

Outbreak: Lessons Learned from Developing a “History Game”¹

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Abstract

This paper describes the production of *Outbreak*, a game focused on the 1885 smallpox epidemic in Montreal. It is a preliminary report on the manner in which, by both theorizing about and building a game, we are responding to some of the questions that have animated the literature on computer games for history. The article begins with a survey of publications by researchers who have studied the capacity of games to support learning, and outlined how these can be used in concert with books and other media. We next provide the context to our project, which was conceived to market a film to be broadcast on television, and support a book on which the film was based – a bestselling history of a preventable tragedy that resulted in the deaths of over 3,000 Montrealers. We outline how we built from the book, creating a game that asked the player to save as many as possible from death, using tools that mimicked that which was available in the late nineteenth century. We conclude by reflecting on the lessons that we learned, and how we will apply these to our present and future projects.

Author Keywords

Gaming, simulations, serious games, history, learning

Introduction

Browse the shelves of the nearest electronics store, and one cannot help but be impressed by the popularity of history computer games. Take the example of the most popular history game franchise, *Civilization IV*: It sold over six million copies in the six months that followed its September 2005 release. Yet take some of those games home, and one will quickly realize that there is little history in them, and that which exists has been bent beyond recognition. Sid Meier, the creator of the *Civilization* franchise, has made no apologies. “We’re not trying to duplicate history,” he told the *New York Times* upon the launch of the third installment of his series. “We’re trying to provide you with the tools, the elements of history and let you see how it would work if you took over.” Bruce Shelley, the creator of *Age of Empires*, another bestselling history game, referenced filmmaker John Ford when describing how his game used the past: “it is more important to film the legend than the truth” (Kushner, 2001).

Historians need not storm the barricades just yet. Players of *Call of Duty* or *Age of Empires* know that entertainment comes first and historical truth (however defined) a distant second. At the same time, however, historians should not ignore the influence of video games – we need to be part of the conversation. Players are learning aspects of history as they play and sometimes those interpretations of the past need to be challenged. *Civilization*, for instance, has been

criticized for perpetuating American myths of benevolent capitalism and frontier expansion.

Historians can go further, if they choose, and develop history games to better represent the past. Our paper describes one such effort: the production of *Outbreak*, a game focused on the 1885 smallpox epidemic in Montreal. It is a preliminary report on the manner in which, by both theorizing about and building a game, we are responding to some of the questions that have animated the literature on computer games for history. We begin with a survey of publications by researchers who have studied the capacity of games to support learning, and we outline how these can be used in concert with books and other media. We next provide the context to our project. It was conceived to market a film intended for broadcast on television, and to support a book on which the film was based. The book is a bestselling history of a preventable tragedy that resulted in the deaths of over 3,000 Montrealers. We outline how we built a game from the book; a game that asked the player to save as many as possible from death, using tools that mimicked those which were available in the late nineteenth century. We conclude by reflecting on the lessons that we learned, and how we will apply these to our present and future projects.

Literature Review

Researchers who want to develop games can benefit from a growing body of literature. Among the leading voices in the field is James Paul Gee, who has shown that video games can be “good for your soul” when they are played thoughtfully, and when players reflect upon their game play experiences (Gee, 2005). Gee sees great promise in games’ capacity to support learning, both inside and beyond school. Games empower learners when they allow players to customize aspects of the game, such as game-play mechanics (changing the speed, for instance, by which a disease spreads from one character to another); they teach problem-solving along a cycle of expertise, becoming progressively more difficult and requiring more skill; they build understanding of how systems function (for instance, how a city in the grip of a pandemic works, or does not work); and they encourage players to identify with the roles that they take on in a game (such as a city leader trying to battle a smallpox outbreak) (Gee, 2005).

Games promote a deeper understanding of history, Tom Taylor notes, when used in concert with the books that inspired them (2003). Taylor has employed Sid Meier’s *Civilization III* along with the book that provided much of the original *Civilization* game’s content: *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*, by Yale historian Paul Kennedy. *Civilization III*, as Taylor notes, puts the player in the position of an active participant within Kennedy’s model of global power, where she is forced to analyze and then balance connected and sometimes competing political, economic, military and social systems. The player can pose hypothetical questions of the model, allowing her to reference, the 704 pages of the book without the need for a mastery of it. Kurt Squire has shown that *Civilization III* players will reference other texts as well in an attempt to more effectively play the game,. Like Taylor, he points out that rather than competing with written history, games can compliment the text-based work of historians (Squire, 2004).

The key is to let the book be the book, and focus on making a game with patterns that are easily understood by the player. As Raph Koster points out, video games are essentially “iconic

depictions of patterns in the world” (Koster, 2005, p. 34). They are puzzles made up of symbols and icons that the brain can quickly recognize and understand. A developer’s goal is not to capture reality as it is, or as it was expressed in the text, but rather as it can be interpreted in a game. That usually requires filtering out distracting details, and instead focusing the player’s attention of the elements that she needs to understand to be successful (Koster, 2005).

Naturally, the manner in which those patterns and symbols are assembled requires care. We should be wary of following conventions that have been established by commercial game developers, because these may not apply to the historical lessons that we are trying to communicate. As William Urrichio and others have pointed out, the Civilization franchise teaches benevolent capitalism and frontier expansion in part because it is a Turn-Based Strategy Game, where each turn builds on the actions taken in previous round. The player guides a tribe of people from the Stone Age to the Space Age, conquering the world as she goes. It would be hard to imagine an alternative conception of historical process being built into a Turn-Based Strategy Game – the mechanics of the game are built for “progress”. Historical contingency has been determined by the formal rule system, which has been created by the computer programming (Poblocki, 2002: 163-177; Urricchio 2005).

In this way, computer games have the capacity to persuade us of specific arguments or change our attitudes or behaviours. B.J. Fogg has shown through the power of simulation, that computer technologies can demonstrate specific cause and effect relationships and model environments or objects in a particular manner. Fogg uses than other Sid Meier’s franchise game SimCity, as an example. Sim City’s designers advocated for public transportation by programming the occupants of a SimCity to respond positively to environments in which public transportation has replaced vehicles and roads, even though these environments provide no means to dispose of garbage (Fogg 2003).

Ian Bogost has labeled the rule-based representations and interactions that make an argument “procedural rhetoric”. Video games, he shows, have unique powers of persuasion because of the manner in which they use procedural rhetoric (Bogost, 2007). Through the use of processes executed by the computer, games force the user to master concepts and rules to understand and solve problems. In the case of *Civilization III*, the player must understand and then exploit the links built by the game developers between different fields such as science, religion and economics. In this way, the player is persuaded of those links and is shown how these things work (Bogost, 2005). Bogost shows historians how to make games that represent a scholarly view of events such as the 1885 Montreal smallpox epidemic – use the game to force the user to master concepts and rules and solve problems that are rooted in our understanding of the past.

Context – Outbreak, The Year of the Plague, and Plague

*Outbreak*² was intended as a marketing tool for *The Year of the Plague / L'Année de la variole*, a documentary film to be broadcast on Discovery Channel and Radio-Canada, in 2009. Written and directed by award-winning filmmaker Jefferson Lewis, and produced by PMA Productions in Montreal, the movie blends together two strands. The historical strand provides the dramatic spine of the film, presenting the gripping and tragic story of Montreal's 1885 smallpox epidemic,

the last urban outbreak in the modern world. The contemporary strand asks the question: how would Montreal, or any major city, react today if faced with an epidemic of smallpox or some other killer disease?

The movie was inspired by, and based in part on, the national bestseller *Plague*, by historian Michael Bliss. Drawing primarily on newspaper accounts, Bliss traces the arrival of the disease, via a train conductor from Chicago, and the inept response of the city's officials in the weeks and months that followed. Exacerbating the crisis were tensions between the primarily English-speaking leaders and the French-speaking citizens of the city. When a batch of contaminated vaccine caused the death of scores of French, Catholic, lower-class children, their parents concluded that this "mistake" was in fact part of a larger conspiracy; in the weeks and months that followed they openly defied the advice of the "experts".

Further complicating matters were competing viewpoints on the efficacy of vaccination among members of the not-yet professionalized medical community. William Bessey, a young doctor who was the official supplier of the smallpox vaccine to the city, argued that despite the side effects, vaccination was the only practicable method to avoid infection. Alexander Milton Ross, a "doctor" whose training was in the field of hydrotherapy (drink only water, eat no meat, and avoid tobacco, whiskey, and masturbation) portrayed vaccination as the injection of poison into the body. Bessey may have been the better scientist, but Ross was the more successful propagandist. As a result, the city's citizens were confused about how to combat the outbreak.

Should Montrealers quarantine the sick? The city's smallpox hospital had been closed for several years, and when it was hastily reopened, it proved a deathtrap. Should they administer the vaccine? Forcibly inoculating frightened citizens resulted in riots. Should they take Alexander Ross' advice and remove the garbage and contain the open sewers that plagued the city? Cleaning the streets and alleys made life more pleasant, but did relatively little to address the problem of smallpox. While officials tried to find a solution, approximately 3,157 people died, mostly children under the age of 5 (Bliss, 1991).

This history provided the context for our game. Inspired by the example of *The Rise and Fall of the Great Powers* and the *Civilization* franchise, and building on the insights of Taylor and Squire, we sketched out plans for a multi-media environment that would encourage users to watch the film and read the book, while also providing access to further information via a Web site, and interactive experiences via games. Funding from the Bell New Media Development Fund (\$50,000) as well as Brock University, PMA Productions and the developer Kevin Kee's corporation financed the production of the first phase of *Outbreak*. Development began in the winter of 2008, just as PMA Productions started to shoot the movie.

Look and Feel

At its most basic level, the game follows many of the rules and devices employed in strategy games, a genre suited to the exploration of a variety of tactics to solve a problem (Morris, 2005). Strategy games are rule-based systems, which provide the player with a set of tools that can be used to employ a range of tactics, each of which has an impact on the system. Effective strategy games avoid "dominant strategies" (which succeed regardless of the other actions in the system) or "dominated strategies" (which never succeed). The player must develop a methodology that

employs the available tools and tactics to achieve his goal. Strategy games encourage the player to consider the “big picture,” and how his strategy will play out over a period of time. This involves planning ahead and considering how immediate actions or tactics will affect the game system later. This genre of games can be either complex or simple. As examples, *Civilization III* requires tens of hours to finish, whereas *Desktop Tower Defense* engages a player for only a few minutes.

Several online strategy games inspired the *Outbreak* development team. *Patrician II* is a trading simulation set in the Middle Ages. *September 12*, which addresses the response of Western governments to terrorism, uses a two-dimensional isometric viewpoint and cartoon colours. Both of these games served as models for the look and feel. *September 12* appealed to the development team for another reason: like the game we imagined, *September 12* uses cause and effect to convey a simple yet effective message. In addition, it has no win conditions – the player’s goal is to play as long as he can. From *Defend Your Castle* we took the ability to pick up and drop sprites around the game world through clicking and dragging. From the *McDonald’s Game*, we took Advisors who guide the player and comment on his actions. In brief, the player’s goal is to use the tools at his disposal – vaccinating citizens, quarantining them in hospital, or cleaning the streets in an attempt to slow down the epidemic.



Figure 1: Outbreak in-game screen shot

Development

The initial *Outbreak* development team was composed of a Project Manager (Kee) who was also the Researcher/Writer, Interactive Designer (John Bachynski), Graphic Designer (Andrew McNiven), and System Designer (Joe Peric). In the later stages of development, we collaborated with Cerebral Vortex Inc.³ on the Graphic Design and Web Development, and Furi Inc.⁴ on the programming. In order to reach the widest possible audience, we opted to deliver the game via Flash Player on the Web, using Flexbuilder and Actionscript. We created the art assets in Photoshop and Flash. The means by which we would build the game was arrived at quickly. The development of the concept, naturally, took time. Our process followed that of Leblanc, whose conceptual framework for game design (2006) proposes that developers determine the game's *aesthetics* (the emotional responses that occur during gameplay), then the *dynamics* (the behaviour of the game – the events that occur during the game) that will create those *aesthetics*, and finally the *mechanics* (the rules for the game, as well as the dimensions of game board) that will create the *dynamics* that elicit the *aesthetics*.

The aesthetics that we wanted to draw out were easily arrived at: the emotions of the city leaders in 1885, as described in the book (not the movie, for which production had just begun). The aesthetics included:

- i. sympathy for the victims suffering through the epidemic;
- ii. a feeling of being overwhelmed by the chaos that reigned in the city;
- iii. ii. frustration with the difficulties inherent to containing a highly contagious disease in a major urban centre.

Fun, it should be noted, was not an emotion that we aimed to elicit, a decision that would have important implications for the game's reception by its target audience.

Next, we developed the *dynamics* that would create these emotions. The player is faced with a problem – how to contain the spread of the disease. The player can respond by:

- i. forcibly vaccinating citizens with a Syringe Tool;
- ii. isolating citizens in Hospitals with a Hand Tool;
- iii. cleaning the garbage that litters the city streets with the Shovel Tool.

The options are similar to those available to city leaders in 1885. As noted above, vaccination and isolation were championed by William Bessey and the city's leaders, while cleaning was promoted by Alexander Ross and some of his friends in the press.



Figure 2: Tools

Each of these actions has an impact on the game system. Vaccination is a simple action that

takes little time and seems an obvious choice from a twenty-first century perspective. However, if the player over-immunizes or loses track of those who have already been vaccinated and attempts to inoculate them again, the citizens riot (as noted above, Montrealers were anxious about immunization, a process many did not understand, and angry at the deaths that had resulted from a batch of contaminated vaccine). Rioting results in more infections, compounding the player's problem. Another obvious choice from today's vantage point, Isolating citizens is a slightly more labour-intensive action and is effective to a point. But if the player places too many citizens in the hospital too quickly, or isolates Montrealers who are not sick (thereby exposing healthy people to infection), the citizens will again riot, and the disease will spread at a quicker pace. Finally, cleaning the streets, will result in a happy citizenry. Though it is a slightly more labour-intensive action,– the citizenry have the impression that the environment around them is “cleaner”, and so lowers the likelihood of riots. While cleaning the streets may seem an productive action, it will have no effect on the spread of the disease, because relatively few citizens become sick because of the garbage.

In sum, the player must find the optimal balance among these three actions, but in the context of a late nineteenth-century understanding of disease. Following Ralph Koster's admonition to create “iconic depictions of patterns in the world”, we attempted to build a system of symbols that the players could recognize and understand – immunize, isolate or clean. But we added a twist, because Montrealers in 1885 saw the world in ways different from us today. The conflict between the player's viewpoint and resulting actions and those of the in-game characters and their actions creates a unique dynamic.

The mechanics reinforce this tension. The citizens are represented as sprites walking the streets of Old Montreal, spreading (or being infected by) smallpox. The sprites have a finite number of states: i. Angry (the sprite turns red if the player over-vaccinates, or the city becomes overwhelmed by garbage); ii. Vaccinated; iii. Not Vaccinated; iv. Carrier (i.e. not yet visibly sick); vi. Sick; vii. Dead. We built tension into the game by introducing an additional state: Vaccinated, but Carrier – this sprite will be infectious, even though the player has inoculated it. The sprites appear “normal” in the Vaccinated, Not Vaccinated, Carrier and Vaccinated but Carrier states, but turn green when they become sick, and turn into corpses when they die. Some of the states are constant (“Dead” is, necessarily, one of these), while others are time-limited (a sprite that is a Carrier will soon become Sick).

The advisors in *Outbreak* – Alexander Milton Ross, Dr. William Bessey and Madame Chaput – both orient and disorient the player. On the one hand, they provide the player with informed insight. On the other hand, their viewpoints are contradictory. All three were taken from Bliss' *Plague*, and chosen because they represent the major divisions within 1885 Montreal. As noted above, Ross was an ardent anti-vaccinationist, while Bessey was a forceful proponent of immunization. Madame Chaput, (who is mentioned briefly in Bliss' book) stood between the two extremes. She saw the wisdom of vaccination, but disagreed with the forced separation of family members under quarantine. Chaput serves as a “voice of the people” – an informed citizen who is trying to sort out the competing claims of the city's elites.



Figure 3: Male Sprite Sheet

Listening to the advisors makes clear to the player how difficult it was to effectively respond to the epidemic. It does not help the user respond to the game system, however. More reliable advice comes from the newspaper headlines that scroll across the bottom of the screen. Inspired by the extensive use of newspaper sources in Bliss' book, these provide feedback, often in humorous tones, about the current state of the game, and more specifically, the "opinion" of the characters and sprites on screen. The player might read, for instance, that his ambitious program of vaccination is contributing to the riots he is witnessing on screen, or that his obsession with cleaning is causing some journalists to question his fitness for public office.

A slow response to the crisis will also be noted in the thermometer on the right-hand side of the screen. The mercury rises when the virus spreads, when citizens riot or they die; it falls when citizens are immunized at an appropriate pace, when they recover in Hospital and when waste is cleaned. If the mercury is low, the player knows that his actions are having the desired effect and that the epidemic is under control. If it rises, however, he knows that smallpox fever has set in and that Montreal is drawing closer to death. The game ends when the mercury reaches the top. In addition, a timer counts the number of minutes that the user is able to stave off the inevitable and thus serves as a simple indicator of success: the player's goal is to beat his previous time and the times of other players.

The introduction of the timer does much more, however. It serves as the mechanic that creates a fast-paced arcade-game style dynamic, eliciting our second aesthetic: the feeling of being overwhelmed by the chaos wrought by the epidemic. The clock forces the player to compete against time, creating a feeling of panic as the tide turns against him. This is not a game that allows for reasoned reflection – the player's strategies must be generated "on the fly".

It should be reiterated that the player's goal is not to stop the outbreak – he can only temporarily slow it down. We followed the lead of the developers of *Civilization III*, who placed the player in a model similar in nature to that articulated by Paul Kennedy in *Rise and Fall of the Great*

Powers. But where Meier and company transformed Kennedy's book of the decline of succeeding empires into a game about progress (in the process creating a genre now known as "God games"), we followed Bliss' tragic telling of the epidemic to the letter. In our game, just as in the book, the city is doomed, and the player as leader is a human being, with inherent limitations. Where Meier and company created a Turn-Based Strategy Game, in which each turn provides a moment of reflection before the user progresses toward world domination, we instead adopted a procedural rhetoric. This choice underscored the sense of panic brought about by an uncontrolled epidemic, as well as the confusion that results when the player's actions do not achieve the expected results.

The user tests revealed that we had succeeded in creating the desired emotions, such as confusion, but in some cases beyond what testers were willing to tolerate. The tests were conducted with players that fit our target audience of men, aged 18-49 (the same target audience that the Discovery Channel and Radio Canada were trying to reach with the film). A professional firm was contracted, and four sets of tests, several months apart, were lead in St. Catharines (with university students aged 18-30) and Toronto (with men aged 30-49). During each session, the testers played the game (as developed to that point), answered a questionnaire, and then expanded on their reflections in a discussion lead by the tester.

The tests uniformly showed interest in the gameplay, but a frustration with the mechanics, and especially the feedback mechanisms. As a result, we added a variety of video and audio feedback cues to inform the player of his actions and in-game events, such as colour overlays that, when moused over, revealed a sprite's state (e.g. green equals sick). In addition, each tool was given a corresponding sound effect so that the player could tell if it has been successfully used (e.g. the sound of a shovel entering dirt when the user removes garbage from the street). Sound effects also announce the change in a sprite's state: for instance, when a citizen "dies", a cough can be heard, and if citizens riot, they boo loudly. Changes in the game state are also announced via both audio and visual cues. For example, when the Outbreak meter nears the top, the sound of a heartbeat, and red flashes around the thermometer, signal that the game has reached a critical state.

Lessons Learned

Additions such as these helped better orient the player. So did the removal of distracting and unnecessary elements. As Koster points out, developers need to focus on that which is central to the game play experience and remove everything else. In an attempt to accurately reflect the historical record, in which children were the primary victims of the 1885 epidemic, we included child sprites among the "men" and "women" on the game board and programmed these to die more quickly. But these were necessarily smaller than the adult sprites and difficult to vaccinate with the syringe tool, or move with the hand tool, creating more frustration than our testers were willing to tolerate. We also developed English-speaking sprites and French-speaking sprites, and clothed them differently, so that the player could see that Montreal's French-speaking citizens were the primary victims of the 1885 outbreak. Alas, this only added to the cognitive overload, and served no gameplay function.

At the same time, the tensions that existed between English and French and the psychological toll exacted by an epidemic that took children first are central elements to the story of smallpox in Montreal. One might contend that removing these elements from the game resulted in a significant loss of understanding of the story, and we would agree. But following Taylor and Squire, we concluded that delivering a comprehensive understanding of the outbreak was impossible in ten minutes of gameplay. We intended the game, book and film to work in concert. We hope that players who want to move beyond an understanding of the challenges of controlling an epidemic in the nineteenth-century to a nuanced understanding of the events of 1885 will turn to the book or film for the details.

Sorting among the details that should be left in or out of *Outbreak* helped team members better understand the affordances and limitations of online games. Learning about games was one of Kee's central goals for the team, whose members had experience in developing aspects of games but had not been previously employed in the field. The core team consisted of two M.A. students and three undergraduates. Three of these were majors in history, one was taking a degree in Visual Arts, and the fifth was studying computer science. They had varying degrees of experience with the software that they were using, which resulted in substantial changes to assets as they learned the capabilities of the tools. Development documents such as Flow Charts and UML Diagrams were underutilized, and the Game Design Document changed substantially with each revision. The students, for their part, were necessarily concerned with classes, assignments and exams, and not always able to concentrate the required attention on the tasks at hand. In short, the development process was not up to industry standards.

Nor should it have been. As noted above, learning was one of Kee's goals for the project. But while learning is a central component of professional game development – in a quickly-changing industry, no employer wants to hire a worker who does not want to keep up with the advances in his field – the marketplace is demanding. The academy's standards are different from those of the workplace, and mixing the two is not always practical. The academy succeeds as a think-tank, a place to prototype ideas that may be later developed into products; it functions less well as a hothouse for product development. As a result, during the final stages of production, we partnered with professional developers.⁵ The quality and pace of production of *Outbreak* increased; at the same time, however, we created a new set of problems: outsourcing meant that some details got lost in translation.

How then does one provide a team of students with the opportunity to work together, test their ideas, and develop for the marketplace, in a space dedicated to production? Kee is now involved in a new venture – the “Niagara Interactive Media Generator” (or nGen) – where students and professionals work together to develop for the “real world.” Students are mentored while working in a business environment, learning as they go. Open since the spring of 2008, nGen is staffed with several members of the original development team, some of whom have gone on to establish development companies of their own. In nGen we may have found an effective model for the future.

We seem to be succeeding, in part, because we are one step closer to our “customers” and their desires. This was not the case for *Outbreak*; its production was guided first and foremost by *our desires* to express the lessons of the book. Where the developers of the *Civilization* franchise

inverted Paul Kennedy's history from a story of decline to one of progress, we held true to Bliss' account. Furthermore, our goal was not to illustrate *how to contain* a smallpox epidemic, but instead to underscore *the difficulties inherent in containing it*. To this end, we removed any winning conditions. The precedent for successful games without winning conditions is well established – a player cannot win *Tetris*, and yet it is considered to be among the best computer games ever created. But what works for *Tetris* did not work for *Outbreak*; the PC game model did not translate to our online arcade/strategy game. The conventions for these types of games seem to have been set – at least in our testers' minds – and they are broken at a developer's peril. We have since concluded that replayability may provide the bridge that allows players to cross over from the established conventions to our gameplay. To this end we are developing a robust scoring system, rendered in PHP, which will goad the player into beating his previous score, or that of other players. Further testing will determine if this strategy is effective.

This will only partially mitigate the confusion created by the game system, however. *Outbreak* will continue to disorient players for the simple reason that we designed a game to disorient players. The emotions that we hoped to elicit included a feeling of being overwhelmed by the chaos of the epidemic, and a frustration with the difficulties of containing it. Our user tests showed that our game achieved these goals. But there is a limit, understandably, to the frustration that a player will tolerate. In order to help prepare the player for the task ahead, we built a Web site that situates the game within the context of Michael Bliss' *Plague*, and PMA Productions' *The Year of the Plague / L'Année de la variole*. The player enters the game with a basic understanding of the smallpox outbreak, the central characters, the manner in which they attempted to stop the epidemic, and the player's goal: to save as many as possible. In addition, a brief tutorial orients the player within the game system.



Figure 4: Advisors

In sum, we attempt to give the player every indication that he is not, in fact, playing a game. The primary goal of *Outbreak* is not fun, but instead the simulation of the challenges inherent to containing an epidemic in 1885. And that realization has necessarily led to a shift in our target audience. It is clear that *Outbreak* cannot compete as a game played “for fun” by men, aged 18-49, in their spare time online. It can, however, function effectively within an educational context, where high school and undergraduate students – men and women – are focused on learning about epidemics past and present. In the midst of continuing discussions around the use of terms such as “game”, “serious game” and “persuasive games”, we came to the conclusion that while we had set out to build a game, in the end we had developed a simulation.



Figure 5: *Outbreak* Web site Home Page

With students as our target audience in mind, we are developing features to enhance replayability. A grading system will assess, in a humorous way, the player's performance, and as noted above, goad the player into trying to do better. We have also enriched the gameplay experience by incorporating levels, so that the player learns how to use one of the three tools in the first stage, then is provided with a second tool in a slightly more difficult stage of the outbreak, and then is given all three tools at stage 3 –

the height of the epidemic. As production of the film reaches completion, we will expand the Web site, adding footage and outtakes from the film and links to associated sites, and incorporating primary source material, such as newspaper articles and images.

Future iterations of *Outbreak* will see the player stopping contemporary epidemics with modern tools. Epidemiologists, emergency planners, doctors and nurses will provide advice in the same way as the Advisors in the present simulation. Web site additions such as a forum will enable players to discuss issues raised by the documentary and the book, and share strategies to succeed at the game. A final iteration will enable players to adjust the mechanics of the game, such as the type of disease, rate of infection, or tools available to combat it, so that *Outbreak* functions more like an agent-based simulation.⁶ In this way, we will continue to develop a simulation that underscores the challenges of containing epidemics, all the while learning more about how games and simulations can best support engagement with important issues past and present.

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Games

September 12th <http://www.newsgaming.com/newsgames.htm>

Defend Your Castle <http://www.xgenstudios.com/play/castle>

Patrician II http://www.download-free-games.com/simulation/patrician_2.htm

McDonald's Game <http://www.culture-jamming.de/politicalgames.en.html>

Third World Farmer <http://www.heavygames.com/3rdworldfarmer/showgame.asp>

¹ This research was supported by the Canada Research Chairs Program and Brock University. Funding for the development of the *Outbreak* game was provided by the Bell New Media Development Fund, Brock University, PMA Productions, and 6843212 Canada Inc.

² The prototype Web site and game can be found, as of this writing, at a temporary URL: <http://fizspot.com/outbreak/>

³ The Cerebral Vortex Web site can be found at: <http://www.cerebralvortexgames.com/>

⁴ Information about Furi Inc. can be found at <http://furi.ca/>.

⁵ Libero Ficocelli has recently advocated increased collaboration between industry and the academy. (Ficocelli 2007).

⁶ An agent-based simulation is a computer program that comprises a set of agents or autonomous entities, and which attempts to mimic the behaviour of real-world phenomena. Agents are programmed to have simple action sets, and can mimic the behaviour of humans, insects, or vehicles, depending on what is being simulated. For example, an agent-based simulation was created to examine how smallpox would spread across transportation and social networks in contemporary Portland (Barrett, 2005).