A Qualitative Study on the Use of Computer Gaming Teaching Methods in a High School Social Studies Curriculum

by

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ABSTRACT

Using computer gaming as a vehicle for instruction has the potential for profound impacts on student learning, including increased motivation, the ability to experiment with authentic learning scenarios that cannot be replicated with traditional teaching methods, and to allow students to collaborate in novel ways. Unfortunately, teachers have been apprehensive to tap into computer gaming as a teaching method because of the uncertainty involved in their ability to effectively utilize gaming in an academic setting.

The purpose of this study is to use a teacher-designed history computer simulation called *Revolution: Boston* to demonstrate the ways in which teachers can incorporate computer games into a high school social studies curriculum. Students will participate in a week-long study that will survey their backgrounds in computer gaming, evaluate how they interact with the gaming environment, and how they connect the game to the learning process.

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Chapter I: Introduction

In American education today, the potential for the educational use of computer simulations and gaming has been woefully underutilized. College graduates in this decade have spent upwards of 10,000 hours of their lives playing video games, about twice as many hours spent reading books (Prensky, 2001). In addition, the Kaiser Family Foundation (2002) found that every day nearly a third of American children ages 2 to 18 play video games for an average of about an hour of gameplay per session. In an ideal world, educators should be able to tap into this medium to engender successes in the classroom in terms of critical thinking, problem-solving and creativity. Computer simulations and gaming need not replace traditional methods of teaching; instead it should supplement it, enriching the varied techniques in which today's educator reaches and inspires students and their learning into the 21st century.

Unfortunately, Prensky (2007) estimated less than one percent of the nation's 2.2 million teachers use computer simulations and gaming in their instruction. One stumbling block to adding these methods into the curriculum lies with educators' lack of computer knowledge, real or perceived. Educators require the capacity to both recognize pertinent gaming software and use it effectively to make a connection with the curriculum, offering a smooth transition between traditional and technology-driven materials (Facer, 2003). Reasonable trepidation on the part of the educator to join the ever-growing and often-intimidating technology-savvy world of his or her students can erect a barrier to progress (Simpson & Steinkuehler, 2007). Understandably, many educators may chose to remain in the comfortable world of teaching the way they have been taught, unaware of the

greater impact on their students they may have achieved had they attempted a few novel, although not difficult, computer gaming approaches.

The addition of gaming into the typical classroom could have multiple beneficial results for student learning. Computer games capture attention in ways the traditional classroom cannot; they increase and maintain motivation in learners, especially those who may not have engaged in other methods of instructional delivery (Habgood, 2007). Simulation games allow students to take risks in a safe and static learning environment that promotes small failures as a means to greater successes (Royle & Clarke, 2003). Likewise, these simulations can immerse students into situations that would be too complex, expensive, or dangerous to enact in the classroom (McCaskill, 2005). Consider a computer simulation concerning neurosurgery to inspire soon-to-be doctors or a non-violent resistance movement trainer that permits students to take the role of Martin Luther King, Jr. and other civil rights leaders- both simulations would likely be much too detailed and dangerous for students to experience in real life, but safe and motivating in a virtual environment (Purdy, 2007).

Given the experiences of American youth, 21st century approaches to teaching and learning will likely include some form of computer gaming. Educational research should evaluate the benefits and limitations of such gaming, as well as address the barrier between traditional educators and their computer-knowledgeable students by identifying various techniques that could be used to combine these simulations and gaming into current curriculum. Such research will be necessary to demonstrate the validity of gaming to elevate its status as a worthwhile educational tool in the eyes of teachers, parents, and school administrators.

Statement of the Problem

A problem in education today is teachers rarely use computer gaming or simulations in the planning of their curriculums or within their everyday lesson plans. Ideally, educational research and teacher education should demonstrate and model how computer gaming can be incorporated as a learning tool for modern-day classrooms. Without such knowledge, today's educator has had little training, confidence, or interest in pursuing this method, missing an opportunity to take advantage of a medium their students know well. The consequence of this inaction stunts the growth of both teacher and students' ability to develop much needed 21st century skills and handcuffs the educator's teaching repertoire to the traditional instructional methods. Links between these games and educators must be solidified before any significant change can occur. Research must provide how students learn using games, how students connect to the content through gaming, and how a teacher can successfully incorporate gaming into the curriculum.

Purpose of the Study

This study aims to show how computer gaming can be employed as a profitable means of learning in education today. Since gaming is a familiar mode of knowledge delivery to youth outside of the classroom, this research intends to provide an analysis of how educators can duplicate this process within the classroom using curriculum content. This study will attempt to demonstrate a workable model of computer gaming as an educational tool in high school social studies courses from the lesson plan to assessment.

Research Questions

This research seeks to answer the following questions:

1. What pedagogical value does a computer game offer that traditional methods do not?
2. How do students learn social studies curriculum content through computer gaming?
3. How can teachers most successfully incorporate computer gaming into a social studies curriculum?

Assumptions of the Study

The main assumption of this study is that students actually wish to have computer gaming as an educational tool. Although the research of the Kaiser Family Foundation (2002) has shown youth ages 2 to 18 spent considerable time playing computer games, the majority of game players were male. Additionally, it is assumed a large segment of educators lack the knowledge, confidence, or interest in developing teaching practices that include computer gaming rather than limitations of other means such as lack of money for computers or software, lack of space for computer labs or lack of administrative or community support.

Definition of Terms

Authentic Learning. Authentic learning involves gaining knowledge within the context of real world events and practices opposed to classroom lecture and textbooks.

Avatar. An avatar is any graphical representation of a player within a virtual environment, usually taking the form of a human or human-like being.

Collaborative learning. Collaborative learning involves gaining knowledge through the experience of having worked with others in a way that promotes cooperation and group effort.

Computer game. A computer game refers to any computer-generated activity with a defined set of rules designed to challenge or provide competition for the game player.

Computer simulation. A computer simulation is any computer game whose format is intended to replicate a real life situation, procedure, or setting.

Commercial off-the-shelf (COTS) games. COTS games are ready-to-play computer games that can be purchased and readily placed into a curriculum without changes to its programming.

Educational density. Educational density refers to the proportion of the amount of learning a student achieves to the time required to learn (Federation of American Scientists, 2006).

Massively-multiplayer online games (MMOGs). Massively-multiplayer online games are computer games in which a large number of players interact within the same online, virtual environment through avatars.

Module. A module is a user-created version of a game or simulation that makes use of an original game's design tools, often offered by commercial off-the-shelf software at purchase.

Serious games. Serious games are computer games whose goals, play, and outcomes are primarily instructive rather than entertainment-based.

Virtual environment. A virtual environment is an environment whose sensory stimuli are generated by computer.

Limitations of the Study

Since computer gaming is an active endeavor rather than a passive one such as listening to lecture or educational programming via television, it is particularly adept at teaching higher-ordered thinking skills that are difficult to measure on standardized testing. Students may struggle in social studies classes that traditionally test using objective tests or on government-mandated multiple choice tests. Likewise, since computer gaming often does not create a product, evaluation of student learning may be complex and measures will likely be more subjective.

In addition, this study will be limited by school resources. The site of the study has only one computer lab and one laptop lab available. The laptop lab's computer memory capacity is inadequate for game software, so the availability and capability of the one computer lab must suffice. Any computer hardware problems could limit the ability for individual students to play games and more collaborating teams would have to be substituted.

Methodology

This study will attempt to use student backgrounds measured by survey and couple them with the data collected from classroom simulation of pre-Revolutionary Boston and its most famous history events. Students will spend one week completing these surveys and in actual gameplay. Their actions and opinions will be recorded to obtain a workable model of the incorporation of computer gaming into a social studies curriculum.

Chapter II: Literature Review

Innovative strategies infusing computer gaming with traditional instructional methods could have a tremendous positive impact on learning in social studies education today. Computer games have been shown to increase student interest and motivation (Habgood, 2007). These games also allow students to become an active participant in their own learning and foster collaborative teams (Green & Hannon, 2007). Furthermore, computer games can simulate otherwise dangerous or costly situations, allowing a learner to engage in a safe recasting of an event or scenario, often repeatedly if goals are not met (McCaskill, 2005).

Schools should attempt to tap into and use students' early experiences with computers for instruction. A teacher, then, is the crucial catalyst who demonstrates to students that computers can be a learning tool rather than a source of mere entertainment. Teachers can also help to change society's dominant view that computer games are non-educational entertainment by employing them as a learning conduit to a playful exploration of curricular content. Teachers should supply the relationship between the virtual and real worlds and allow the learner to interact within both worlds by clearly providing real-life historical, social, or political context to the games themselves (Woods, 2004). Lastly, teachers should craft the link between computer gaming and assessments that engender greater understanding of the course material.

Educational Value of Serious Gaming

Creating Student Interest and Motivation

A major difficulty with traditional teaching methods is the dearth of intrinsically-motivating material and the often uninteresting presentation of said material; students are

asked to absorb information rather than be inspired and energized by it (Wesch, 2008). Instead of learning passively by lecture and textbook, students should be active participants in their own learning, preferably using an intrinsically motivating vehicle for such learning. According to psychologists such as Csikszentmihalyi (1997), intrinsic motivation provides and reinforces *flow*, the state of deep concentration and enjoyment where a goal is pursued with seemingly little action because the actor is so vigorously involved with its pursuit. For Csikszentmihalyi, personal interest and sufficient challenge are the keys to flow. Echoing Csikszentmihalyi, social constructivist Lev Vygotsky (1934) promoted imaginative play as the basis of early childhood development. Vygotsky theorized children generated knowledge by deriving meaning from actively playing games that interested them.

Unlike most textbooks, serious gaming, such as computer simulation, can foster personal interest by gaining and maintaining attention. According to Habgood (2007), curiosity at the novelty of a newly-presented game becomes the hook which draws in the student. Once drawn in, Gee (2008) demonstrated how the student begins a personal relationship with the game. In many simulations, the student takes a role or character within the game, called an avatar, with which the student identifies and would like to see succeed. Through stages of the game itself, the student becomes committed to the character.

For instance, in the online life simulator, Second Life, game players are asked to explore a computer mock-up of everyday life as their avatar (Trgovac, 2007). They learn to live, act, and respond as that character in a virtual world. Green and Hannon (2007) have shown a player's commitment to their character develops into ownership, a sense of

having a tangible stake in the progression of the character. The student's success and failures are one in the same as their virtual alter ego on the screen.

In addition to interest, sufficient challenge is also needed for flow. The flexibility of user-selected skill levels are built into most serious games. Game creators also design serious games with a sliding scale of difficulty to have an optimal amount of challenge for a student's skills to develop (Habgood, 2007). Games are frequently broken into small segments, missions, or levels which increase in difficulty as a student masters them. Bandura (1994) stated that being successful in successive mastery experiences, that is, for the student gamers, successive levels and, possibly, ultimately the game itself, builds their self-efficacy. Self-efficacy is the belief that their own skills can influence their life events rather than being passive players buffeted by life events beyond their control. It is the student, then, who brings interest, self-motivation, and self-efficacy to the table when learning from a game, not something that an educator *teaches*.

Learning by Doing and Experimentation

As with Bandura's (1994) self-efficacy, Csikszentmihalyi's (1997) concept of flow included the idea that students will play an active role in their learning, applying their own skills and testing their own limits. Unlike sitting in a lecture, serious gaming does not allow the student to be passive; they must interact. In Vygotsky's social constructivist theory, a social context was critical for students to actively construct knowledge from their own experiences (Dahms, et al., 2007). A modern extension of this social context is the characters presented in the computer games or simulations themselves. To play, the students must interact with these computer characters and make decisions based on those interactions. Students will typically be provided feedback by the

game in the form of rewards such as in-game money or punished such as in their avatar's premature demise. Either way, students construct meaning from the game environment.

Also unlike traditional teaching methods, learning by serious game means learning by failure (Gee, 2008). In each mastery experience or level, the student will fail on a small scale several times, must recognize what incorrect actions they took, and correct those actions in order to master that level. Paradoxically, Royle and Clarke (2003) stressed from failures come successes; learning occurs by the repetition of doing. Experimentation also is promoted by failure. If small failures are routine and expected, students see experimentation as less of a risk; risks they can afford to take (Gee, 2008). Most games also employ a *save game* option where a student can save their game at a point of progress, then pursue risky or unconventional avenues within the game knowing they can always revert the game back to that original point of progress. Moreover, experimentation is fostered because, for the most part, the small failures in a serious game transpire privately (Royle & Clarke, 2003). In the instance that the game has multiple simultaneous players, failures are so routine they go unnoticed by the other players, who have likely made the same mistakes earlier in the game or will be soon to make them.

Simulating Authentic Learning Situations

Reese (2007) stressed it is critical for students to be able to access what they previously learned in regards to a new problem to provide a basis for attacking that problem. When the problems are simple and occur in real time in the classroom, teachers can employ simple and real time strategies of instruction, not unlike showing a kindergartener how to add two to two by using fingers or blocks. However, when the

problems are complex and require abstract thinking, people often attempt to form analogies from their prior learning to make sense of the new problem. Some problems are so new that students do not have the prior learning to form these analogies. Computer games have the advantage in this situation in that the teacher can construct a game environment which is, in itself, a teacher-created analogy in which students can explore and learn in a quicker, more efficient manner (Quest Atlantis Team, 2008). For example, several simulation games offer a toolset, or game editor, which allows the teacher to create more specific in-game scenarios called modules. The teacher does not have to create art, but can use pre-constructed images from the toolset to design their own game environments without needing the skills of an artist or computer programmer. The teacher, then, has complete control of the module's game environment and variables, allowing them to guide student learning in ways commercial software and standard textbooks cannot.

Another benefit for student gamers is the ability to simulate real world events or conditions in the classroom without incurring the costs of time, money, and, possibly, lives. Vygotsky (1934) stressed the essence of play at school age is one of creating a relationship between situations in thought and real situations. Computer simulation adds a visual dimension to these situations in thought, allowing the student to both analyze and rehearse the situations in detail before encountering a real world example.

One of the most prevalent areas of serious gaming involves training and depicting concepts critical to the workplace (Smith, 2007). Businesses, science, and the military are currently using these types of trainers. McCaskill (2005) reported Forterra Systems Inc has created virtual simulations for some of the most dangerous and stressful real life

situations, including terrorist attack response mockups, hazardous material spill clean ups, and emergency medical services situations. Any one of these simulations can be utilized in some form in social studies courses from police science to psychology to sociology. For some students, the games themselves may offer instruction in the operational aspects of running a small business. For instance, Trgovac (2007) pointed to the massively-multiplayer online game, *Second Life*, which has spawned markets within the game itself; making gamers into entrepreneurs, selling virtual clothing, hair and even their avatars' own skins. A boon for economics courses, students could use *Second Life* to understand the principles of supply and demand while actively raising money for school fundraisers at the same time.

Fostering Collaborative Learning and Team Building

Furthermore, these multiplayer games offer opportunity for students to collaborate in many ways. For one, Gee (2008) emphasized many massively-multiplayer games require some element of cooperation among team members to be successful. In what Gee calls *cross-functional teams*, players must recognize each others strengths and weaknesses, learn strategies to form a cohesive group, and execute plans as a single unit. These cross-functional team principles can be applied to smaller networked gaming sessions in school labs, engaging students in group problem-solving and critical thinking. Green and Hannon (2007) added that, during these team processes, students are actively instructing other students on game strategies outside the game itself. This fosters student-to-student horizontal learning as well as the vertical instruction from the educator or game. Moreover, Brainbridge (2007) noted virtual worlds have their own unique social norms students can engage in, critique, and show their own skills within the group

dynamic. Since a player's avatar, or in-game character, can be male or female and, for many games, take on any appearance, typical social biases against gender and skin color allow for new avenues of discussion in race and gender relations. For instance, white students could play African-American avatars, enter a virtual environment simulating America in the 1960s, and participate in the civil rights movement, experiencing the difficulties encountered organizing an effective active non-violence campaign for change.

Educator's Role when Instructing with Serious Games

Tapping into the Computer Play Experience of Today's Learner

One of the fundamental misconceptions of the use of serious gaming in instruction is that the games themselves are, in a sense, a *spoonful of sugar* employed to make learning more palatable. Instead, as Rodriguez (2006) pointed out, serious gaming is likely to be more effective as a routine method of instruction than a vehicle to make learning appealing because traditional play in itself is a fine teacher. From the tenderest of ages, children explore their world through play; it is self-initiated, self-paced, and subject to one's own reflections afterward (Reese, 2007). The Kaiser Family Foundation (2002) has shown 92% of today's youth ages 2 to 18 spend some of this play time engaged in computer gaming. To tap these computer-gaming play experiences, Rodriguez (2006) suggested instructional content is what is to be played. The computer game is just a familiar, neutral conduit used to facilitate the play. For example, a basketball court is also a familiar, neutral conduit used by American youth across the country to play out the skills of basketball: among them- teamwork, physical coordination, and stamina. The court's purpose is not to make these skills attractive, but to provide a venue where these

skills and their acquisition can become playful in their own right. Computer games could be employed in the same fashion.

A second misconception is that gaming must have specific elements within them that address differences in gender. Hayes (2005) found the preconceived notion that females do not enjoy certain types of games has influenced marketing and advertising in ways that socialize young women and their parents into believing gaming is *not for girls*. To amplify this effect, women tend to be denied into the higher positions at game design companies (Pham, 2008). In her investigations with females engaged in a fantasy role-playing game, *Morrorwind*, Hayes (2005) discovered overall game design, rather than its individual elements such as combat, social interaction, or certain puzzles, mattered more in terms of motivation and learning. The idea here, then, is not to concentrate on gender differences so much as to discover which games appeal to individual learning styles and select or create games that reflect both the content a teacher wants to teach and show good game design.

Educators, then, who provide the computer games as conduits of learning, provide tools with familiar and safe boundaries that learners can use to playfully explore specific instructional concepts. Not all of these games need to be serious games designed for a specific educational outcome. Sandford (2006) recommended commercial, off-the-shelf (COTS) game titles can be utilized in tandem with lesson plans assess student's game literacy to improve learning outcomes. For instance, games that simulate the raising and care of pets such as *Petz* or *Creatures* could be used to demonstrate operant conditioning principles in psychology.

Supplying the Connection of Virtual and Real Worlds

One important misreading of the use of serious gaming to simulate real world events is educators may believe these games replace the need for any actual experience. Galloway (2004) warned, while serious gaming can make for a realistic representation of reality, the games themselves are not reality. Bringsjord (2001) pointed out the limitations of a computer game's ability to simulate actual persons as a compelling dramatic agents, that is, virtual people who are robustly autonomous from the game player in a way that said virtual people could get a sense of understanding of the game player themselves. Furthermore, Squire (2002) called into question the transferability of skills learned by game to its real-life counterpart situations. For example, the sniper ability gained in a military training game gained by keyboard and mouse does not guarantee accuracy with a rifle. Likewise, no computer simulation of a 1960s lunch counter sit-in can fully replicate the stress involved in the situation for the civil rights worker who actually *did* sit-in.

These critiques show computer gaming is not a panacea when it comes to replicating authentic learning situations nor will they replace teachers in the instructive roles. However, serious gaming can still provide vital connections to the real world. Reese (2007) has shown, when used in conjunction with other teaching strategies, computer gaming supplies educationally-explorable analogies. Woods (2004) explained computer games do not need to reproduce the reality of a situation, but instead should recreate numerous potential outcomes of the simulated situation. Hence a civil rights training simulation is not necessarily forced to recreate the Birmingham campaign of 1963, rather the simulation only needs to mock up the strategic aims and non-violence

tactics used by Martin Luther King at that time and allow students to rediscover and attempt those strategies and tactics. In this way, the teacher and learners develop the insights of the problem itself and recognize every problem has several possible solutions. Despite his earlier criticism, Squire (2002) acknowledged serious games, such as the history-simulating *Civilization*, can allow teachers a vivid alternate source of learning in which students can use to create original projects, make critical comparisons of material or even evaluate the biases built-in to the game itself. Teachers can ask students to take several perspectives inside and outside of the gaming environment in order to critique the historical context, all its pertinent players, and even the game's interpretation of the events.

Alternative Assessments for Serious Games

Not only does instruction become unconventional with serious gaming, assessment avenues also change. According to Chen and Michael (2005), the teacher's role in assessment comes in three forms: completion, in-progress, and teacher evaluation. Completion assessments involve the success or failure of the game or its elements itself, objective criterions that are not unlike questions on traditional tests. In-progress assessment, however, is an added benefit of computer gaming. In an in-progress assessment, the computer game records information on the advancement of a learner in the game. A teacher may then go to the student's game for this information or, if the game is online, can use software to *mine*, or gather, data that shows a learner's progress (Rapaport, 2008). The recorded advancement of a students' avatar, or in-game representation of oneself, could also determine a student's progress by marking how many acquired skills or treasures that avatar has accumulated. The teacher evaluation

component of assessment involves combining the data mining with responses from the student themselves (Chen & Michael, 2005). At this stage, the teacher's role is as crucial as they are in the classroom. This is the teacher's opportunity to provide detailed feedback to the learner on his/her ability to synthesize all the material, virtual or otherwise, and learn through analogies (Reese, 2007).

Chapter III: Methodology

This study will examine the effects of computer gaming as a component of a social studies curriculum in terms of student motivation, attitudes toward games as teaching aides, and the game's relationship to the curriculum on the whole. This case study will involve subject surveys to determine their background in computer gaming, field observations of the subjects engaging in social studies-related gaming in an educational context, and a capstone evaluation with the subjects to discover how effectively the game was tied to the curriculum.

Selection and Description of Sample

The setting of this study will be social studies classes at River Valley High School in Spring Green, Wisconsin. River Valley High School is a typical rural Wisconsin high school with an enrollment of about 490 students. The population which will be examined is a mixed gender group of high school sophomores approximately 15-16 years of age. These students will be drawn from social studies classes whose content is associated with the serious game being investigated in the study, in this case, the year-long United States History course which is required for all sophomores for graduation. Most of these students share the same rural, small town background and have experienced traditional teaching methods in History since elementary school. In addition, most of these students have had at least a general exposure to both academic and recreational computer gaming prior to this case study. All students will been given a consent form which will detail the study, ascertain their willingness to be a subject in said study, and attain their parent's permission for their involvement.

Description of the Gaming Experience

In this study, the sample will be exposed to a serious game called *Revolution: Boston* which simulates Boston, Massachusetts and its surrounding area in 1770-1775, just prior to the American Revolutionary War. *Revolution: Boston* is a teacher-developed module created with Bioware's Aurora Neverwinter Nights Toolset, a game editor that allows the teacher to use the original art in new gaming scenarios. In conjunction with the Bioware toolset, some of the toolset items used in a similar game module designed by the University of Wisconsin-Madison will be utilized in the game's construction. *Revolution: Boston* recreates four historical events critical to the start of the American Revolution: the Boston Massacre, the Boston Tea Party, the Middlesex Powder Alarm, and the events at Lexington. Students experience these events through a game avatar, participating in the role of a soon-to-be American patriot. In addition to learning basic historical names and dates, the students will also have to engage in problem-solving scenarios which ultimately decide how deep their avatar will involve him/herself in the Revolution. Unlike massively-multiplayer online games such as *Second Life*, Revolution: Boston is a stand-alone, single player game that cannot be played via the internet.

Instrumentation

Student motivation, attitudes, and perceived connection of game to social studies curriculum will be evaluated by surveys before and after the study. Since these surveys will originate with the researcher, no measures of reliability or validity have been recorded for these instruments. A short pre-study survey (see Appendix A) will ask for the gender of each participant along with their prior computer gaming experience and attitudes toward such gaming similar to the survey on video game playing and attitudes

conducted by the Kaiser Foundation (2002). The questions will be open-ended for a more extensive response for researcher analysis. A more comprehensive post-study survey (see Appendix B) will focus on the participants' assessment of their experience with the game and their comparisons of former teaching methods with the computer gaming method using questions inspired by the work of Gee (2008). A written evaluation (see Appendix C) of each participant's learning during gameplay will also be compulsory which will require students to compare the game environment with historical images, answer critical thinking questions, and identify the significance of the various revolutionaries their avatar has met during gameplay. This evaluation is not to determine what participants know per se, but rather an evaluation of the strengths and weaknesses of the gaming environment to transfer elements of social studies learning and promote each student's ability of schema-building. This evaluation will be designed to explore the current deficits in educational gaming research as critiqued by Squire (2002) who stressed most of today's research focuses on the viability of gameplay in education rather than assessing the ways in which gameplay can be successfully incorporated into curriculum. The evaluation will also be used to determine the educational density of the curricular unit in order to document whether computer gaming methods require more time per content learned than traditional teaching methods.

Data Collection

Both the pre-study and post-study surveys will be distributed in class before and after the game-playing experience respectively. The researcher will actively record field observations of each game-playing session which will likely run approximately fifty minutes each day over a three day period. During these field observations, the researcher

will be documenting the salient aspects of the subjects' interaction with the game, historical material, and the curriculum. In addition, information will be recorded on student motivation and attitudes toward the game and the material. The writing evaluation will also be distributed in class at the beginning of the week to record participants' knowledge of the material, critical thinking involving the game and history itself, and reflections of the entire gaming experience.

Data Analysis

Both surveys will have the participant backgrounds recorded and reflective answers analyzed for recurring themes. Likewise, the evaluation will also be analyzed for recurring themes. The researcher will engage in an interpretational analysis on all the instruments and the data from the field observations. Patterns involving gaming and its links to the social studies curriculum will be the focus of this analysis.

Limitations

Given the descriptive nature of the study and the small, homogeneous sample of thirty-five participants with only eleven of them female, the ability to generalize the findings of the study is likely limited. Although, since there is a dearth of studies examining how educational gaming can be inserted effectively in curriculum as a focal point, a number of case studies in this topic can comprehensively demonstrate specific avenues for further study.

In addition, since this the subjects within the study are not part of the researcher's class load, permissions need to be sought from colleagues and possibly the school before the study begins. The game module is also specially-designed by the researcher. This fact is beneficial because the researcher has a great knowledge of both the participants and the

game. However, teacher-designed modules from commercial games can add an element of potential game disruption or failure causing the game to freeze or shut down when the teacher is a novice to game construction or the module is of great size.

The size of the module itself is also a potential barrier to its full inclusion into a traditional social studies course. For the average student, the full, four-act game experience would likely take four to six hours, or roughly a week and a half of class time. For this study, only the first two acts, which cover the Boston Massacre and the Boston Tea Party respectively, will be used. The remaining two acts will be offered to students outside the study as extra credit options.

The complexity of the module may be at issue for a number of the computers in the lab where the research will be conducted. The equipment is not new and some of the computers have older monitors whose resolution and color limitations may present some difficulties for students during play.

Chapter IV: Results

In order to determine the best approaches to the inclusion of computer gaming into a social studies curriculum, both pre-study and post-study surveys along with the written evaluation are critical measures necessary to understand how the students in the sample perceive the learning experience.

Pre-Study Survey Analysis

All students were given a pre-study survey before gameplay began that asked their gender, general computer learning background, and their attitudes about computer gaming. Most of the students reported having played computer games for entertainment purposes, but few had actually attempted serious games or simulations where the intention was to derive learning from the gameplay. Several of the students commented that their former teachers and their parents do have favorable attitudes towards using computer games to learn or have no objection to inserting gaming into school curriculum, but neither the teachers nor parents had emphasized gaming methods specifically in the past. Two of the 35 participants reported no computer gaming experience at all. There was no gender difference in respect to both computer gaming experience and attitudes toward games in learning.

Gameplay Analysis

All students participated in the three day simulation of *Revolution: Boston*. The first day included a short tutorial that introduced the game. During this tutorial, students were given the option to select a prefabricated avatar or to create an avatar themselves from scratch. All but two of the participants chose to create their own avatar which involved the selection of that avatar's appearance, voice, skills, clothing, and tools. All of

the students were successful in getting their avatar into the simulation and interacting within the game environment.

The next two days, the participants used their avatars to meet the people of revolutionary Boston who were involved in the Boston Massacre and later the Boston Tea Party. The two learning goals of the simulation were to understand the Boston Massacre through interviews of the witnesses to the event and secondly to decide to whether or not to take an active role in the Boston Tea Party. Students often compared their progress in the game with their neighboring students' progress. Through an examination of the written evaluations, most students were able to form critical opinions of both the Boston Massacre and the Tea Party using the game as support. Several students engaged in game behaviors that were immaterial to the two core missions in the simulation. For instance, many of the participants used their avatars to explore the center of Boston, although it was not necessary for the successful completion of primary learning activities. Likewise, some participants attempted to infuriate Red Coats or goad them into fights which enviably lead to the avatar's death by musket. Before attempting these types of risky in-game behaviors, students often used the strategy to save the game beforehand, thus allowing them to revert to a former stage in the game if needed. Several students expressed interest in a networked version of the simulation so that their avatars could meet within the game environment rather than the current game in which all the avatars were separated in their own versions of *Revolution: Boston.*

Post-Study Survey Analysis

In the post-study survey, the participants were generally positive about learning history through *Revolution: Boston.* The most noted positives included the ability of the

game to immerse the player into the simulation, the highly motivational nature of the game, the hands-on interactivity and customizability of the game, and the concreteness of events depicted in the game opposed to their textbooks. Some students complained that their avatars' discovery of the core learning events took time and therefore the game was not as efficient as their textbook in respect to historical content coverage. Some of the students disliked that the game did not have as much structure as traditional lecture-worksheet teaching methods. Both genders shared these positive and negative comments; there was no gender-specific point of praise or criticism. Overall, 17 of the 35 participants responded that *Revolution: Boston* taught them the most about pre-revolutionary New England. Thirteen responded that their textbooks and lectures taught them more, while five participants preferred to be taught with both methods or with projects included.

Table 1

Gender Breakdown in Teaching Method Preference

Gender	Preferring Game	Preferring Text	Preferring Both / Project	Total
Females	5	5	1	11
Males	12	8	4	24
Both	17	13	5	35

Chapter V: Discussion

One important avenue in education in the 21st century is the incorporation of quality computer gaming and simulations into school curriculums to engage growing technology-savvy student populations. This paper has explored the ways in which a teacher can include gaming and simulations into a social studies curriculum via a pre-Revolutionary War simulation called *Revolution: Boston.*

Conclusions

In terms of the student's actual interaction with using gaming and simulations in school, *Revolution: Boston* highlighted many critical aspects of the learning process. *Revolution: Boston* was successful in creating student interest and motivation. Students found themselves truly immersed in the game environment; its motivating qualities were praised more on the post-play surveys than any other comment, positive or negative. It is important to note that 33 of the 35 participants created their own avatar, thus they were personally motivated to advance their avatar's knowledge, wealth, and social standing. The student's relationship to their avatar becomes very intimate. They are pleased when their avatar has new experiences and acquire new skills or treasures. Students often audibly emote their frustration when their avatar is prevented from some goal because of a particularly difficult challenge and are noticeably angered and sad when their avatar gets hurt or dies. Teachers who opt to use simulations with avatars should link has many learning objectives as possible to the advancement of the avatars.

Revolution: Boston provided an opportunity for students to learn by doing and experimentation within a computer-generated authentic environment. Since it is economically unfeasible to create historical Boston on a life-sized scale, *Revolution:*

Boston is the only way in which a student could wander the wharfs and visit the meeting houses of old Boston. In addition, as Gee (2008) pointed out, multiple minor failures are often more instructive than successes. Students experienced several threats in Revolution: Boston including roving units of Red Coats, unfriendly rope workers, and ship owners who disagreed with rebelliousness of the Tea Party patriots. Trying and re-trying these difficult interactions using the *save* function allowed students to learn through failure without impacting the advancement of their avatar.

Revolution: Boston fostered collaborative learning in that students themselves would confer outside the gaming environment to decide on best courses of action within the game. *Revolution: Boston* can be networked to create a multiplayer game in the future. As a multiplayer game, students could confer inside the gaming environment through their avatars, deepening the authenticity of said environment.

Recommendations

There are several post-study recommendations for teachers who plan to use computer gaming and simulations in social studies curriculums. Despite thoughts to the contrary, students likely have less computer gaming and simulation experience than teachers may assume. Most students have played computer games for entertainment, but may not have any educational gaming experience at all. Traditional teaching methods are comfortable for both students and teachers, so both may be apprehensive and need encouragement to try to learn through gaming. It would benefit the teacher to carefully handpick or even design the game itself since the more personal creativity the game or simulation allows, the more motivating the game or simulation is.

When it is possible to use avatars in simulations, allow students an option to create their own school-appropriate personal avatar. Whenever possible, teachers should strive to tie the in-game advancement of the avatar to the learning objectives and the academic progress of the student who controls the avatar.

In order to facilitate learning through acceptable minor failures, teachers should choose games and simulations that contain *save* and *load* functions. Learning by experimentation entails that students will test the game or simulation in ways that do not advance the learning goals that the teacher had intended. This may necessitate more time required to meet these goals. Ultimately, computer gaming and simulations are not a be-all and end-all proposition of teaching methods. Students have different learning styles that must be addressed by a variety of teaching methods.

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Appendix A

Pre-Study Survey

***Revolution: Boston* Pre-Play Interview Questions**. This interview is designed to collect information for the understanding of how serious gaming can or cannot be used as a teaching method. Please answer all as fully and truthfully as you can.

Background-

1) Gender- M or F (Circle One)
2) Describe your experiences with computer games before this study.

Attitudes about Learning through Gaming-

1) How would you describe your feelings about learning through computer gaming?

2) How would you describe your former teachers' attitudes of educational computer gaming?

3) How would you describe your parents' attitudes of educational computer gaming?

Appendix B

Post-Play Survey

***Revolution: Boston* Post-Play Interview Questions**. This is not an evaluation of your progress in the game *Revolution: Boston*. Instead this interview is designed to collect information for the understanding of how serious gaming can or cannot be used as a teaching method. Please answer all as fully and truthfully as you can.

Gender- M or F (Circle One)
Comparing Gameplay with Previous Methods-

1) In what ways have your former social studies teachers taught you American Revolutionary War history?
    a. Use textbooks?
    b. Worksheets?
    c. Lecture?
    d. Mapping?
    e. Projects?
    f. Writing?
    g. Charts/Graphs?
    h. Computer gaming (besides our study?)
    i. Other?

2) Compare the computer game, *Revolution: Boston*, with these previous experiences. In what ways was the game superior and/or inferior to these previous teaching methods?

3) Compare the work packet for *Revolution: Boston* with these previous experiences. In what ways was this packet superior and/or inferior to these previous teaching methods?

4) In your opinion, what teaching method taught you most about the pre-Revolutionary War period between 1770-1775?

5) Would you recommend teachers use *Revolution: Boston* to teach about pre-Revolutionary Boston? Why / why not?

Assessing the Game-

1) Can you give me three to four adjectives about how it felt to attempt to learn through computer gaming?

2) Did you feel motivated to learn through the game?

3) Did you feel as motivated to answer the packet as much as the game?

4) Would you feel more motivated to learn in another way other than the game?

5) Did you experiment in the game? If so, how?

6) Did you succeed in the game? How?

7) Did you fail in the game? How?

8) Did you attempt to cheat in the game? If so, how?

9) In what ways do you believe *Revolution: Boston* accurately depicts pre-Revolutionary Boston?

10) In what ways do you believe *Revolution: Boston* inaccurately depicts pre-Revolutionary Boston?

11) What important aspects of pre-Revolutionary Boston did you learn from the game?

12) What important aspects of pre-Revolutionary Boston did the game seem to neglect?

13) If you could change something about the game what would it be and why?

14) If you were the teacher, would you teach with *Revolution: Boston*?

15) If you were the teacher, would you teach with *Revolution: Boston* and its associated packet?

Appendix C

Written Evaluation

Revolution: Boston

Before 1771- The Seeds of Strife

Play Revolution: Boston, Part I

Create or choose a character to play. Everyone will begin as a law clerk (paralegal) for prominent Boston attorney, John Adams. Familiarize yourself with the various locations of central Boston. You will stop play when you reach the courthouse on Queen's Street and talk to the people inside. Good luck.

Identifications for Part I

An Identification in History contains two parts: the definition of the identification (the who, what, when of the subject) and its significance to history (why was he/she/it important?). Give the definition and significance of all the following Identifications (the first one is given as an example).

John Adams- Prominent Boston attorney who became the first vice president and, later, second president of the United States from 1797-1801. Defended the British regulars in the Boston Massacre Trials of 1770, showing that colonist courts, despite grievances with Parliament, could be entrusted to conduct fair trials. Adams was also the strongest proponent of revolution and new government during the Constitutional Congresses between 1774-1778.

Samuel Adams-

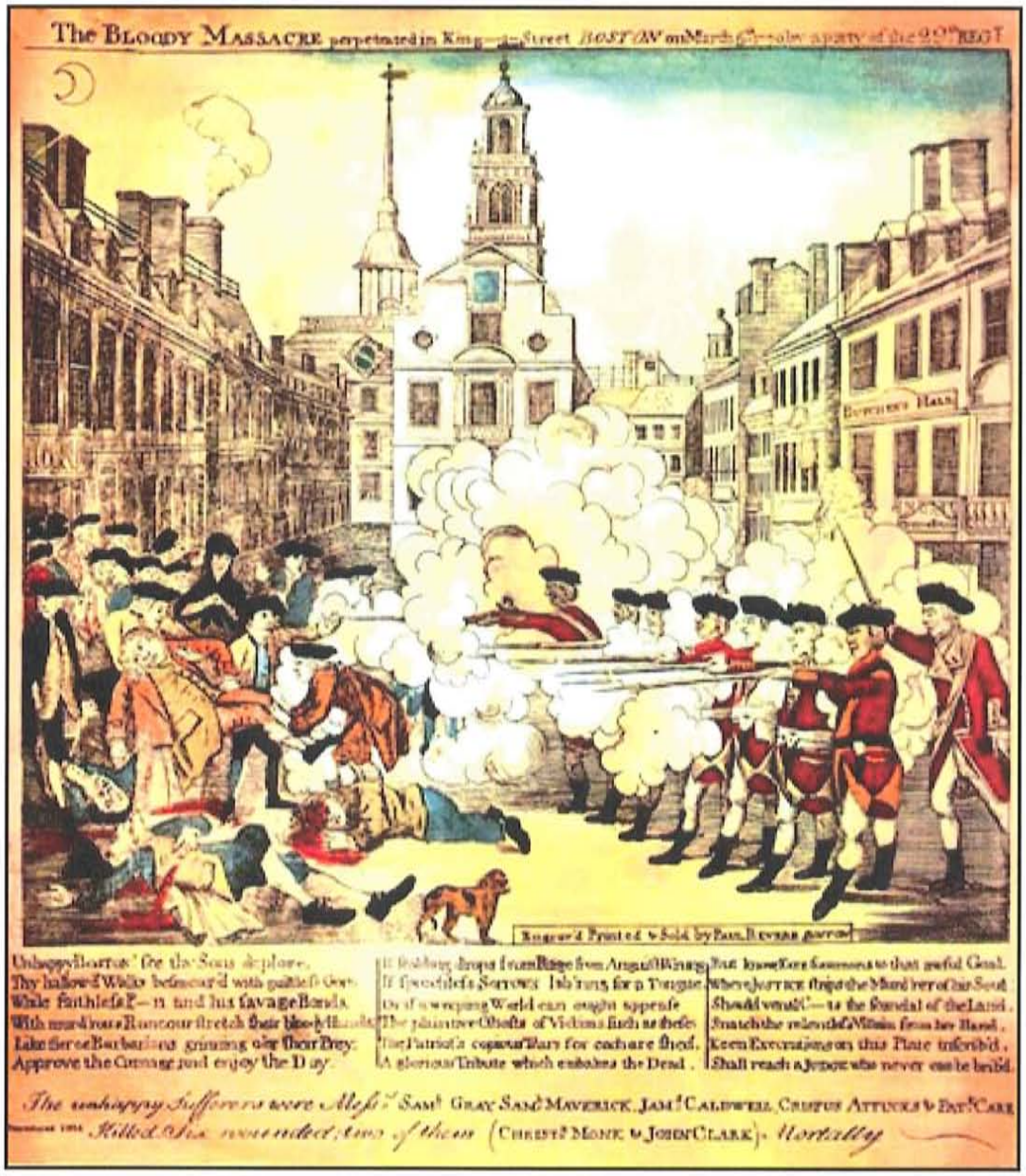
Boston Massacre-

Captain Thomas Preston-

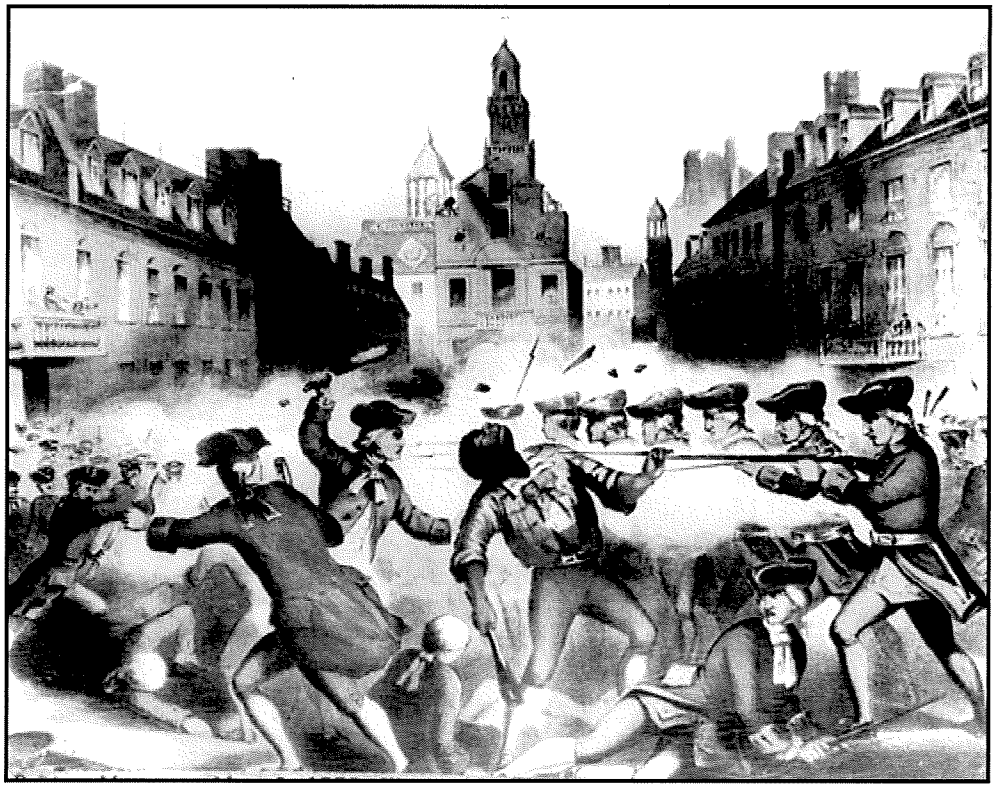
Historical synthesis- Boston Massacre

Compare the two depictions of the Boston Massacre with the one in the game Revolution: Boston. Answer the questions following with support.

Paul Revere's Gravure



Crispus Attucks Shot



1) Consider the three depictions. In what ways are they similar? In what ways do they differ?

2) From the eyewitness testimonies, what is historically inaccurate with the three depictions? If the creators of these depictions know full well what the actual history was, why do they show them with the inaccuracies (detail for each depiction)?

3) Consider how Crispus Attucks is shown in all three depictions. (If you are unsure who he is, find out.) What is the significance for each? Is Attucks heroic? Support your answer.

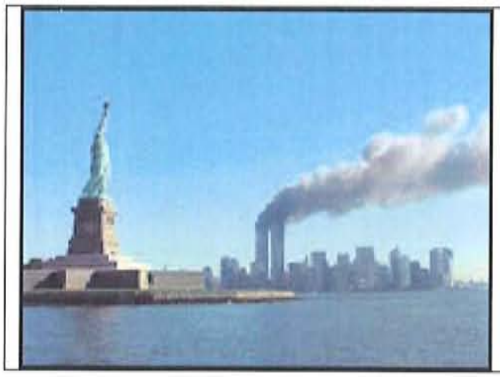
Revolution: Boston

1771-1774- In the Cause of Liberty...or Terror

Play Revolution: Boston, Part II

After you leave the Queen Street Courthouse, you will advance three years into the future. In the time between December 1770 and December 1773, you have joined Samuel Adams, pushing for liberty in the Americas and fighting against taxes from Parliament. So far, your only duties have been writing handbills and broadside propaganda, but now it will get much riskier. You will stop and save play once you have reached Mr. Johnson's Ropewalk.

Historical synthesis- Boston Tea Party



Americans in the 2000s tend not to think of terrorism as relative. For all of the current generations, America has been a superpower; superpowers tend to have the political, economic, and/or military might to leverage many of their activities in the world. However, small groups and nations often do not have these abilities. Instead they may rely on guerrilla tactics, suicide attacks, or other asymmetric warfare, like the Al-Qaeda attackers on 9/11.

Study your activities in the game Revolution: Boston during the Boston Tea Party and compare your actions with other events that Americans have considered 'terrorism' in the past. Read FEMA's definition of 'terrorism' at http://www.fema.gov/hazard/terrorism/index.shtm and compare it to the Boston Tea Party. In the space below, argue that the Boston Tea Party was or was not an act of terrorism on the part of the colonists. Justify your answer by showing that it does/does not conform to FEMA's definition or other traditionally-labeled terrorist acts.