>Hello, friend. Tell me about your artillery and provisions in Concord. I hear there is a magazine of powder and cartridges hidden there. Samuel Adams told me all about it. Is it true?</p>	<p>Major Pitcairn told the Lexington militia to lay down their arms. It's not his fault that the Lexington men started to fire! I saw volleys coming from behind walls, hedges, and trees!</p>
<p>James Robertson</p>	<p>Slave for the blacksmith (Daniel Harrington)</p>	<p>Sir, what is your name? If you are a registered Minuteman for Lexington, Mr. Daniel Harrington will call your name soon. Poor Mr. Harrington has busy forging muskets and musket balls all night long. He can't keep up with all the orders!</p>	<p>I have been helping Daniel Harrington create guns for the Lexington militia. We have been working day and night, and some of the guns are poorly constructed. I even noticed that sometimes those muskets go off accidentally! I hope that isn't what happened here in Lexington today.</p>
<p>Jeremy Lister</p>	<p>Ensign, King's troops</p>	<p>Be gone rebel! I have nothing to say to you!</p>	<p>You men are savages! How dare you greet the King's troops with gunfire! I saw and heard someone firing at us from behind a hedge near Buckman Tavern. I bet it could have been that wife of William Munroe. She was yelling at us all morning.</p>

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<p>Jesse Adair</p>	<p>Lieutenant, King's troops; Hard-charging young Irish Marine</p>	<p>We weren't trying to give your men any trouble, we just wanted to ask them a few questions. Are there any illegal military stores in Concord? Have you heard of men named Adams or Hancock? Why are your men holding guns? You seem very suspicious.</p>	<p>You rebels are everywhere, and you're all looking for a fight! Major Pitcairn says that you villains were shooting from behind a wall near Buckman Tavern, and I believe him.</p>
<p>John Bateman</p>	<p>Regular Lieutenant of the King's Troops</p>	<p>Get out of my way, you rebel!</p>	<p>Stop that darn belfry from ringing!</p>
<p>John Hancock</p>	<p>Political leader</p>	<p>I'm ready to go to the Meetinghouse, take a gun, and fight alongside the rest of the minutemen. Sam Adams has been trying to dissuade me. Let it be known that if I had my musket, I would never turn my back on the Minutemen.</p>	
<p>John Lowell</p>	<p>Personal Secretary of John Hancock</p>	<p>Samuel Adams sent me to keep an eye on John Hancock. Adams wants him to leave Lexington and go into hiding, but Mr. Hancock is being stubborn and wants to fight. If you ask me, Adams is the one who wants to start a fight. He wants any excuse to start a war against the British government. ---No matter, I heard from a source that the Regulars are not even coming to Lexington.</p>	<p>Mr. Revere and I had to rush back to retrieve John Hancock's trunk at Buckman Tavern. As we escaped with the trunk, we were only half a gunshot away from the Regulars!</p>

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<p>John Pitcairn</p>	<p>Major of the King's troops</p>		<p>I deny ordering anyone to fire! I told my soldiers not to shoot, to keep their ranks, and to surround your men. As we approached you, there were two shots, perhaps from the direction of Buckman Tavern. Was there anyone near Buckman who would have done that?</p>
<p>Jonas Parker</p>	<p>Oldest Minuteman soldier; Father of Jonas Jr; cousin of Captain John Parker</p>	<p>I'm an old man, but I am ready to fight! I don't care what cousin Captain John Parker says (I never listen to him anyway). I will never run from the Regulars. Look down on the ground, son. I've set my hat down beside my feet, it's filled with flints and musket balls. I will spend all morning fighting the British Regulars if I have to. ---I tried out my musket yesterday and it misfired a few times, so those Regulars better be careful!</p>	<p>.....</p>
<p>Jonathan Harrington, Jr.</p>	<p>FATALLY WOUNDED; SHOT IN THE BACK; Wife is Ruth Fiske Harrington; Son-in-law of Dr. Fiske; 30 Years Old</p>	<p>I'm proud to be a Minuteman, but I'm not ready to fight anyone. I still feel loyalty to England. I hear that Jonas Parker is ready to fight anyone, no matter what! He believes we need to end the British rule of the colonies. But I think he has been listening to Reverend Clarke too much, if you ask me.</p>	<p>.....</p>

<p>Lucy Bowes Clarke</p>	<p>Wife of Reverend Jonas Clarke; 39 years old</p>	<p>Don't be fooled. My husband, Jonas Clarke, is the Reverend, but he is also the political leader of Lexington. I'm worried that he will get in trouble with General Gage because he is always preaching about the unfairness of King George's rules. ---I wish Jonas would have told me he was letting all those men—and their families—stay here. I think they will bring nothing but trouble! I overheard them saying that Mr. Hancock went to Buckman Tavern to deliberate with Captain Parker. Did you hear what they were discussing?</p>	<p>Are you injured? I have been giving men onions to eat to stop their wounds from bleeding. Are you looking for Adams and Hancock? I overheard my husband, Jonas, saying that they went into hiding. I also heard him blaming someone named "Sutherland" for causing the skirmish today. He mentioned a crazy horse.</p>
<p>Lydia Mulliken</p>	<p>Young Lexington townswoman</p>	<p>Don't support those violent Whigs at Buckman Tavern! They came up to me and swore they would tar and feather me.</p>	<p>The Whigs had no right to fire at the King's troops! The King has done so much for the colonies.</p>
<p>Margaret Winship</p>	<p>Female townspeople</p>	<p>This town doesn't need rebellious young fools! I heard there is a man from Woburn--Sylvanus Wood--who is a spy for the King. My friend, Daniel Murray, told me all about it.</p>	<p>X</p>
<p>Mary Asbury</p>	<p>African American slave for the Munroe house</p>	<p>Sir, would you like some breakfast? If you want information, you'll have to talk to Prince Estabrook. He's the only person I will speak to.</p>	<p>Sir, let me get some bandages for your wounds. Mr. Nathan Munroe was also fighting in the battle. I think he went over to Buckman Tavern.</p>

<p>Molly Munroe</p>	<p>Daughter of Nathan Munroe; Niece of William Munroe</p>	<p>Hello, sir. Can I see your gun? Are you going to shoot someone with that? I am not afraid of any danger. I hear a secret visitor named Revere went to Reverend Clarke's house last night.</p>	<p>Mr. Robbins, I hope you shot at the Regulars! One of them was on horseback, chasing my father! Is he okay?</p>
<p>Nathan Munroe</p>	<p>Minuteman soldier, Lexington town member; Son of Marrett Munroe; Brother of William Munroe</p>	<p>Hello John! Would you like some food? I need a big meal before I fight those Regulars! I heard from Elijah Sanderson and Solomon Brown that they were captured by General Gage's men last night on the way to Concord. You can ask them about it at Buckman Tavern. I don't know whether I agree with the loyalists, but I trust Reverend Clarke, so I will fight with the Minutemen!</p>	<p>I retreated from the Common after Captain Parker gave the order to disperse. We were running away, with our backs turned, and heard a shot that sounded like it came from one of the Regular officers, probably that Edward Gould or even Pitcairn! I got myself over the wall into Buckman's land, about six rods from the Regulars, and then turned and fired at them. But I did not fire at them until the Regulars fired at me first!</p>

<p>Paul Revere</p>	<p>40 years old; Boston silversmith</p>	<p>Last night, after warning people in Lexington, I also went to Concord to warn them that the Regular troops were on their way. As I rode on my horse down the road, I was suddenly surrounded by five Regular officers! They lied to me and said they were out to catch other Regular soldiers who were deserting from their troops. But I told him I knew why they were *really* out on the road.---I then laughed and told them that I had already alarmed the country all the way up! He seemed surprised and rode immediately away. Then one of the British Regulars, Major Edward Mitchell, clapped his pistol to my head and said he was going to ask me some questions, and that if I did not tell the truth he would blow my brains out!---While I was captured, I learned that there is a British spy here in Lexington. I heard them call him Daniel or Murray.</p> <p>After they let me go, I rode back here immediately and told Mr. Hancock and Mr. Adams of my experience.</p>	<p>Mr. Hancock remembered that he left an important trunk of papers in Buckman Tavern. The papers deal with the matters of the Provincial Congress and the Committee of Safety—papers we do not want the Regulars to discover! I ran back to the Tavern with Hancock's Secretary, John Lowell.</p>
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<p>Reverend Jonas Clarke</p>	<p>Pastor of Lexington's Church of Christ; Husband of Lucy Clarke; Distant relation of John Hancock; 44 years old</p>	<p>Even though the Coercive Acts may not affect us Lexingtonians, it can still set a precedent to deprive us of future freedoms! We set up the Committee of Correspondence to counter the oppressive acts of Parliament, but we also need to protect with force. You are part of the elite force, the Minutemen, who are ready to fight at a minute's notice.---If you really want to get inspired, talk to John Hancock or Samuel Adams, two of the secret visitors who were staying at my house last night. It seems like they want a war to start soon.</p>	<p>Where courage, valour, or fortitude has reason for its basis, it allows men to face the greatest dangers, to stand the severest shocks, to meet undaunted and serene the charge of the most formidable enemy and all the horrors of war. Now is the time to face the enemy.</p>
<p>Ruth Fiske Harrington</p>	<p>Wife of Jonathan Harrington, Jr./Daughter of Dr. Fiske</p>		<p>Help my Jonathan, please! Those horrible Redcoats shot him in the back while he was running away!</p>
<p>Samuel Adams</p>	<p>Political leader</p>	<p>O, what a glorious morning for America. We learned that General Gage ordered troops to move across the countryside toward Lexington. They must be after the secret military stores in Concord. Now that Gage has made his move, we can start the revolution! I can finally prove to all the colonists that we cannot live under British rule any longer. ---We must oppose the British march to the last extremity! But fighting is not *my* business. Where is John Hancock? He and I need to leave Lexington and move to safety.</p>	

<p>Solomon Brown</p>	<p>Minuteman soldier; 18 years old</p>	<p><Gasp> Last night at ten, while traveling to Concord, Elijah Sanderson and I were surprised by nine Regular officers. They rode up to us, mounted and armed, and put guns to our breasts. ---They seized our horses and swore that if we took another step, we would be dead. We surrendered and they detained us for four hours, searching us and abusing us. They said that five regiments of Regulars are on their way to seize the magazine at Concord! We evaded their questions until we escaped and ran back here.</p>	<p>That horrible Major Mitchell saw me and started shooting at the Minutemen! I think he wanted revenge on me! Two musket balls missed me by a hair! One hit my coat, and the other hit the wall behind the Tavern, where I was hiding. Those scoundrels!</p>
<p>Sylvanus Wood</p>	<p>Minuteman soldier from Woburn</p>	<p>Hello, sir. I went in haste from Woburn when I heard the Lexington belfry ring. I first inquired of Captain Parker, the commander of the Lexington company, who said a man informed him that the Regular troops were not coming. But while we were talking at Buckman Tavern, a messenger came up and told Parker that the Regular troops were only half a mile away! I hope you are ready for a fight.</p>	<p>John!!! Are you hurt? I saw Major Pitcairn point at us and swing his sword. I heard him say "Lay down your arms, you damned rebels, or you are all dead men. Fire!" Then there was a gun fired by a Regular on a horse that was out of control. Within my knowledge, there were no guns fired by any of Captain Parker's company. What did you see?</p>
<p>Thomas Fessenden</p>	<p>Lexington spectator/townsperson</p>	<p>Be careful with that musket. They sometimes go off when you least expect it.</p>	<p>You Minutemen say the Regulars fired first, the Regulars say you fired first. Then who is right? I overheard the blacksmith Daniel Harrington say that those guns are so shoddy that they may have gone off by accident!</p>

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<p>Thomas Munroe</p>	<p>Son of Anna Smith Munroe and William Munroe</p>	<p>Are you going to help protect the town from the bad men?</p>	<p>I heard lots of gun fire from across the Common, not near Buckman Tavern, thank goodness! Mother said it was from the Redcoats.</p>
<p>William Diamond</p>	<p>Drummer for Minutemen/16 years old</p>	<p>Captain Parker ordered me to go to the Lexington Green and beat the call to arms for the Minutemen. He has some important news about the arrival of the Regulars. You can find Captain Parker at Buckman's Tavern, if you have not spoken to him already.</p>	<p>It felt like we were outnumbered 70 to 700! I think eight men were wounded, including Jonathan Harrington, Jr.! He was trying to run away, but they fired at him in the back. Although he was wounded, I saw him crawl to his house and into his wife's arms. I will keep beating my drum until the smell of gunpowder disappears.</p>
<p>William Munroe</p>	<p>Orderly Sergeant of the Minutemen; Husband of Anna Munroe</p>	<p>When Paul Revere arrived at the Hancock-Clarke House last evening, I did not recognize him! I told him the family didn't want to be disturbed by noise. He was very angry and said, "You'll have noise enough before long. The Regulars are coming." Finally Mr. Hancock came out and said "Come in, Revere; we're not afraid of you." So I finally let the famous Paul Revere inside.</p>	<p>I helped Adams, Hancock, and Revere hide in the woods near Woburn, but Paul Revere ran back here to find a trunk in Buckman Tavern. It has some important papers about the revolution that were written by the Provincial Congress. --- Those Redcoats were bloodthirsty today. Especially that Edward Mitchell. He defied his commanding officer's orders by firing shots right in the beginning!</p>
<p>William Sutherland</p>	<p>Soldier, The King's Own Regiment, 38th Foot</p>	<p>The noted Paul Revere was seen with a gun, stirring up trouble throughout the countryside. Now he's spreading false rumors. --- Why is Lexingtonian Benjamin Wellington carrying a musket *and* a bayonet? I think he is looking for a fight! You all need to surrender your weapons!</p>	<p>You cowardly rascals! It is murder to shoot at us while you are hiding. We fight out in the open, not from unseen positions. I saw some of the Lexington villains go over the hedge and fire at us. It was then, and not before, that the King's troops began to fire back.</p>

William Tidd	Lieutenant of the Minutemen; Brother-in-law of Daniel Harrington		I retreated toward Reverend Clarke's house when Captain Parker told us to disperse, but then the Regulars started to fire at us! One of the Majors on a horse started to pursue me. He called out to me "Damn you, stop, or you are a dead man!" I could not escape him, so I jumped over a fence, made a stand, and discharged my gun at the horrid officer. The Regulars are lying about who started this skirmish—they fired the first shot, not us.
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GAME SCRIPT (ANN HULTON/LOYALIST)			
NPC name	Description	Ann 1	Ann 2
Abraham Diderot	African American slave		I wouldn't trust those other slaves. I saw a bunch of the slaves behind Buckman Tavern; maybe they wanted to get revenge on their masters by firing at the Minutemen!
Anna Smith Munroe	Wife of Sergeant William Munroe; 33 years old; hiding with her three small children		
Benjamin Wellington	Minuteman soldier; the first man to carry milk from Boston all the way back to Lexington.	I was walking to Concord, captured by Regular soldiers, and brought here to the Meetinghouse. They spoke to me as if I was a child! I wouldn't trust them, if I were you.	I was only 30 yards away from the Regular soldiers, and I clearly saw one of the officers pointing at us, as if telling his men to fire. It seemed like he fired the first shot, too.
Captain John Parker	Captain of the Minutemen; Farmer in Lexington	First Daniel Murray told me that there are no Regulars coming. Then I heard from others that there are between twelve and fifteen hundred Regulars coming! I do not know who to believe. Perhaps I shall confer with Reverend Clarke across the Common. He will know what to do.	See what the Regulars have done? They shot me in the leg! I ordered the Minutemen to disperse and not to fire. But the Regulars rushed furiously, fired upon us, and killed ten of our party, without receiving any provocation from us.
Daniel Harrington	Blacksmith of Lexington/Clerk of the Minutemen Company/Son-in-law of Ensign Robert Munroe/Brother-in-law of William Tidd		Jonathan Harrington is dying in his wife's arms.

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Daniel Murray	New Englander	I have been secretly helping Lieutenant Adair, who is over by the hill behind the Munroe house. We captured some of the men who were spreading an alarm across the countryside! Ann, many people hate us for our loyalist sympathies, but I believe that we should protect the King's name.	Ann, don't tell anyone, but I am spreading rumors that the first shot came from one of those Minuteman scoundrels standing behind Buckman Tavern. But the truth is that I think I heard more than one weapon go off at first. Maybe two shots fired at once.
Dorothy (Dolly) Quincy	Fiancée of John Hancock	Hello, Ann! I saw your brother in Boston last week. I have been staying with the Reverend's family here in Lexington because my fiancée thought it would be safer here than in Boston-- but I think he may be wrong! I overheard one of the men at the Reverend's house saying he wants a fight to begin here!	Oh, Ann! Men are so silly! Amid all this frenzy, my fiancée, Mr. Hancock, sent a messenger to tell me to bring over the salmon. How can he think about fish at a time like this? Mr. Hancock wants me to join him in hiding, but I am not under *his* authority, yet!
Dr. Fiske	Lexington doctor; Father of Ruth Fiske Harrington		Is this what you loyalists wanted? Bloodshed and tears?! Have you seen Jonathan Harrington?
Edward Mitchell	Major of the 5th Foot of the King's Troops	Hello, Miss. Look how strong I am! Last night, I caught those scoundrels Paul Revere, Elijah Sanderson, and Solomon Brown with my bare hands!--How can you live here? This town is filled with a mob of angry peasants! We've been intercepting messengers from Lexington all night. But don't worry, we will protect you. There are hundreds of the King's troops arriving soon.	Don't be silly, woman. Don't believe the Minutemen. Those Minutemen fools think *I* fired the first shot? I was busy helping William Sutherland catch his crazy horse. Are you going to believe those traitors? Those Lexington men had so much drink in them, they likely fired the first shot and didn't even know who they were firing at! We saw them staggering out of Buckman Tavern all morning.

<p>Edward Thornton Gould</p>	<p>Regular Lieutenant for the King's Troops; a young man</p>	<p>Ma'am, this is not the place for a woman. Under the order of General Gage, we have come to seize secret military supplies. Have you heard where the colonists are hiding it? I hear that it is in Concord, only a few miles away, but I am tired of walking. Colonel Smith, my commander, led us through marshes and knee-deep in water all night long.</p>	<p>There was a lot of shouting and huzzaing and I didn't know what was going on. Once the firing began, we all kept shooting until there were no more of those rebels in sight.---I do not know which party fired the first shot: the Royal infantry or the Lexington Minutemen troops. Did you see what happened? It was probably that Benjamin Wellington. He's been giving our soldiers trouble all morning. I think he knows where a secret store of guns is hidden.</p>
<p>Elijah Sanderson</p>	<p>Lexington town cabinet maker Minuteman soldier</p>	<p>Ma'am, now the Regulars are threatening our lives! A large group of Regular Officers captured Solomon Brown and myself! We were abused and questioned for hours. I even saw them capture another man, by name of Revere. You will change your allegiance after you hear about the King's plans for the colonies.</p>	<p>Did you see what happened? The Regulars were firing on the Minutemen as we were running away! I heard one of the Regular officers say, "damn them—we will have them" and then the King's troops began firing on us. Then, the Regulars did not take a pause, but reloaded again as soon as possible and *continued* to fire on us. The Lexington Minutemen did not fire a gun before the Regulars started firing at them. They are murderers!</p>
<p>Elizabeth Clarke</p>	<p>Daughter of Reverend Jonas Clarke and Lucy Clarke; 12-year-old girl</p>		

<p>Elroy Hatchett</p>	<p>Regular Lieutenant, The King's Own Regiment</p>	<p>I think our whole expedition will fail. I do not approve of General Gage or Lieutenant Colonel Smith. Gage does not know how to command an army from Britain. Colonel Smith is constantly slow. We spent so much time waiting earlier today that the rebels likely heard about our plans and had time to assemble. From the beginning, this expedition has been ill-planned and ill-executed.--- Being a soldier in the King's army is so bad, I wouldn't be surprised if one of us fires a gun today, just so we can cause some chaos and escape unseen.</p>	<p>If we killed several of the Lexington militiamen, it was their fault! When we approached the Common, the rebels started to fire one or two shots at us. We had no choice but to rush them, fire back at them, and send them running.</p>
<p>Francis Smith</p>	<p>Colonel of the King's troops, leader of the expedition</p>		<p>It was not in the plan to slaughter the rebels, but we needed to disarm them. We wanted to seize their arms to keep *anyone* from fighting. I arrived here late, and I was shocked to see such a violent scene. Our soldiers were running around, aiming at homes and the tavern! I was desirous of putting a stop to further slaughter of those deluded Minutemen, so I gave orders to end the fighting.</p>
<p>Frederick MacKenzie</p>	<p>Lieutenant for the King's troops (23rd Royal Welch Fusiliers); Cool-headed, sharp-eyed</p>	<p>It seems like every man I have passed has had a short stick or a bludgeon in his hand. The tension between the colonists and the King's soldiers is growing! One blow will signal the beginning of hostilities.</p>	<p>What is a pretty lady like you doing here at a time like this?! There's too much violence here for a woman. I told John Robbins that it was a woman who fired the first shot--and I think he believed me!</p>

<p>Henry DeBerniere</p>	<p>Lexington spectator/British spy</p>	<p>Ma'am, I hear you are loyal to the King. I am an Ensign, 10th Foot, in the King's troops. General Gage sent me on a secret mission to make sketches of the countryside. I'm pretending to be a townsman and trying to find out more information about the secret store in Concord.</p>	<p>Hello, Ma'am. I am an Ensign, 10th Foot, in the King's troops. I am dressed in plainclothes so the Minutemen do not know I am working secretly for General Gage.---When the rest of the King's troops approached Lexington, there were about a hundred and fifty rebels on the Green. Major Pitcairn ordered us to disarm them, and he told the rebels to lay down their arms. Before we could advance any further, though, the rebels started to fire at us!</p>
<p>James Robertson</p>	<p>Slave for the blacksmith (Daniel Harrington)</p>	<p>Ma'am, Daniel Harrington is busy calling the roll for the Minuteman militia.</p>	<p>Pardon me, ma'am. I did not see you, there are so many people here. I thought women were hiding, not out on the battlefield! I will get out of your way after I am done assisting Mr. Harrington.</p>
<p>Jeremy Lister</p>	<p>Ensign, King's troops</p>	<p>I heard that the Lexington colonists are murdering and torturing our fellow soldiers! Four men in my company were killed and scalped, with their eyes gouged, and their noses and ears cut off. I heard someone named Revere is to blame. He sounds like a violent man.</p>	<p>Stay away from the Lexington militiamen! They're savages! I saw and heard someone firing at us from behind a hedge near Buckman Tavern. Once those cowardly rebels began firing at us, we fired back. ---Who was firing behind that hedge? It could have been those Lexington men captured by Edward Mitchell earlier today.</p>

<p>Jesse Adair</p>	<p>Lieutenant, King's troops; Hard-charging young Irish Marine</p>	<p>Daniel Murray, William Sutherland, and I have been capturing rebels all night. We weren't trying to give them trouble, we just wanted to ask them a few questions. I think their behavior is very suspicious. Be wary of Elijah Sanderson and Solomon Brown and the other men we captured. I wouldn't be surprised if they started a battle here today.---Who are these suspicious-looking rebels? Well, Elijah Sanderson, Solomon Brown, and Paul Revere are some of the worst offenders.</p>	<p>I trust that Major Pitcairn knows what happened at this skirmish. He told the rebels to lay down their arms and disperse, and then he told us not to fire. Pitcairn is a good man.</p>
<p>John Bateman</p>	<p>Regular Lieutenant of the King's Troops</p>	<p>I am in the 52nd Regiment and I am here in Lexington on the orders of General Gage.</p>	<p>Major Edward Mitchell told me that he saw that madman Solomon Brown firing at us from behind Buckman Tavern. I think Solomon Brown the same man who was giving us trouble earlier tonight when we were guarding the road to Concord.</p>
<p>John Hancock</p>	<p>Political leader</p>	<p>I'm ready to go to the Meetinghouse, take a gun, and fight alongside the rest of the Minutemen. Read the document (by the esteemed Dr. Warren) that was given to Mr. Revere, and you will agree that it is time to fight against British colonial rule.</p>	
<p>John Lowell</p>	<p>Personal Secretary of John Hancock</p>	<p>Do I seem worried? No, no, I'm not. There is nothing going on in town, Ma'am. I hear that the Regulars are not even coming.</p>	<p>There were so many muskets firing at us, I thought we surely would be killed! Mr. Revere and I were busy carrying a trunk of ... medical supplies. We are looking for the wounded Minutemen. I think there are many hurt near the Common.</p>

<p>John Pitcairn</p>	<p>Major of the King's troops</p>		<p>When we approached the rebels on the Green, I called out to my soldiers, "Don't fire, keep your ranks, and surround them." The Lexington militia did not disperse. There was a shot fired from the direction of Buckman Tavern, starting a series of scattered shots on the Common. I did not want to start a battle here, but after the shots were fired, we had no choice but to return the fire.</p>
<p>Jonas Parker</p>	<p>Oldest Minuteman soldier; Father of Jonas Jr; cousin of Captain John Parker</p>	<p>Stay away from the Common, ma'am, because there will be fightin' soon. I'm not afraid. No matter what the circumstances, I won't run from anyone. I am prepared to fight all morning if I have to!</p>	<p>....</p>
<p>Jonathan Harrington, Jr.</p>	<p>FATALLY WOUNDED; SHOT IN THE BACK; Wife is Ruth Fiske Harrington; Son-in-law of Dr. Fiske; 30 Years Old</p>	<p>Do you think the King's troops are coming? If they do, I don't think they will be hostile. They have been peacefully roaming the colonies for many months. --- My grandfather, however, is ready for a fight. He believes we need to end the British rule, but I think he has been listening to Reverend Clarke too much, if you ask me.</p>	<p>.....</p>

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<p>Lucy Bowes Clarke</p>	<p>Wife of Reverend Jonas Clarke; 39 years old</p>	<p>I know you don't agree with my husband, Jonas, but he believes in fairness and freedom for all men. Please do not turn him in to General Gage and the Regulars.</p>	<p>If you see any injured men, tell them to come here. I have been giving men onions to eat to stop their wounds from bleeding. So many of the innocent men of Lexington have been hurt or worse!-- But don't bring any of those redcoats. I heard a soldier named Edward Mitchell started this skirmish to get back at Paul Revere for alarming the countryside!</p>
<p>Lydia Mulliken</p>	<p>Young Lexington townswoman</p>	<p>Those Whigs are violent men! They want to tar and feather me because I helped some Tories (Loyalists) find a house in Concord.</p>	<p>How dare those terrible Whigs fire at the King's soldiers. Those soldiers were just here to protect us! I thought I saw a Minuteman soldier behind Buckman Tavern fire the first shot, so I ran over here to check it out.</p>
<p>Margaret Winship</p>	<p>Female townspeople</p>	<p>We women need to be strong and brave, too. Even if we cannot fight with guns, we can fight with words. I saw Daniel Murray earlier today. He is over by the schoolhouse guiding some of the King's regiments.</p>	<p>I've been seeing those Minutemen--such as Solomon Brown and Elijah Sanderson--staggering out of the Tavern, drunk, and waving their guns around! They likely fired their guns by mistake, they were so drunk.</p>
<p>Mary Asbury</p>	<p>African American slave for the Munroe house</p>	<p>Ma'am, would you like some breakfast? If you want any information, you'll have to talk to Prince Estabrook. He's the only person I will speak to.</p>	<p>Hello, ma'am. Nathan Munroe is not here. He may be at Buckman with some of the other Lexington men.</p>
<p>Molly Munroe</p>	<p>Daughter of Nathan Munroe; Niece of William Munroe</p>	<p>Yes, ma'am. I do think it is good to stay loyal to the British King George. Even my dog agrees.</p>	<p>Ms. Hulton, I'm worried about my father. I saw one of the redcoats chasing him on horseback.</p>

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<p>Nathan Munroe</p>	<p>Minuteman soldier, Lexington town member; Son of Marrett Munroe; Brother of William Munroe</p>	<p>Hello Ann, would you like some breakfast? We might as well eat while we wait to see what happens with the Regulars. I don't know whether I agree with the Whigs, but I trust Reverend Clarke, and he thinks we should fight the Regulars. He was meeting with some important visitors last night.</p>	
<p>Paul Revere</p>	<p>40 years old; Boston silversmith</p>	<p>Do not be alarmed, Ma'am. The Regulars are not after traitors like *you*! They are looking for people who care about freedom for the colonies!</p>	<p>This trunk should not interest you. You should consider the pain of the families who lost men here at the hands of the brutal Regulars.</p>
<p>Reverend Jonas Clarke</p>	<p>Pastor of Lexington's Church of Christ; Husband of Lucy Clarke; Distant relation of John Hancock; 44 years old</p>	<p>The King is restricting our liberties. Even if Lexingtonians are not affected, it can still set a precedent to deprive us of future freedoms. Now the Coercive Acts have closed the port of Boston, and allowed soldiers to be quartered on us without our permission, among other evils!</p>	<p>Will you still pledge your allegiance to the King? Where courage, valour or fortitude has reason for its basis, it allows men to face the greatest dangers, to stand the severest shocks, to meet undaunted and serene the charge of the most formidable enemy and all the horrors of war. Now is the time to face the enemy.</p>
<p>Ruth Fiske Harrington</p>	<p>Wife of Jonathan Harrington, Jr./Daughter of Dr. Fiske</p>		<p>Do you see what the Regulars have done to my husband, Jonathan? He was shot in the back by the Regulars and he crawled all the way to our house to be in my arms!</p>

<p>Samuel Adams</p>	<p>Political leader</p>	<p>Ms. Hulton, I know you think that I am a rabble rouser, but I am just a humble cobbler. You, on the other hand, are a traitor!---Between you and me, I heard that General Gage ordered troops across the Charles River. The colonists are afraid he is going to destroy this town on the way to Concord. We must oppose their march to the last extremity. Their plans encroach on our civil liberties.</p>	
<p>Solomon Brown</p>	<p>Minuteman soldier; 18 years old</p>	<p>The Regulars took me, Mr. Elijah Sanderson, and Mr. Paul Revere as prisoners! They seized our horses and swore that if we took another step, we would be dead. They asked as many questions as a man could. Now they are coming to Lexington to take away the rest of our freedoms.</p>	<p>Look what the Regulars have done! They fired two musket balls at me. One hit my coat, the other hit the wall behind the Tavern. Yes, I fired back, but only after they fired first. It was that terrible Major Mitchell who began firing at us.</p>
<p>Sylvanus Wood</p>	<p>Minuteman soldier from Woburn</p>	<p>Did you hear the Lexington belfry ring? It was so loud that I heard it in Woburn. I ran all the way to Lexington because I was afraid something was wrong. Now there are some suspicious men standing there.</p>	<p>There was not a gun fired by any of Captain Parker's company. I was situated so close that I would have known who fired! It was a Regular officer on a crazy horse who fired first. Captain Parker then ordered us to disperse, and the Minutemen began running and leaping over walls and hiding.</p>
<p>Thomas Fessenden</p>	<p>Lexington spectator/townsperson</p>	<p>Do you think the Regulars are storming Lexington? I don't know if I agree with Captain John Parker and the rest of the Minutemen. They are all at Buckman Tavern, drinking and getting ready for a fight! It's so noisy in there. Do they even know what they are fighting for?</p>	<p>All that commotion was likely started by one of those guns going off by mistake--maybe by someone who does not know how to use it properly! I thought I heard a misfire behind Buckman Tavern. Once the firing began, I ran off the Common as fast as I could!</p>

<p>Thomas Munroe</p>	<p>Son of Anna Smith Munroe and William Munroe</p>	<p>Mother does not want to speak to you, but she said we should be polite.</p>	<p>My mother said that you are a traitor. What does that mean?</p>
<p>William Diamond</p>	<p>Drummer for Minutemen/16 years old</p>	<p>Ma'am, I think you should stay away from the Lexington Common. I hear the Regular troops might be arriving soon.</p>	<p>I mean no offense, ma'am, but how can you still pledge allegiance to King George III? His soldiers started this bloody battle and shot the men from our town! I hope my drums can drown out all the pain and suffering I see before me.</p>
<p>William Munroe</p>	<p>Orderly Sergeant of the Minutemen; Husband of Anna Munroe</p>		<p>Ann, did you see Anna Munroe? It's sad that you don't speak to her anymore. Your loyalties have divided you! If you want to see her, she is hiding with the children behind Buckman at the stables. Perhaps if you see how scared my family is, you will consider breaking your allegiance to King George.</p>
<p>William Sutherland</p>	<p>Soldier, The King's Own Regiment, 38th Foot</p>	<p>The noted Paul Revere seems very suspicious. Major Mitchell, who is over by the horse shed, saw Revere riding with a gun and stirring up trouble. Mitchell tried to calm him, but Revere made lots of noise and avoided his questions. Now Revere is spreading false rumors! That Lexingtonian Benjamin Wellington also appears to be a liar.</p>	<p>Sorry, ma'am, I do not know who fired the first shot of the skirmish, but I'm sure it was one of those Lexington rascals. Major Pitcairn said to us, "Soldiers, don't fire, keep your ranks, and surround them." But I saw some of the Lexington villains go over the hedge and fire at us. It was then, and not before, that the King's troops began to fire back. Did I shoot? No, my horse took off and I was busy chasing after it.</p>

William Tidd	Lieutenant of the Minutemen; Brother-in-law of Daniel Harrington		I no longer pledge allegiance to King George and his hostile troops. The Regulars began firing at us while we were dispersing! One of the officers, I think it was one of the majors, started to pursue me. He cried out to me, "Damn you, stop, or you are a dead man!" I could not escape him, so I jumped over a fence, made a stand, and discharged my gun at that horrid officer.
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GAME SCRIPT (PHILIP HOWE/BRITISH (REGULAR) SOLDIER)			
NPC name	Description	Philip 1	Philip 2
Abraham Diderot	African American slave	One of the Minutemen is a slave, like me. I do not understand why he would support his masters! I would rather fight against them.	I wouldn't trust those other slaves. I saw a bunch of the slaves behind Buckman Tavern; maybe they wanted to get revenge on their masters by firing at the Minutemen!
Anna Smith Munroe	Wife of Sergeant William Munroe; 33 years old; hiding with her three small children	Pay no mind to us. We are just lost on our way to visiting my aunt.	Please do not hurt my children! Your men on horseback are terrorizing my family. Look at how my children are shivering!
Benjamin Wellington	Minuteman soldier; the first man to carry milk from Boston all the way back to Lexington.	Sir, I have removed my musket and my bayonet. Can I please leave now? I am tired of being a prisoner and I want to go home! The other Regular soldiers are not letting me leave.	I thought I saw one of your officers shout at us and fire the first shot. I was only 30 yards away, but there was so much chaos that I can't be sure. It seemed like the officer was pointing at us, and then fired.
Captain John Parker	Captain of the Minutemen; Farmer in Lexington	I am too busy to speak to you. I think there are some animals in the horse shed who are more suitable for conversation.	Look what you and your men have done! You fired upon and killed ten of our men, without receiving any provocation from us.
Daniel Harrington	Blacksmith of Lexington/Clerk of the Minutemen Company/Son-in-law of Ensign Robert Munroe/Brother-in-law of William Tidd	Please leave my family alone. I have seven children and I want them to grow up without soldiers on every road of our town! King George's soldiers should not be quartered in this town without our permission.	Look what you have done! You murderers shot Jonathan Harrington. He's now dying in his wife's arms.

<p>Daniel Murray</p>	<p>New Englander</p>	<p>I have been secretly helping Lieutenant Adair, who is on the hill past the Munroe House. We captured some of the men who were spreading an alarm across the countryside! We need to work together to halt the rebel insurgence.</p>	<p>If you ask me, I don't think there was just one first shot. It sounded like there were at least two shots fired at once, and then the entire Green exploded in gunfire. But it was hard to tell with all the shouting and noise.</p>
<p>Dorothy (Dolly) Quincy</p>	<p>Fiancée of John Hancock</p>	<p>Leave this town! There is no one *here* who will speak to you! I do not care if you are part of the King's regiment.</p>	<p>Look at all the men here who are wounded. Your fellow soldiers did this! I heard a few of the British soldiers whispering about causing a diversion so they could escape. Maybe their diversion was firing a few shots here in Lexington!</p>
<p>Dr. Fiske</p>	<p>Lexington doctor; Father of Ruth Fiske Harrington</p>		<p>Your Edward Mitchell just stood back and let his men slaughter the innocent people of Lexington.</p>
<p>Edward Mitchell</p>	<p>Major of the 5th Foot of the King's Troops</p>	<p>Those damn rebels! The whole countryside has been alarmed already. We captured that villain Paul Revere, and he said that there are hundreds of scoundrels in Lexington ready with arms to keep us from going to Concord. We will not be opposed by a mob of angry peasants!</p>	<p>Those drunken scoundrels were firing at us before we could even see their faces. I saw them shooting us from Buckman Tavern, a drink in one hand and a gun in the other.</p>

<p>Edward Thornton Gould</p>	<p>Regular Lieutenant for the King's Troops; a young man</p>	<p>Colonel Smith told us to take form, stand still, and be quiet. We need to find out where the rebel colonists are hiding their munitions and military supplies. I heard they are hiding it in Concord, only a few miles from Lexington. Do you think the rebels will attack us today, or will we be able to pass peacefully?</p>	<p>I do not know which party fired the first shot, our infantry or the Lexington troops. Do you know? Before any firing began, our troops rushed in, shouting and huzzaing. There were sixty or seventy Lexington men on the Common. They began to disperse and then the firing started. Our troops continued to fire until we couldn't see any more of the rebels.</p>
<p>Elijah Sanderson</p>	<p>Lexington town cabinet maker Minuteman soldier</p>	<p>Why did your men detain me last evening? They threatened my life! I promise: there are no military supplies in Lexington or Concord or anywhere in the colonies.</p>	<p>Surrender, you murderers! You Regular soldiers did not even take a pause, but kept reloading and firing on us. The Lexington Minutemen did not fire a gun before you and that Major on a horse started to fire at us. What is his name?</p>
<p>Elizabeth Clarke</p>	<p>Daughter of Reverend Jonas Clarke and Lucy Clarke; 12-year-old girl</p>	<p>My Father, Reverend Clarke, told me not to speak to strangers.</p>	<p>I am not scared of you. My Father, Reverend Clarke, is a very strong man. He said the Redcoats started a war! But I think the phantom soldier fired the first shot. Have you seen the phantom?</p>

<p>Elroy Hatchett</p>	<p>Regular Lieutenant, The King's Own Regiment</p>	<p>Why were we delayed so long in Cambridge?! After wading through the marsh (where we were wet up to the knees) we were halted in a dirty road until 2 in the morning, waiting for provisions. Once the provisions came, the food was so disgusting that we threw it away.---Being a soldier in the King's army is so bad, I wouldn't be surprised if one of us fires a gun today, just so we can cause some chaos and escape unseen.</p>	<p>Those Lexington militiamen asked for it! They fired one or two shots at us, so we had no choice but to rush them and fire back.---Those Lexington militiamen asked for it! They fired one or two shots at us, so we had no choice but to rush them and fire back.</p>
<p>Francis Smith</p>	<p>Colonel of the King's troops, leader of the expedition</p>		<p>I will tell you now that the destination of this expedition is Concord. It was not in the plan to slaughter the rebels, but we needed to disarm them. We heard that there were arms in Concord, and we wanted to seize them to keep the Lexington men from starting a fight!---Despite what happened here, I have my orders from General Gage and I am determined to obey them. Thus far, it seems as though our plans have gone awry.</p>
<p>Frederick MacKenzie</p>	<p>Lieutenant for the King's troops (23rd Royal Welch Fusiliers); Cool-headed, sharp-eyed</p>	<p>No one seems to know what is going on except for our commanding officers. Every Lexingtonian I have passed has had a short stick or a bludgeon in his hand. The tension is growing between the colonists and the British Regulars! One blow will signal the beginning of hostilities.</p>	<p>I'm sure that the first shot came from the Lexington rebel who was standing behind the corner of Buckman Tavern. Our men could not even get any good shots at those drunk villains! The Lexington men were firing under cover of a stone wall, from behind a tree, or out of a house. They were acting like wild animals--not civilized soldiers like us!</p>

<p>Henry DeBerniere</p>	<p>Lexington spectator/British spy</p>	<p>I am an Ensign, 10th Foot, in the King's troops. Sir, General Gage sent me on a secret mission to dress in plainclothes, explore the roads near Concord and Lexington, and bring back sketches of the countryside. We heard that the rebels have 14 pieces of cannon, a secret a store of flour, fish, salt, and rice, and a magazine of powder and cartridges. We think it might be in Concord.</p>	<p>Hello, sir. I am an Ensign, 10th Foot, in the King's troops. I am dressed in plainclothes so the Minutemen do not know I am working secretly for General Gage.---There seemed to be hundreds of those Lexington villains running all over the Common! Major Pitcairn told us to disarm them, but they started to fire at us. It was probably that colored soldier who fired first! Let us make haste to Concord to find their secret store and keep down the rest of the rebellion!</p>
<p>James Robertson</p>	<p>Slave for the blacksmith (Daniel Harrington)</p>	<p>Sorry sir, I cannot answer any questions. I am helping Mr. Daniel Harrington with his blacksmith duties. He has had more orders than ever before. I hope he isn't making any mistakes.</p>	<p>Sorry, sir. I am not allowed to speak to you.</p>
<p>Jeremy Lister</p>	<p>Ensign, King's troops</p>	<p>I heard that the Lexington colonists are murdering and torturing our fellow soldiers! Four men in my company were killed and scalped, with their eyes gouged, and their noses and ears cut off. I heard someone named Revere is to blame.</p>	<p>The Lexington militiamen are savages! I saw and heard someone firing at us from behind a hedge near Buckman Tavern. There was so much fire on us that we had to return it and then run away. Just ask Ann Hulton! I told her who I really think it is.</p>

<p>Jesse Adair</p>	<p>Lieutenant, King's troops; Hard-charging young Irish Marine</p>	<p>Daniel Murray, William Sutherland, and I have been capturing those rebels all night. They all seem very suspicious. I think they know that we are coming to seize the secret military stores in Concord. --- Who are these suspicious-looking rebels? Oh, Elijah Sanderson, Solomon Brown, and the worst offender: Paul Revere.</p>	<p>I was deafened by the shouting of my own men during that skirmish, so I didn't hear what happened. I trust Major Pitcairn, though. If he says that the villains were shooting from behind a wall near Buckman Tavern, then I believe him. Pitcairn is a good man.</p>
<p>John Bateman</p>	<p>Regular Lieutenant of the King's Troops</p>	<p>How long have you been on duty here in the Americas? Many of the other soldiers in our regiment have deserted. I hear there is an escape route for soldiers who want to defect. ---I hate the barracks duty! Life here in the colonies is harsh for us soldiers. Maybe we should fire a few shots here in Lexington to cause a diversion so we can escape!</p>	<p>Even though there was a small gathering of Lexington militiamen on the Common, they were all madmen! Men like that rebellious Solomon Brown were firing at us from behind the Tavern. He wanted to get back at us for capturing him earlier in the night.</p>
<p>John Hancock</p>	<p>Political leader</p>	<p>Mr. Samuel Adams? I don't think he really exists. He's just a myth, like the mermaids in Boston Harbor. Me? I am just a businessman from Boston, here on one of my periodic visits, enjoying a drink at the Tavern.</p>	
<p>John Lowell</p>	<p>Personal Secretary of John Hancock</p>	<p>I heard that the drum call and belfry ringing are false alarms. I suppose that means your soldiers will not be arriving in Lexington for a fight?</p>	<p>What's inside the trunk? This trunk? Oh, it is filled with my old clothing.</p>

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<p>John Pitcairn</p>	<p>Major of the King's troops</p>		<p>I said "Soldiers, don't fire, keep your ranks, and surround them." I did not expect the Lexington men to start shooting at us. I heard a shot come from Buckman Tavern. I did not want to start a battle here.</p>
<p>Jonas Parker</p>	<p>Oldest Minuteman soldier; Father of Jonas Jr; cousin of Captain John Parker</p>	<p>No matter what the circumstances, I won't run from anyone. I am prepared to defend my town all morning if I have to!</p>	<p>....</p>
<p>Jonathan Harrington, Jr.</p>	<p>FATALLY WOUNDED; SHOT IN THE BACK; Wife is Ruth Fiske Harrington; Son-in-law of Dr. Fiske; 30 Years Old</p>	<p>The King's troops are coming in peace, right? I hope King George still cares about his colonies.</p>	<p>.....</p>
<p>Lucy Bowes Clarke</p>	<p>Wife of Reverend Jonas Clarke; 39 years old</p>	<p>Unless you are going to help me take care of my twelve children, please leave.</p>	<p>I do not have time to answer questions. I am busy giving onions to the injured Minutemen onions to stop their wounds from bleeding.</p>
<p>Lydia Mulliken</p>	<p>Young Lexington townswoman</p>	<p>Sir, get rid of those Whigs in my town. They are violent scoundrels! They told me they would tar and feather me because I have been helping the loyalists.</p>	<p>Were you wounded? I'm sorry that the terrible Whigs in my town started this skirmish! It's probably those rabble-rousers Adams and Hancock who are to blame.</p>

Margaret Winship	Female townspeople	Thank you for coming to our town to keep down the Whig rebellion! I saw some of your fellow soldiers by the Meetinghouse and the Belfry across the Common.	All that chaos was likely started by a drunk Lexington man looking for a fight! I bet it was Elijah Sanderson and Solomon Brown. I saw them coming out of Buckman Tavern earlier. Maybe they were so full of drink they fired their guns by mistake!
Mary Asbury	African American slave for the Munroe house	Hello sir. I am busy cooking breakfast for the Munroes. If you want any information, you'll have to talk to Prince Estabrook. He's the only person I will speak to.	Hello, sir. The Munroe family does not want to be bothered.
Molly Munroe	Daughter of Nathan Munroe; Niece of William Munroe	Are you going to hurt my family?	You horrible men! Why were you redcoats chasing after my father!?!?
Nathan Munroe	Minuteman soldier, Lexington town member; Son of Marrett Munroe; Brother of William Munroe	Hello! It is a typical morning in Lexington. My slave is cooking breakfast and I am reading a book. What is happening over at Buckman Tavern? Oh, I think they are holding a church meeting there.	X
Paul Revere	40 years old; Boston silversmith	Hello, sir. I know what your men are after, and I've alarmed the country all the way up! I know you are here to seize our freedoms.	Get away, woman. There is nothing of interest in this trunk I am carrying. The only thing you should be interested in is figuring out which one of your so-called leaders fired the first shot today. If you want to know what is in the trunk, ask a true patriot like John Robbins.

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<p>Reverend Jonas Clarke</p>	<p>Pastor of Lexington's Church of Christ; Husband of Lucy Clarke; Distant relation of John Hancock; 44 years old</p>	<p>The American government should originate from the people, not from *your* British parliament! Which liberties will you deprive us of next? First we had the Stamp Act, now the Coercive Acts. We will restore our freedoms and protect ourselves from further restrictions! Leave our peaceful town now.</p>	<p>Surrender to us! This is only the beginning. We will face the greatest dangers, stand the severest shocks, to meet undaunted and serene the charge of the most formidable enemy.</p>
<p>Ruth Fiske Harrington</p>	<p>Wife of Jonathan Harrington, Jr./Daughter of Dr. Fiske</p>		<p>Your men shot my husband! I saw one of your Lieutenants shoot him in the back while he was running away! Now get away from here.</p>
<p>Samuel Adams</p>	<p>Political leader</p>	<p>Who am I? Oh, I'm just a humble cobbler. You want to know the whereabouts of Mr. John Hancock? Let's see. I think he left for New York or Philadelphia or some town far, far away.</p>	
<p>Solomon Brown</p>	<p>Minuteman soldier; 18 years old</p>	<p>Begone! The men you are looking for are not in Lexington. There is nothing here for you.</p>	<p>We will get you on your way back from Concord! You should try your Major Edward Mitchell for treason. His gun and his attitude is the reason this battle began.</p>
<p>Sylvanus Wood</p>	<p>Minuteman soldier from Woburn</p>	<p>X</p>	<p>Surrender soldier! It was your officer mounted on that angry horse--he was the one who fired at us first. You should question him, not us.</p>

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Thomas Fessenden	Lexington spectator/townsperson	Lexington is just a sleepy little village. I don't know what all the fuss is about. You should go toward Buckman Tavern if you want to find out what is really going on here.	You think the Minutemen fired first? The Minutemen think you fired first. *I* think no one fired the first shot—one of those old guns just went off by itself by mistake! I thought I heard a misfire behind Buckman Tavern, and another shot on the Common at the same time.
Thomas Munroe	Son of Anna Smith Munroe and William Munroe	Who are you? Why are you holding that gun?	X
William Diamond	Drummer for Minutemen/16 years old	X	X
William Munroe	Orderly Sergeant of the Minutemen; Husband of Anna Munroe	X	I was proud to fight alongside Captain Parker against the King's troops. Your men are bloodthirsty--especially that Edward Mitchell. Surrender to us, redcoat!

<p>William Sutherland</p>	<p>Soldier, The King's Own Regiment, 38th Foot</p>	<p>I'm ready to fight those villains. Last night I captured that rebel Benjamin Wellington on his way to Concord. Then Major Mitchell captured the noted Paul Revere. Mitchell saw him riding with a gun and stirring up trouble! We all tried to calm Revere, but he made lots of noise and avoided our questions. Now he's spreading false rumors.</p>	<p>I do not know who fired the first shot of the skirmish, but I'm sure it was one of those Lexington rascals. Major Pitcairn was next to me, and I heard his voice call out, "Soldiers, don't fire, keep your ranks, and surround them." The rebels fired upon us and then I was busy chasing after my horse. It dashed away upon hearing all the shouts and shots! By the time I got my horse back, most of the Lexington men had disappeared into the woods.--- After getting my horse back, I returned to the Green and Colonel Smith asked me "Do you know where a drummer is?" I found a drummer who beat to arms and finally, after hearing the drum beats, our troops stopped firing.</p>
<p>William Tidd</p>	<p>Lieutenant of the Minutemen; Brother-in-law of Daniel Harrington</p>		<p>After this battle, I no longer pledge allegiance to *your* King George III. One of your majors pursued me by horse, and he was ready to kill me! He called out, "Damn you, stop, or you are a dead man!" Fortunately I escaped, but some of my fellow Minutemen were not so lucky.---Why did you Regulars begin firing at us without any provocation?! It was no accident, I know you Redcoats fired the first shot intentionally.</p>

Appendix XXIV: Summary of Testimonials

SUMMARY OF TESTIMONIALS FOR FIRST SHOT AT LEXINGTON					
NPC name	Loyalty	Prince 2	John 2	Ann 2	Philip 2
Abraham Diderot	Loyalist		Other slaves	Slaves as revenge toward Patriot masters; behind Buckman Tavern	Slaves as revenge toward Patriot masters; behind Buckman Tavern
Anna Smith Munroe	Patriot	She has a musket	Regulars on horses		
Benjamin Wellington	Patriot	Regular officer on a horse	Regular officer on a horse	Regular officer	Regular officer
Captain John Parker	Patriot	Regulars	Regulars	Regulars	Regulars
Daniel Harrington	Patriot	Misfire/British spy	British spy		
Daniel Murray	Loyalist/Spy for British	Adams; Minutemen fired first	Adams; Behind Buckman Tavern (Minutemen)	Two shots at the same time	Two shots at the same time; chaos
Dorothy (Dolly) Quincy	Patriot	Hancock wants to start a fight	Hancock wants to start a fight		British soldiers causing a diversion

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Dr. Fiske	Patriot	Edward Mitchell	Edward Mitchell/Colonel Smith		Edward Mitchell
Edward Mitchell	British/Regular	Drunken Minutemen	Drunken Minutemen	Drunken Minutemen/(Paul Revere/Elijah Sanderson/Solomon Brown)	Drunken Minutemen/Paul Revere a villain
Edward Thornton Gould	British/Regular	Chaos	Chaos	Benjamin Wellington	Chaos
Elijah Sanderson	Patriot	Regular officer (Major)/Edward Mitchell	Regular officer (Major) with a pistol/Edward Mitchell	Regular officer	Regular officer (Major) on a horse
Elizabeth Clarke	Patriot	Phantom soldier/Hancock and Adams want a fight			Phantom soldier
Elroy Hatchett	British/Regular	Minutemen	Minutemen	Minutemen/British soldier fires shot for diversion	Minutemen/British soldier fires shot for diversion
Francis Smith	British/Regular	Two shots at the same time			
Frederick MacKenzie	British/Regular	Slave/Minutemen behind Buckman Tavern	Lexington towns person behind Buckman Tavern (woman?)		Drunken Minutemen/behind Buckman Tavern

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Henry DeBerniere	British/Regular			Minutemen	Slave/Lexigton men
James Robertson	Patriot	Shoddy guns	Shoddy guns		Shoddy guns
Jeremy Lister	British/Regular	Minutemen	Wife of William Munroe/Behind Buckman Tavern	Behind Buckman Tavern/Minutemen captured earlier/Paul Revere	Behind Buckman Tavern (Minutemen)/Paul Revere
Jesse Adair	British/Regular	Behind Buckman Tavern	Behind Buckman Tavern	Elijah Sanderson/Solomon Brown/Paul Revere	Behind Buckman Tavern (Minutemen)/Elijah Sanderson, Solomon Brown, Paul Revere
John Bateman	Regular/British	Solomon Brown/British soldier fires shot as diversion		Solomon Brown	Solomon Brown/British soldier fires shot as diversion
John Hancock	Patriot		Wants to fight but doesn't have a gun		
John Lowell	Patriot		Hancock wants to fight		
John Pitcairn	British/Regular	Two shots at the same time	Two shots at the same time/Buckman Tavern	Buckman Tavern	Buckman Tavern

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Jonas Parker	Patriot	Shoddy guns	Shoddy guns		
Jonathan Harrington, Jr.	Patriot/Neutral	Adams/Hancock ready for a fight	Adams/Hancock ready for a fight		
Lucy Bowes Clarke	Patriot		William Sutherland/Man on a crazy horse	Edward Mitchell	
Lydia Mulliken	Loyalist	Minutemen	Minutemen/Sylvanus Wood	Behind Buckman Tavern (minutemen)	Adams/Hancock
Margaret Winship	Loyalist			Drunken Minutemen (Solomon Brown/Elijah Sanderson)	Drunken Minutemen/behind Buckman Tavern (Solomon Brown/Elijah Sanderson)
Mary Asbury	Neutral?	Regular officers/Secret spy			
Molly Munroe	Patriot				
Nathan Munroe	Patriot		Edward Gould/Major Pitcairn		

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Paul Revere	Patriot	British spy (Daniel Murray?)	Edward Mitchell/British spy (Daniel Murray)		
Reverend Jonas Clarke	Patriot				
Ruth Fiske Harrington	Patriot				Regular Lieutenant
Samuel Adams	Patriot				
Solomon Brown	Patriot	Edward Mitchell	Edward Mitchell	Edward Mitchell	Edward Mitchell
Sylvanus Wood	Patriot	Regular officer on a horse	Regular officer on a horse	Regular officer on a horse	Regular officer on a horse
Thomas Fessenden	Loyalist/Neutral	Shoddy guns	Shoddy guns	Shoddy gun/Buckman Tavern	Shoddy guns/Behind Buckman Tavern
Thomas Munroe	Neutral?	Regulars/Spy?			

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William Diamond	Patriot	Shoddy guns		Regulars	
William Munroe	Patriot		Edward Mitchell		Edward Mitchell
William Sutherland	British/Regular	Benjamin Wellington/Paul Revere	Minutemen/Paul Revere/Benjamin Wellington	Minutemen behind hedge/Paul Revere	Minutemen/Paul Revere/Benjamin Wellington
William Tidd	Patriot	Regular officer on a horse (Major)	Regular officer on a horse (Major)	Regular officer	Regular officer (on a horse)

Appendix XXV: Game Items Script

GAME ITEMS (PRINCE ESTABROOK/SLAVE/MINUTEMAN)				
Item Name	Description	Location	Prince 1	Prince 2
Lexington Common	Lexington Common or Lexington Green; the town's green. The site of the Battle of Lexington on April 19, 1775.	Center of Common		Look for the markers on the Green, so you can see where the Minutemen stood during the Battle.
Buckman Tavern	Buckman Tavern was a popular tavern in Lexington and a center for town activity. It was built around 1709.	Buckman Tavern	The rest of the Minuteman soldiers are inside Buckman Tavern. Buckman Tavern is the headquarters of the Minutemen.	Minutemen soldiers are wandering in and out of the Tavern. A musket ball from the Regulars hit one of the doors at the Tavern.
Stable	The site of the stable during April 19, 1775.	Stables	Some of the Lexington townspeople are hiding around these stables. They seem scared.	The Lexington townspeople who were hiding behind the stables seem very upset.
Meetinghouse	During April 19, 1775, the town's second Meetinghouse stood on this location on Lexington Green.	Meetinghouse	The arms for the Lexington company are stored in the Meetinghouse, but the Meetinghouse is surrounded by Regular soldiers.	Some of the Minutemen ran into the Meetinghouse to hide from the Regulars, but they found them there and shot them anyway.
New Belfry	This hill is the location where the Belfry was first built in 1761. The Belfry was moved to Lexington Common in 1768, where it rang the bell, alarming the town in 1775.	Up the hill	This Belfry is making a lot of noise this morning. There are two Regular uniforms stashed in the woods here.	The alarm is still ringing. Perhaps more Minutemen will arrive in Lexington to protect the town from the Regulars.
Old Belfry	This is the site of the Old Belfry during the Battle of Lexington. The Belfry stood on the Lexington Green and sounded the alarm on April 19, 1775. It was built in 1761 and was moved to the Common in 1768.	West of Common	Follow the sign on Massachusetts Avenue and Clarke Street to find the new location of the Old Belfry.	The belfry is surrounded by wounded Minutemen soldiers.

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Colonial Hat	A hat from one of the Lexington townspeople	Behind Buckman Tavern	This hat looks rather dirty, like someone marched over it. Perhaps it fell off when someone was fleeing.	Someone must have run off quickly to forget his hat.
Munroe House	The Munroe House. This is where Nathan Munroe and his father, Marrett Munroe, lived during April 17, 1775. It was built in 1729.	Munroe House	The people who live here have a good view of the Common. They could see the Regulars march in.	Many Minutemen ran to the Munroe house for safety when the Regulars were firing at them.

GAME ITEMS (JOHN ROBBINS/FREE/MINUTEMAN)				
Item Name	Description	Location	John 1	John 2
Lexington Common	Lexington Common or Lexington Green; the town's green. The site of the Battle of Lexington on April 19, 1775.	Center of Common		Look for the markers on the Green, so you can see where the Minutemen stood during the Battle.
Buckman Tavern	Buckman Tavern was a popular tavern in Lexington and a center for town activity. It was built around 1709.	Buckman Tavern	The rest of the Minuteman soldiers are inside Buckman Tavern. Buckman Tavern is the headquarters of the Minutemen.	Minutemen soldiers are wandering in and out of the Tavern. A musket ball from the Regulars hit one of the doors at the Tavern.
Stable	The site of the stable during April 19, 1775.	Stables	Some of the Lexington townspeople are hiding around these stables. They seemed scared.	The Lexington townspeople who were hiding behind the stables seem very upset.
Meetinghouse	During April 19, 1775, the town's second Meetinghouse stood on this location on Lexington Green.	Meetinghouse	The arms for the Lexington company are stored in the Meetinghouse, but the Meetinghouse is surrounded by Regular soldiers.	Some of the Minutemen ran into the Meetinghouse to hide from the Regulars, but they found them there and shot them anyway.
New Belfry	This hill is the location where the Belfry was first built in 1761. The Belfry was moved to Lexington Common in 1768, where it rang the bell, alarming the town in 1775.	Up the hill	This Belfry is making a lot of noise this morning. There are two Regular uniforms stashed in the woods here.	The alarm is still ringing. Perhaps more Minutemen will arrive in Lexington to protect the town from the Regulars.
Old Belfry	This is the site of the Old Belfry during the Battle of Lexington. The Belfry stood on the Lexington Green and sounded the alarm on April 19, 1775. It was built in 1761 and was moved to the Common in 1768.	West of Common	Follow the sign on Massachusetts Avenue and Clarke Street to find the new location of the Old Belfry.	The Belfry is surrounded by wounded Minutemen soldiers.

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Colonial Hat	A hat from one of the Lexington townspeople	Behind Buckman Tavern	This hat looks rather dirty, like someone marched over it. Perhaps it fell off when someone was fleeing.	Someone must have run off quickly to forget his hat.
Munroe House	The Munroe House. This is where Nathan Munroe and his father, Marrett Munroe, lived during April 17, 1775. It was built in 1729.	Munroe House	The people who live here have a very good view of the Common.	Many Minutemen ran to the Munroe house for safety when the Regulars were firing at them.

GAME ITEMS (ANN HULTON/LOYALIST)				
Item Name	Description	Location	Ann 1	Ann 2
Lexington Common	Lexington Common or Lexington Green; the town's green. The site of the Battle of Lexington on April 19, 1775.	Center of Common		
Buckman Tavern	Buckman Tavern was a popular tavern in Lexington and a center for town activity. It was built around 1709.	Buckman Tavern	The ladies have a separate parlor inside Buckman Tavern.	Many of the Minutemen are now in Buckman Tavern. If they let women into that part, maybe I could've listened to them.
Stable	The site of the stable during April 19, 1775.	Stables	There are many spectators from Lexington standing near the stable. They seem scared.	The spectators from Lexington standing near the stable appear very upset.
Meetinghouse	During April 19, 1775, the town's second Meetinghouse stood on this location on Lexington Green.	Meetinghouse	It appears that men in the Lexington company are going in and out of the Meetinghouse this morning.	Some of the cowardly Minutemen soldiers are still hiding in the Meetinghouse.
New Belfry	This hill is the location where the Belfry was first built in 1761. The Belfry was moved to Lexington Common in 1768, where it rang the bell, alarming the town in 1775.	Up the hill	This Belfry is making a lot of noise this morning.	The battle is over. There is no more danger. The Belfry should stop ringing, already.
Old Belfry	This is the site of the Old Belfry during the Battle of Lexington. The Belfry stood on the Lexington Green and sounded the alarm on April 19, 1775. It was built in 1761 and was moved to the Common in 1768.	West of Common	Isaac Stone dedicated the Belfry to the town of Lexington.	The Belfry is still ringing loudly!

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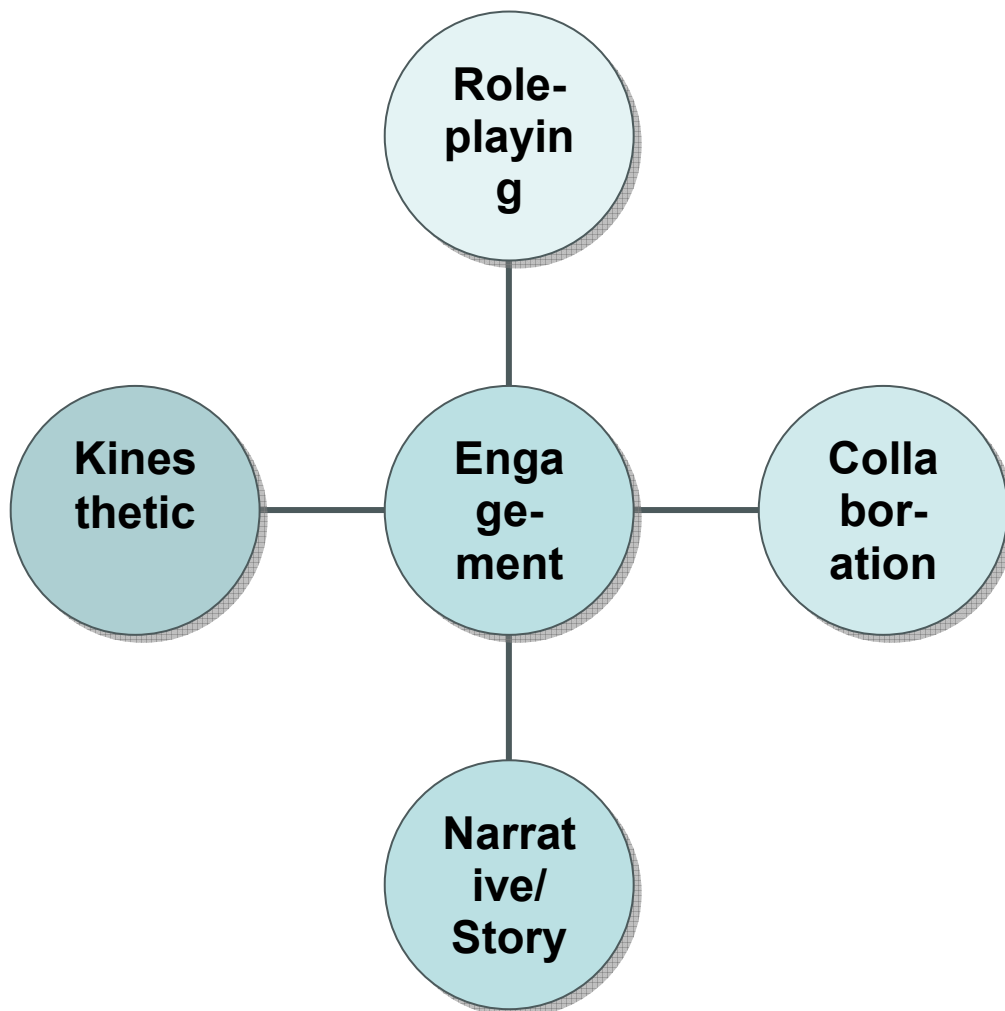
<p>Colonial Hat</p>	<p>A hat from one of the Lexington townspeople</p>	<p>Behind Buckman Tavern</p>	<p>This hat looks rather dirty. It looks like someone marched over it.</p>	<p>This hat looks rather dirty. It looks like someone marched over it.</p>
<p>Munroe House</p>	<p>The Munroe House. This is where Nathan Munroe and his father, Marrett Munroe, lived during April 17, 1775. It was built in 1729.</p>	<p>Munroe House</p>	<p>The Munroe family is very large. There are many Munroes in the town of Lexington!</p>	<p>Some of the Munroe family are standing in the windows, peering out onto the Lexington Common.</p>

GAME ITEMS (PHILIP HOWE/BRITISH (REGULAR) SOLDIER)				
Item Name	Description	Location	Philip 1	Philip 2
Lexington Common	Lexington Common or Lexington Green; the town's green. The site of the Battle of Lexington on April 19, 1775.	Center of Common		
Buckman Tavern	Buckman Tavern was a popular tavern in Lexington and a center for town activity. It was built around 1709.	Buckman Tavern	John Buckman is the proprietor of Buckman Tavern. It seems like a good place for a drink and a night's rest.	The Lexington men are not letting the Regular soldiers into Buckman Tavern, even though some of them are wounded.
Stable	The site of the stable during April 19, 1775.	Stables	There are many spectators from Lexington standing near the stable. They seemed terrified when you approach.	The spectators from Lexington standing near the stable seem very angry.
Meetinghouse	During April 19, 1775, the town's second Meetinghouse stood on this location on Lexington Green.	Meetinghouse	It appears that men in the Lexington company are going in and out of the Meetinghouse this morning.	Some of the cowardly Minutemen soldiers are still hiding in the Meetinghouse.
New Belfry	This hill is the location where the Belfry was first built in 1761. The Belfry was moved to Lexington Common in 1768, where it rang the bell, alarming the town in 1775.	Up the hill	This Belfry is making a lot of noise this morning.	The battle is over. There is no more danger. The Belfry should stop ringing, already.
Old Belfry	This is the site of the Old Belfry during the Battle of Lexington. The Belfry stood on the Lexington Green and sounded the alarm on April 19, 1775. It was built in 1761 and was moved to the Common in 1768.	West of Common	Isaac Stone dedicated the Belfry to the town of Lexington.	The Belfry is still ringing loudly!

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<p>Colonial Hat</p>	<p>A hat from one of the Lexington townspeople</p>	<p>Behind Buckman Tavern</p>	<p>Those colonists are always losing things.</p>	<p>This hat looks very worn. Those colonists do not know how to take care of their belongings.</p>
<p>Munroe House</p>	<p>The Munroe House. This is where Nathan Munroe and his father, Marrett Munroe, lived during April 17, 1775. It was built in 1729.</p>	<p>Munroe House</p>	<p>There are too many Munroe family members in the town of Lexington.</p>	<p>The Munroes ran scared into their home when the Battle began.</p>

Appendix XXVI: Schematic of Engaging Elements



Appendix XVII: Number of Roles Explanation

The reason for this is two-fold. First, my evaluations of the handheld games suggested that three complimentary roles were appropriate for a mobile game context. I thought that adding one more role for this historic context would not be too burdensome, but would allow for an appropriate spectrum of perspectives. Also, the game becomes more flexible with four roles. If there are less than eight people playing the game, they can divide into two or three roles instead. Or, some of the roles can be deactivated depending on the pedagogical goals of a particular run of the game. For example, if a teacher wanted to focus on the differences between the minuteman and British (Regular) soldier, s/he could just choose those roles as possibilities for game play.

Why not 5, 6 or infinite roles? Another role in the game would have added two more participants in the discussion. While it might not matter during Part I of the game (evidence collection period), having two more participants during the debate (Part II) could negatively affect the dynamic. Incorporating another perspective during the discussion deliberations would have made it more difficult to reach consensus, and to evaluate the data and evidence in the time constraints. I did not want to overwhelm the participants with too many possible roles, particularly during the debate period. If the participants needed to rely on more distinct perspectives to build a historical narrative, exchange information, and evaluate evidence, it may have also added more confusion. I wanted to limit the number of roles so that during the game, the participants could uncover the subtle and not-so-subtle contradictions, overlaps, and disconnects among seemingly or superficially distinct roles. This would only happen if the participant was not overwhelmed by the number of roles—they could be challenged enough with four.

Also, a controlled number of participants in the debate would increase the chances that each player verbally participates during the discussion, and that each person has a part in reaching the consensus view. As indicated by the post-game survey results, more than half of the participants felt that they made important contributions to the group. Also, logistically speaking, having a teacher or researcher watch students and coordinate their schedules to play the game is exponentially more difficult as the number of students increases. The other reason for four roles instead of five was also limited time and resources. Each role adds about 60 new interactions, since each role can interact with approximately 30 NPCs, and each NPC says something different before and after the Battle (see more about this later in the section). This meant that, for each role, I would need to write 60 testimonials and create almost as many documents. Finally, I felt that four distinct roles covered the variety of beliefs, values, and characteristics that I wanted to emphasize.

Appendix XXVIII: Human Experience Vs. Usability

The human experience approach considers affect and emotion as important to design, whereas usability analysis considered more closely functional factors (time, accuracy) of the interaction between human and computer. These functional factors are not as important in understanding collaboration, however. The human experience approach favors metrics of “engagement, interaction, and fun.” (R. L. Mandryk and K. M. Inkpen, “Physiological Indicators for the Evaluation of Co-Located Collaborative Play,” CSCW ’04, November 6-10, 2004. Also, John Carroll in *Funology: From Usability to Enjoyment*, (Boston : Kluwer Academic Publishers, 2003) argues that we need to broaden the definition of usability to incorporate fun, not just one that provides efficiency or ease of use. This implies that he sees usability as currently not encompassing fun, and that it should consider happiness and well-being, one’s identity formation, and “social capital.” It is important, argues Carroll, to consider how usability is not just about decreasing physical and emotional stressors, but can make people feel more connected to their own beliefs and to a community. In other words, we need to design something that allows people to not only feel happy from merely using a technology, but allows an individual to understand themselves better, to help define their social roles and personal values, to increase their self-esteem, to feel socially connected, and to feel encouraged in their ambitions. All of these are interrelated to an individual’s overall emotional and physical health, and one’s ability to learn or perform. All of these are also related to a collective health—it benefits everyone in the community. Thus, we need to consider how an experience can address peoples’ and communities’ goals, values, ambitions, and roles. In the “*Funology, Interactions: New Visions of Human-Computer Interaction*,” Don Norman talks about how it is important in design to not just consider materials, marketing, and business issues, but to consider fun, pleasure, and emotion. He describes three different components of emotional design as being behavioral, visceral, and reflective. The latter two seem to comprise the “desirability” of an experience or design. Norman’s visceral element seems to imply that to design something desirable, we need to consider what is aesthetically appealing—in terms of colors, balance, space, and symmetry. The reflective component suggests the importance of making an experience intersect or diverge with cultural and personal values. Gaver, et al., in “*Cultural Probes and the Value of Uncertainty*,” in “*Funology, Interactions: New Visions of Human-Computer Interaction*,” suggest that designers need to take a different approach to fun than to usability. To design for pleasure, we need to look at it from within, with high consideration to understanding emotions and engagement. They argue that we should use qualitative, rich, subjective assessments to evaluate how to design something desirable. In a way, it’s like the “participant-observer” method in ethnography, where you would conduct a “thick description” based on a probe of someone’s culture and beliefs to see what they would desire. Thus, to design something desirable, we need to be aware of what makes them tick, what motivates them, and what they value culturally and individually.

Appendix XXIX: Chart of Design Elements for AR Games

Design Elements for Collaborative AR Educational Games	
Interpersonal Elements	Multiple, diverse, and continuous interactions with people are encouraged and enabled
	Participants teach and learn from each other (and constantly switch roles as teachers or learners)
	Participants must rely on others for information or action. Participants have varying roles, responsibilities, knowledge, and/or abilities (but each participant should be equally valuable)
	Participants are encouraged to share and express personal opinions or hypotheses (supportive environment for all ideas and questions; freedom to express critiques and opinions to the group)
	Active, back-and-forth dialogue from multiple people, not just one person
	Personally meaningful topics or activities (either through prescribed roles or previous experience)
	Multiple handhelds; each contain only pieces of the puzzle (so participants are never isolated or unnecessary)
Reflective Elements	Appropriate length of time to reflect on the content and learning (independently and interpersonally)
	Encouragement not only to reflect on the mini-problems, but the larger social processes (and, also, the game as a process)
Realistic Elements	Perceived consequences (fear of an outcome or losing)
	Sense of responsibility and ownership
	Experiential, hands-on, realistic simulations; information that matches the physical world
	Periods of physical activity and movement within actual locations, with tangible objects and/or with other people
	Use of real factors, like distance or time
Structural Elements	Clear, established, and shared set of objectives or goals
	Perceived, and appropriate level of collective competition
	Shared world
	Shared constraints, like time running out or lack of knowledge
Story Elements	Humor and humorous situations (ability to share jokes or laughter)
	Shared, compelling story and characters
Cognitive and/or Problem-Solving Elements	Rising, appropriate, and varying levels of challenge
	Discovery of novel information at an appropriate pace
	Rewards or incentives from solving smaller problems

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	Ability to test out mini-hypotheses (and ability to fail and try again if the first ones do not succeed)
	Complex, shared problems that require multiple participants to solve them. (These problems should be able to subdivide into smaller mini-problems, and require mini-hypotheses)