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A DIGITAL ROLE-PLAYING GAME FOR THE HISTORY OF MEDICINE
Project blog: http://poxandthecity.blogspot.com/

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Abstract

The history of medicine is the interplay of complex systems, incorporating patients, healers, communities, and disease agents. For our project, "A Digital Role-Playing Game for the History of Medicine," we built a Flash-based game prototype, *Pox and the City*, to explore these complex interrelationships and engage players in historical inquiry. *Pox and the City* is available from our project blog at http://poxandthecity.blogspot.com/, and provides approximately an hour of immersive, humanities-based game play. It is set in Edinburgh, Scotland in 1800, shortly after the introduction of Edward Jenner's vaccine for the prevention of smallpox. The player takes on the role of Dr. Adam Robertson, a young physician, eager to use the new medical technique to develop his practice. In order to successfully compete in Edinburgh's competitive medical marketplace, the player must attract patients, diagnose and treat their ailments, and prove his scientific credentials to his medical colleagues – all while dealing with a smallpox outbreak, investigating a murder and courting an eligible young lady.

The game is an innovative collaboration of humanities scholars, science educators, and game specialists at Stockton College and Rochester Institute of Technology, with concept development from specialists at Michigan State University. It draws on the resources of the College of Physicians of Philadelphia's extensive historical medical collection as well as archival material from the National Archives of Scotland and the University of Edinburgh. A round of playtesting was carried out in March-June 2013, and additional playtesting is ongoing. The enthusiastic and detailed feedback we received has confirmed our belief in the value of role-playing games for the history of medicine and public health. It has also provided us with an excellent basis for refining the concept for future game development.

Pox and the City was developed with support from a National Endowment for the Humanities Digital Humanities Level II Start-Up grant ($49,989), with additional support from Stockton College, Rochester Institute of Technology, and the College of Physicians of Philadelphia. Project activities commenced August 1, 2011 and ended July 31, 2013. The deliverables for the grant are:

1. the game prototype, *Pox and the City*
2. this white paper that presents the project's narrative, next steps, and recommendations,
3. additional project outcomes, and
4. publications and presentations.

The project outcomes show that the Office of Digital Humanities' initial investment has yielded great benefit in the successful design and completion of a working history of medicine game. It has also developed expertise necessary to promote the design of future humanities games. Finally, it has promoted institutional collaborations and collaborations across the disciplines of history, literary scholarship, and game design.

Project Participants

Stockton College
Faculty:
Lisa Rosner, History, Project Director and Co-Principal Investigator
Laura Zucconi, History, Co-Principal Investigator

Grants Office:
Beth Olsen
Jillian Cawley
Joan Joseph

Rochester Institute of Technology
Faculty:
Elizabeth Goins, Museum Studies, Project Lead
Lisa Hermsen, English, Designer, Medical mini-game
David Simkins, School of Interactive Games and Media

Students:
Graham Berger, Lead Programmer
Jonathan Dymock, Art Director
Jason Ferreira, Lead Designer
Tory Mance, Sound Design

Art and Animation:
Benjamin Acevedo
Sophie Herdzik
Evelyn Morse
Caitlyn Redden
Anita Smith
Alicia Treat

Sponsored Research Services:
Charles Bush

Michigan State University
Ethan Watrall, Anthropology, Concept Development

Advisory Board

Joseph Amoroso, St. Rose School, Belmar, NJ

Janet Golden, History, Rutgers University Camden

Russell Maulitz, School of Medicine, Drexel University

Stacey Peeples, Archives, Pennsylvania Hospital

John Pollack, Special Collections, University of Pennsylvania Library

Karie Youngdahl, History of Vaccines (http://historyofvaccines.org), College of Physicians of Philadelphia

Project Narrative

History

This project began as a series of conversations among Lisa Rosner and Laura Zucconi, at Stockton College, and Robert Hicks and Karie Youngdahl, College of Physicians of Philadelphia, about the best way to combine digital media with the rich and diverse collections of the College to energize and educate both a wider public and future scholars. Rosner is a specialist in 18th and 19th century Edinburgh medicine, with an extensive knowledge of relevant materials in the College of Physicians collections. Zucconi is a former programmer with experience in and enthusiasm for games as pedagogical tools. Since the next generation of students and researchers will be visually and technologically sophisticated, their learning will be drawn from more than traditional texts. In recognition of this, the College of Physicians has embarked on an ambitious program to develop their collections and outreach programs for the digital age. Their current projects include a highly-successful interactive website, History of Vaccines (http://historyofvaccines.org), for which Youngdahl is project manager.

As a result of these conversations, Rosner and Zucconi began to conceive of a project to develop a digital role-playing game that would build on their expertise and on the holdings and digital projects of the College of Physicians. They focused on a lacuna in the historical scholarship relevant to the History of Vaccines project: the impact of new vaccines "on the ground," that is, on the physicians and patients who chose to adopt them. Edward Jenner's seminal discovery that material taken from postules produced by cowpox, a mild skin disease, could create an immunity to smallpox, a deadly contagious disease, is very well known among historians of medicine and the general public. But there is very little historical scholarship on what happened next: why some physicians adopted the new technique, and some did not; why some patients chose to be vaccinated, and some did not. Rosner's previous research on the history of medicine in Edinburgh suggested that physicians adopted the new technique out of a combination of scientific conviction and desire to earn a reputation and acquire a practice. The process, seen through the eyes of a young doctor, resembled a quest through the maze of scientific and social worlds of early 19th century Edinburgh. It was, moreover, a quest that could be plausibly situated in a concrete visual environment, as the geography and architecture of the city has been very well documented.

Rosner and Zucconi collaborated with Ethan Watrall, Michigan State University, in writing the successful ODH proposal to fund the game prototype, affectionately (and later formally) dubbed *Pox and the City*. The grant began on August 1, 2011, with Michigan State awarded a sub-contract. That collaboration continued through June, 2012. During this period the initial game concept was further developed. The intent was to sub-contract the actual game development to a game design company. As often happens in the gaming world, however, the company was offered a more lucrative commercial contract, and was therefore unable to make the commitment to complete *Pox and the City* within the specified timeline. The sub-contract to finish the design and complete the prototype was then given to Rochester Institute of Technology, with Elizabeth Goins as project lead in collaboration with Lisa Hermsen and David Simkins. Between August 1, 2012 and March 31, 2013, Goins, Hermsen, Simkins and a team of undergraduate game design majors further developed and built *Pox and the City*. From March-June, 2013, Advisory Board members playtested the prototype on themselves and their various

constituencies, ranging from high school students through public programming experts and medical specialists.

Pox and the City was designed as a Flash-based, 2D point and click game, with static backgrounds and moderate animation. This was the most efficient way to provide rich historical content, while keeping the art and animation costs within our budget. At the beginning of our project (2011), we could point to many examples of successful Flash-based games online, such as *Outbreak* (http://fizspot.com/outbreak/game), based on an 1885 outbreak of smallpox in Montreal. As recently as January 2013, we could write that Flash "is the work horse for casual action/adventure games combined with hidden object mini games (for example, Big Fish games http://www.bigfishgames.com/.)" But professional game developers are increasingly eschewing Flash programming, because of the rise in demand for games to play on mobile platforms that do not support Flash. The College of Physicians expects to pursue alternatives to Flash for its future web programming needs. We will discuss the implications of these technological changes in the Recommendations section of this White Paper.

Game Assets

Art Assets

- Exteriors
  - Grassmarket (Old Town)
  - New Town
- Interiors
  - Doctor's office
  - New Town drawing room (Cochrane)
  - Old Town room (Napier)
  - Tavern.
  - Vaccine Dispensary
  - Royal College of Physicians of Edinburgh (RCPE)
- Graphical User Interface
  - General
    - Map
    - Library
      - Medical Texts and information
    - Journal
      - Quest Log
      - Notes
      - Character information
      - Scoring
  - Minigame
- NPCs, rounded design with some animation
  - Cochranes
    - Selma Farquharson
    - John and Helen Cochrane
    - Alison (9)
    - Mungo (3)
  - Napiers
    - Alan and Heather Napier

        - Jean Napier
        - Brenda (11)
        - Rory (6)
        - Donald (3)
    - Farmer and Son
    - Religious leader/minister (at Napier dinner)
    - Dr. James Gregory
    - RCPE member
    - Second RCPE member
    - Infirmary doctor
    - Second infirmary doctor
    - Medical quests
        - Man in tavern (for Surgery quest)
        - Child in grass market
        - Rich woman in new town (for Surgery quest)
        - Man who comes to the office
        - Doctor in new town
        - Additional characters to populate the scenes
- Additional characters to populate the scenes

Audio Assets

Background music to accompany exteriors and interiors

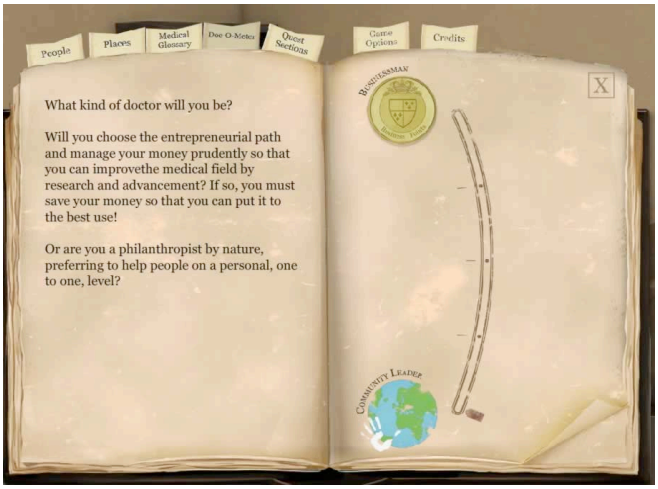
Minigames

- Medical (nicknamed The Surgery)
- Environmental puzzles

Detailed Description of Gameplay

Pox and the City begins, as so much in Edinburgh does, in the Grassmarket, with Edinburgh Castle towering over the city.

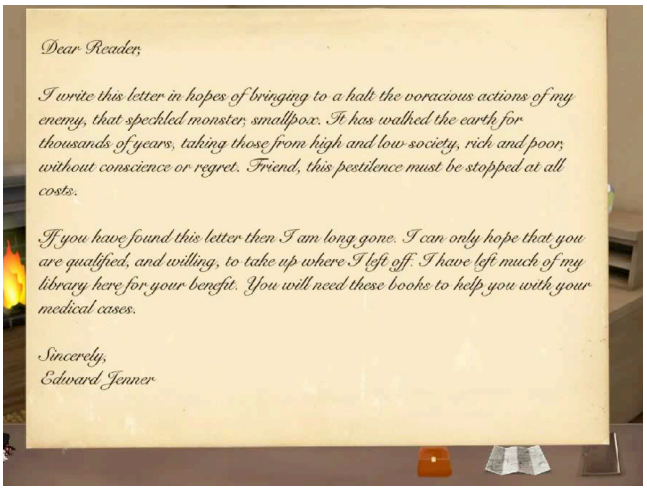
Young Dr. Robertson makes his way to the city. He has heard about Edward Jenner's smallpox vaccine, and is determined to use it to establish his own career. His first decision is whether to play the game as a Philanthropic doctor -- that is, someone who became a doctor primarily to help humanity -- or as an entrepreneurial one, primarily interested in building his career.



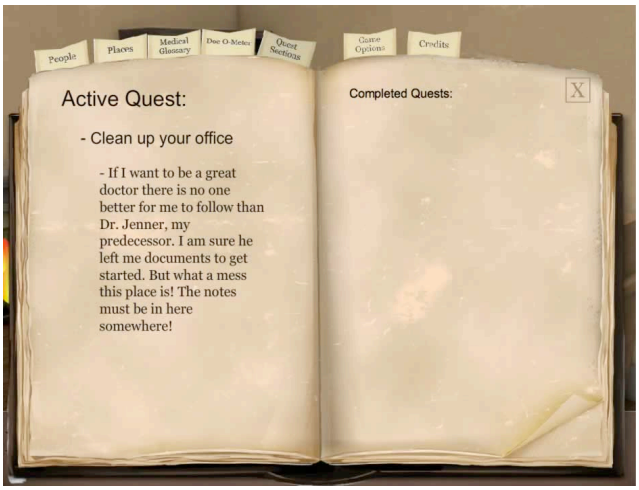
If he is philanthropic, but gives away all his money and time, he won't be able to afford to stay in practice. And if he only cares about earning money, he won't find many patients willing to trust him with their lives and those of their children.

Having made his choice, Dr. Robertson finds himself in his office. This office, like all the interiors and exteriors, was first designed with wireframes. Then, the appropriate textures were added. The fireplace and candle are animated.

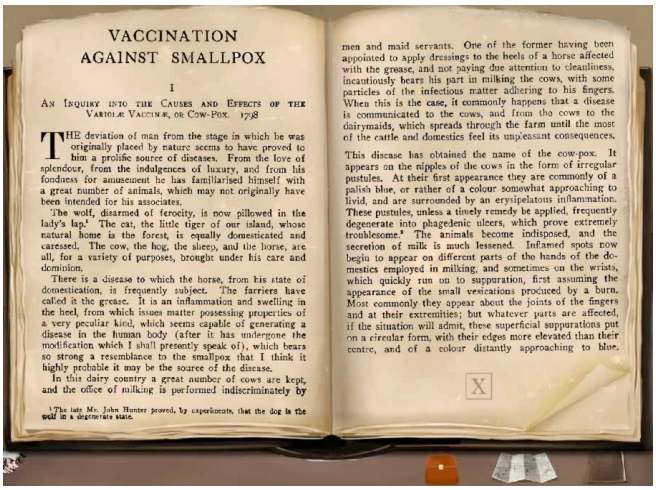
His first quest is to read an important letter from Edward Jenner himself.



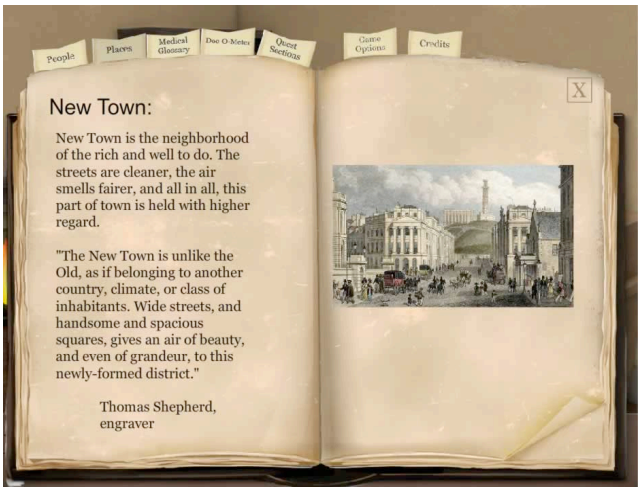
The journal in the lower right keeps track of the player's quests.



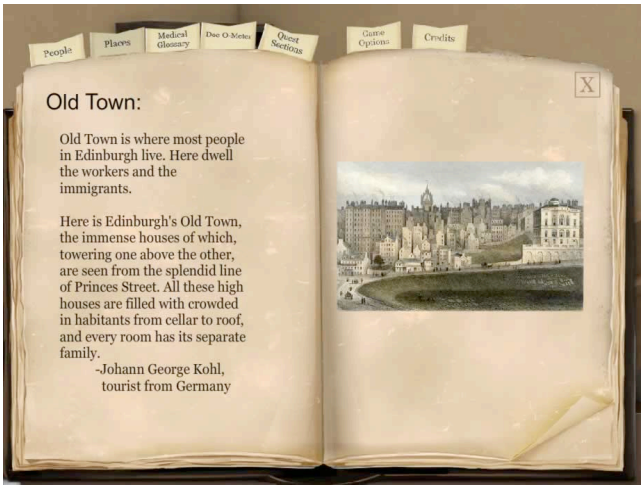
The player can look around the office to find primary sources offering additional information, like Jenner's 1798 text on vaccination:



He/she can also use the journal to find out more about Edinburgh locations important to the game. The New Town is for the people of rank and fortune.

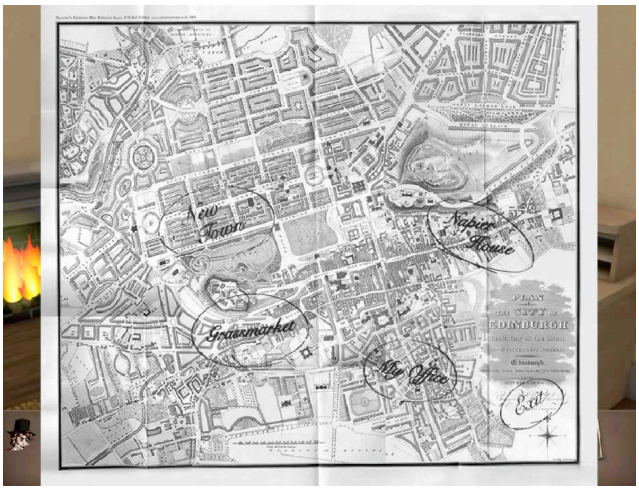


The Old Town is for the "lower orders": shopkeepers, artisans, and the laboring poor.



This journal material is also based on primary sources.

Dr. Robertson can use the map at the bottom of the user interface to move around the city to meet patients and patrons.



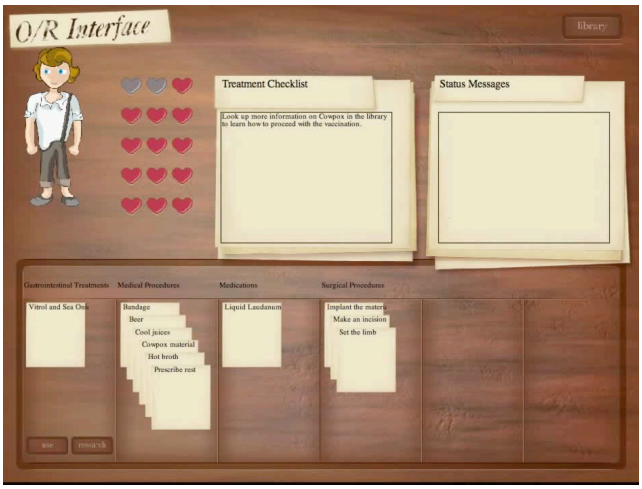
He can build his practice with New Town families...

And with their counterparts in the Old Town...

NPCs were also built using wireframes and textures, with some facial animation.

Through building relationships patients of different socio-economic status, the player learns about the social history of 19th century medicine. Though situated in a specific location, Edinburgh, many aspects of the doctor-patient relationship, as well as the relationships among doctors, can be extended to other geographical locations.

The player learns the medical content of the game primarily through the medical mini-game. The player learns that the patient is showing certain symptoms, and he/she has to follow the correct procedure in order to effect a cure. Players have the option to make a provisional diagnosis, or find more information about that disorder by looking it up in (clicking on) books in the medical library.



Players move through the game primarily by making dialogue choices as they speak to NPCs. At times, they are asked to make specific choices, for example, to order vaccines in advance, or to wait until there is an outbreak. The accumulation of choices determines the outcome of the game. The player "wins" by successfully establishing a practice. Depending on his/her choices throughout the game, including the choice of which young lady to marry, Dr. Robertson may become a successful New Town physician with a practice among the wealthy, or he may become a less well-off, but equally content practitioner with a practice among the poor.

Playtesting

Playtesting was designed to allow us to see, and evaluate, the user experience of *Pox and the City*. Since our game design goals were so ambitious, and our funding and time so limited, the playtesting period was our first opportunity to see how real players played the real game. We wanted to see how they would respond under real-world conditions, that is, how actual teachers, professors, and library and health professionals would make use of the *Pox and the City* in their classes, libraries, and practices. For that reason, we used a survey with open-ended questions.

The result was a wealth of information about the player experience, much of which we are still processing. Players overall found the game engrossing and evinced strong motivation to complete the entire narrative. They reported that their interest in history and history of medicine was enhanced by game play. It was clear from players' responses that they expected more up-to-date features, such as context-sensitive help, than could be realistically incorporated into our budget. The responses also served as a reality check on a too-optimistic view of the game as an educational tool to impart new knowledge. Most playtesters could list a new fact or concept in

the history of medicine that they had learned while playing the game, but far fewer could list a new fact about social history or the Edinburgh context.

We also found intriguing differences within our playtesting population. High school freshmen in general biology classes responded differently from high school juniors taking anatomy; introductory history students responded differently from advanced students working on senior theses. There were clear gender differences as well as differences in what we might call playing styles: whether players thought of the game as an individual, or as a social activity, whether they defined the "win" condition as "getting through the game as quickly as possible" or "exploring the environment so as to get a specific outcome."

We feel our playtesting has been highly successful, clarifying for us both strengths and weaknesses of the current game design, and providing us with a firm foundation for future design efforts.

Additional Project Outcomes

Over the course of the grant, Stockton College provided funding for two related projects. The first is Medical Edinburgh, a virtual world exploration of 19th century Edinburgh. Rosner worked with Peter Bellin, a virtual world designer, to create a Second-Life style environment and avatars.

Medical Edinburgh is hosted by Jokaydiagrid (http://www.jokaydiagrid.com/), and Rosner has used it in introductory history courses. We provided a full description on the *Pox and the City* project blog: http://poxandthecity.blogspot.com/2013/03/the-making-of-virtual-edinburgh-part-1.html.

The original purpose of Medical Edinburgh was to investigate the possibility of creating a virtual space where *Pox and the City* players could meet, discuss aspects of the game, and find out more about Edinburgh social and medical history. However, this proved impractical. As we did not have time or resources to build readable references into the medical library in-world, one of the project participants would have had to arrange in-world "office hours" to answer questions.

Moreover, the Imprudence browser necessary for accessing Jokaydiagrid is not widely available in computer labs either at Stockton or at our Advisory Board institutions. Medical Edinburgh remains a beautiful and intriguing possibility for future projects.

The second project outcome was also a virtual world project, Edinburgh VR, created by Stockton undergraduates Kevin Sundberg and Henry Gaunt, directed by Hannah Ueno, Professor of Graphic Design. Ueno created three-dimensional images of an Edinburgh slum from the early 19th century (http://hannahueno.com/blog01.html). Sundberg and Gaunt then used Unity to transform the images into a game environment, which could be made available for further programming.

This project was successfully completed and presented on the Stockton campus in March, 2012. As Sundberg and Gaunt noted, though, it had taken them most of the previous semester just to create the single section of Edinburgh's Old Town. It would not have been possible for them to complete other sections of the city, let alone an entire Unity-based game, within the academic year.

Moreover, though very beautiful, the Edinburgh slum they created was not practical for an actual game, as the many textures and surfaces meant that the environment would be extremely slow to load. Like Medical Edinburgh, this remains an intriguing possibility for future exploration.

Next Steps

During the playtesting period, we met with Karie Youngdahl, as well as other staff involved in the College of Physicians of Philadelphia's digital initiatives, to discuss the value of *Pox and the City* for their outreach efforts. While recognizing the important work that went into creating the prototype, they felt that a design team made up of undergraduates would be unlikely to meet the professional and technical requirements of a game they would incorporate into their website. Youngdahl also noted that she expected to be moving away from Flash-based programming for History of Vaccines. The question arose whether it would be feasible to move to another game engine, such as Unity, given the constraints of the academic calendar. Given Ueno's and her students' experience with Unity programming (see Additional Project Outcomes, above), it appears unrealistic to think that students could design and implement a fully-fledged game in Unity as a capstone requirement in their senior year. Even if it were possible, once they completed the game as capstone, they would graduate and pursue other opportunities. They would not be in a position to offer ongoing technical support to the College of Physicians staff or their diverse audiences.

We therefore had to make a choice. If we were to continue to work on digital RPGs for the history of medicine, we had to decide whether our primary goal be to promote education in humanities game design, or to promote public appreciation for the history of medicine. After discussion with project partners and the program officers at the NEH, we decided on the latter. It seemed clear from playtesting and from public response to our project (in the form of invitations to write about it and present it) that there is a public audience for the history of medicine, one that would welcome a revised and improved version of *Pox and the City*. We decided that orienting the game towards public programming in the history of medicine would be the best choice.

To that end, we submitted a grant proposal in August, 2013, to the NEH Office of Public Programming for an America's Media Makers Development Grant. The project is entitled *The Smallpox Games: Tracking the Speckled Monster*. While it builds on much of the material developed for Pox and the City, it differs in significant ways:

- The game is set in early 19th century Philadelphia, rather than in Edinburgh. This setting is a better fit for the College of Physicians of Philadelphia's outreach efforts, while building on much of the historical material developed for the prototype. We also believe that players will connect with the history of medicine content more easily if it is presented in a more familiar historical context.
- The game will be designed and built by a professional design studio with experience in presenting history of medicine to public audiences.
- The Advisory Board has been revised, incorporating new members with expertise in American history.
- The project infrastructure has been revised to include project management.

We expect to be notified of the results of our application in March, 2014.

Publications and Presentations

By Project Participants

Lisa Rosner, "It's How You Play the Game," (submitted), History of Medicine in Unexpected Places panel, American Association of the History of Medicing (AAHM) annual meeting, Chicago IL, May 2014.

Lisa Rosner, "The Making of Pox and the City: A Digital Role-Playing Game for the History of Medicine," *Cultural Crossings*, Cleveland State University, March 26, 2013.

Laura Zucconi, Presentation, *THATCamp Games*, Case Western Reserve University, April 19-21, 2013.

Laura Zucconi, Ethan Watrall, Hannah Ueno, Lisa Rosner, "Pox and the City: Challenges in Writing a Digital History Game" in *Writing History in the Digital Age*, ed. by Jack Dougherty and Kristen Nawrotski. Ann Arbor: University of Michigan Press, 2013.

Laura Zucconi and Lisa Rosner, "Pox and the City: Visual Literacy and Digital Games in the History of Medicine," Annual Conference of the International Visual Literacy Association (IVLA), September 2011

Lisa Rosner and Laura Zucconi, "Digital Media in the History of Medicine," Roundtable with Susan Reverby, Michael Sappol, Joanna Ebenstein, and Karie Youngdahl, AAHM Annual Meeting, April 2011

About Pox and the City

Interview with Janet Golden, "Pox and the City: A Public Health History Game," June 11, 2013, http://www.philly.com/philly/blogs/public_health/Pox-and-the-City-A-public-health-history-game.html

Karie Youngdahl, "Testing a Smallpox Digital Game," May 5, 2013, http://www.historyofvaccines.org/content/blog/testing-smallpox-digital-game

Sam Kean, "Pox in the City," *Humanities Magazine*, January/February 2013, http://www.neh.gov/humanities/2013/januaryfebruary/feature/pox-in-the-city

"Pox and the City: A Digital Role-Playing Game for the History of Medicine," *Newsletter of the History of Science Society*, January 19, 2012, http://www.hssonline.org/publications/Newsletter2012/January-pox-and-the-city.html

Steve Kolowich, "The Promise of Digital Humanities," *Inside Higher Ed*, September 23, 2011, http://app3.insidehighered.com/layout/set/popup/news/2011/09/28/national_endowment_for_the_humanities_celebrates_digital_humanities_projects

Recommendations for NEH-Funded Game Design Projects

Although many aspects of game design projects are similar to other creative work in digital humanities, we have also found some important ways in which they require distinctive solutions. We recommend that all those interested in designing humanities-based games include preliminary planning for collaboration and project management, technological change and competitive funding, and playtesting.

Collaborations and Project Management

Humanities game-design projects often begin, as ours did, with a conversation among humanities scholars about a great idea for a game. The expected players may be students in a specific course, or they may be museum or library patrons. The next step may appear obvious: now that they have the idea, they need to find someone to build the game. If they are digitally sophisticated – if they have built websites, for example, or worked on other programming projects – they may feel that they have done the heavy lifting already in coming up with the idea and historical or literary materials. It only remains to find someone with the technical expertise to put the game together.

In fact, building a game is much more complicated than many other programming projects. Even the most stripped-down game design team consists of at least three people: one programmer responsible for the game engine and overall game architecture, one additional "everything else" programmer, and one artist/animator. The team may hire other people with specific skills on an as-needed basis. Typically one member of the team will be the point person who speaks to the client (the person commissioning the game). Like any group of talented and creative individuals, they have acquired specific skill sets, and have preferences for specific design styles. They also may have the expectation that the "client" has come to them because of their styling, and may well prefer that a host of game design decisions be left in their hands.

Humanities scholars who wish to collaborate successfully will find it helpful to spend as much time as possible learning about existing game genres, in order to figure out which genre will work best for the material. It is also helpful to spend as much time as possible with actual game designers. Many indie game design communities are very welcoming, and humanities scholars can learn a great deal by attending developer events and meet-ups.

Humanities scholars will also find it helpful to recognize that game design teams do not typically include script writers; they primarily focus on physical action. It is not uncommon for game programmers, especially those who have limited experience with cultural heritage institutions, to think of dialogue and other mechanisms for conveying humanities content as something that gets added in at the end, once the rest of the game has been designed.

In choosing a game design team, one excellent place to look is the university community. That is, the humanities scholar(s) can ask one or more game design professors to build the game. In many ways this is a natural pairing. Professors are very talented and creative people. They come with natural population of playtesters in the form of their students. Even if faculty come from different disciplines, they often have similar research and publishing goals, and an NEH grant will look good on everyone's resume. The NEH grant reviewers are generally comfortable with academic personnel on applications. Academic institutions have Grants Offices to help manage the paperwork associated with the grant.

But there can be roadblocks associated with academic collaborations as well, especially if they go across institutions. A single professor, no matter how talented, cannot build a game: he/she will have to put together a game design team, either of students or professionals. The structure of NEH grants, which provides compensation for a certain percentage of a faculty member's time, is not well suited to this process. The model is a course release to allow a faculty member to do research or direct a special project, but at many points in the game design process – most notably "crunch time," the final push to finish all the last details and get the game out the door – the game takes over the lives of all the team members. It is simply not feasible for a faculty member to drop all his/her other work in the last quarter of the semester, in order to meet the demands of building the game.

Working with academic partners can also be surprisingly expensive. Universities and colleges charge indirect costs, which operate as a surcharge paid to the institution on top of faculty, staff, or student salaries. For example, if a grant provides $10,000 for a faculty member as course release and summer stipend, the grant may have to pay an additional $5000 to the institution. Despite this surcharge, academic institutions do not usually provide project management services beyond the paperwork for budgets and contracts.

In some cases it may be possible to lower the cost of game design labor by working with undergraduate or graduate students. This can be very effective, as game design students are typically talented, hard-working, and creative. It may introduce a new dynamic, however: once a university-sponsored grant includes students, the university has the obligation to ensure that fulfilling the terms of the grant has educational value for the students as well. The project will be most useful to the students if they have a certain amount of creative control, and if game design decisions are geared towards their expertise and skill sets. These may, or may not, satisfy the expectations of project partners, since undergraduate computer courses are often behind the technological curve when compared to professional programming environments. And once the students' role in the game design project is over, they cannot be expected to provide ongoing technical support or project maintenance.

An alternate approach is to partner with a professional game design studio. Commercial game designers will charge more than academic partners, and they may not view the prospect of publications or an NEH grant as incentives to do the work. It would be necessary to scale down the scope of the work considerably. For example, a prototype designed by a professional game design studio might consist of a 10-minute segment rather than an hour-long game. The advantage is that the segment will be more consistent with professional game-design standards. This is an important aspect to consider for community outreach projects whose audience will expect the computer game's look and feel to be on par with the commercial ones they typically encounter.

In approaching game design companies, humanities scholars will find it helpful to recognize that young game designers may initially be affordable partners, but they have many options and typically move around a great deal from project to project in response to competitively designed contracts. A grant that will pay them for a month to create a prototype, and which may or may not have any follow-up, will not be as attractive as a design project that will pay them for six months and lead to a finished and marketable product. One place to find game design professionals with a commitment to cultural heritage content is Museums and the Web, http://www.museumsandtheweb.com/ .

As a practical matter, we strongly recommend that all collaborating entities, academic or otherwise, sign formal sub-award contracts. We also recommend that all contracts be issued from

the primary NEH-funded institution (that is, a sub-contracted institution should not be expected to issue additional sub-contracts). This process will be facilitated if personnel in the respective Grants Offices discuss the terms of the sub-awards with each other, prior to issuing the contracts.

Technological Change and Competitive Funding

Digital technologies change rapidly, and that has an especially drastic impact on game design. Over the course of *Pox and the City*'s two-year lifespan, Flash-based design changed from being considered a viable option for certain kinds of games to an old-fashioned approach with a distinctly retro feel. The new all-purpose software favored by many game designers is Unity, but when we priced out the cost of a Unity version of *Pox and the City*, it ran to five times our entire grant budget. It is too early to tell whether Unity programming will become ubiquitous enough in the next few years to fill the needs of casual and indie game designers. If it does, then it will become a viable alternative for NEH-funded humanities games as well.

The issues go beyond software development. The ODH start-up grants are in many ways better suited to produce digital tools than games. That is because tools developed for one set of content can be extended and adapted to other content, thus supporting the efforts of their developers to gain additional funding. Tools such as Omeka, once developed and – in gaming terms – playtested for usability, can include programming features that can be used by other developers. They do not need to be rebuilt from the ground up. For many of the most successful digital tools, code written for the start-up grant was repurposed for later implementation grants.

Games, however, are content and often code specific. In that they are more like movies than digital tools. A game's architechture is its own design, and for it to be repurposed for subsequent games in a given genre, it has to have been written with that repurposing in mind. Art assets take an enormous amount of time and money, and if the game is given a new setting, the art has to be completely redrawn. Inexpensive video cameras, iMovie, Windows MovieMaker, and YouTube have effectively put the creation and distribution of content-specific video in the hands of the general public. But those tools do not yet exist for digital games. Until they do, any start-up funding is likely to fall short of what is necessary to build a game of enduring value to the humanities.

One possibility would be for humanities scholars interested in ODH start-up grants to use the start-up funding for a proof-of-concept, rather than a complete game. We suggest that the proof-of-concept focus on key features of the game relevant within the broader context of the project. For example, an application for a game intended for a cultural heritage organization might be designed to produce a high-quality trailer, which could be used to gauge audience interest. An application for a game designed to convey course content might focus on designing game architecture for the relevant genre, as well as the graphical user interface and script. For this to work, though, these possibilities would have to be included in ODH grant instructions, and reviewers would have to agree on the criteria by which to evaluate these more targeted proposals.

Playtesting

We strongly urge all humanities scholars developing proposals for game design projects to be sure to include playtesting. Jesse Schell, in *The Art of Game Design*, describes the Rule of the Loop: "The more times you test and improve your design, the better your game will be." As he says, this "is an absolute truth. There are no exceptions to the Rule of the Loop. You will try, at times in your career, to rationalize it away, to convince yourself that "this time, the design is

so good, we don't have to test and improve," or "we really have no choice – we'll have to hope fo the best," and you will suffer for it each time"(80). We recommend playtesting for all appropriate project outcomes, and we recommend that it include as many representatives from target audiences as possible.

Project participants may find it helpful to separate assessment from playtesting. The goals of project assessment will vary according to the project, but typical assessment issues include costs (in time as well as money) versus benefits, fit with institutional mission, and fruitfulness of project for the participants engaged with it. The goal of playtesting is to see how users play the game. This may turn out to be exactly as anticipated in the game design documents, or it may be quite different. The goal of playtesting should be to elicit as much feedback as possible. The feedback may be quantitatively rigorous; it may also be qualitative or open-ended. It may be positive or negative, and there may well be a range of positive or negative comments focusing on specific features. Since age and gender differences have been found to play a major role in how players interact with games, we recommend providing some way to track those differences. Schell's book is an excellent introduction to this aspect of game design as well as many others.

When designing playtesting procedures, project directors should consult with their institution's Institutional Research Board (IRB) to ensure that they are in compliance with regulations for the protection of human subjects, as established by the US Department of Health and Human Services.

Playtesting is particularly important in humanities games, because there is a growing scholarly literature on the value of educational games in teaching and learning. There are, however, comparatively few scholarly accounts of the impact of playtesting on educational game design. Incorporating playtesting into ODH game design projects would provide a much-needed perspective on the design and impact of humanities-based educational games.

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