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Owen Gottlieb



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New Design Principles for Mobile History Games

Owen Gottlieb (Rochester Institute of Technology)

Abstract

This study draws on design-based research on an ARIS-based mobile augmented reality game for teaching early 20th century history. New design principles derived from the study include the use of supra-reveals, and bias mirroring. Supra-reveals are a kind of foreshadowing event in order to ground historical happenings in the wider enduring historical understanding. Bias mirroring refers to a non-player character echoing back a player's biased behavior, in order to open the player to listening to alternative perspectives. Supra-reveals engendered discussion of historical themes early in the game experience. The results showed that use of a cluster of NPC bias mirroring techniques enhanced student ability to articulate points of view previously unavailable to them.

Background

Jewish Time Jump: New York (Gottlieb & Ash, 2013) is a mobile, placed-based, augmented reality game (ARG) designed to teach history to 5th-7th grade school students, set on location in Washington Square Park, New York City (Gottlieb, 2015)[i]. The game's subject matter is at the intersection of modern Jewish history, immigrant history, labor history, and women's history. Designed on the ARIS platform for iPhones and iPads, the game presents historic media triggered by GPS location.

The game includes digital historical characters, digitized versions of primary sources such as newspapers (with translations from Yiddish), photographs, and ephemera. Players take on the role of time travelling reporters working for the fictional *Jewish Time Jump Gazette*. An editor character presents players with the task of retrieving a story "lost to time." Guided by a narrator character in the guise of their time travel device, players "land" in 1909, on the eve of the Uprising of 20,000, a garment workers' strike, and the largest women led strike in U.S. History. Players conduct digital guided interviews with workers, labor organizers, factory owners and manufacturers, and other historic and amalgamated historic figures. They analyze primary sources, and track down clues, to present and discuss their story after the game. Players can trigger different garb to blend in with those they meet, and game mechanics facilitate features of the game including mistaken identities. For example, *shtarkers*, or tough guys hired by manufactures to attack strikers may mistake a player for a striker, and players must evade attacks. Or players may be mistaken for manufacturers and invited to a closed-door meeting at which the owners organize against the strikers.

Enduring Historical Themes & Engendering a Best Case, Fair Hearing

This article presents results from a series of design cycles which were centered on two core goals of the game. First, a key goal was to seek learner understanding of the enduring nature of key historical themes and their contemporary relevance (Barton and Levstik, 2004/2012, Preface, para 1.) What is the meaning of the historical story today? How do the debates and questions remain immediate and relevant?

A second important goal, which aligns with civic and democratic education was to nurture a “best case, fair hearing” of multiple and competing perspectives (Kelly, 1986; Stoddard, Nemacheck, & Banks, 2013).

The particular historical narratives of the Uprising of 20,000 and the Triangle Shirtwaist Factory Fire (1911, also featured in the game) were defining moments in American history and labor history. The owners of the Triangle Factory had been one of the few holdouts against reform for safety and other worker concerns in the wake of the 1909 Uprising strikes. In 1911 the Triangle went up in flames and 146 workers, mostly young Italian and Jewish women, died in the fire. The aftermath revealed locked doors, shoddy fire escapes, and in more recent historic accounts, even suggestions that the owners had made the factory more fire-likely as part of planned insurance fraud Von Drehle (2004). The outrage and protest eventually led to some of the nation’s foundational labor laws. The relationship of labor and business is one of the themes that run through history. Contemporary labor organizing, labor disputes, and unfortunately, disasters and abuses are not limited to the early 20th century. The design of the game and simulation would work to tie the relevance of the past to the present. How could the historical narratives of the game be effectively linked to the broader themes of labor disputes, including those that occur today?

In approaching methods and tactics for engendering a best case, fair hearing, I believed this set of narratives provided an opportunity for exploring an edge case in history. The negligence and culpability of the owners of the Triangle Shirtwaist Factory is obvious and a rare moment of moral clarity in history. That said, historian Hasia Diner (2011) points out that merely casting the owners as villains covers over the complexity of the relationships between the owners and workers. The owners themselves were Jewish immigrants, who not long before were working in sweatshops. They were community heroes for having succeeded in ascending from being fresh off the boat to successful entrepreneurs. As evidence of the connections between the owners and the community, Diner points out that, one of the male workers who perished in the fire was engaged to be married to Isaac Harris’ (one of the factory owners) niece (Diner, 2011).

For a more layered approach to history, one in which understanding surpasses blame, how might one better understand the perspectives of the owners’ stances and decisions prior to the fire? Due to the clarity of the culpability of the factory owners, this narrative could provide an ideal test case for techniques to encourage the understanding (not the condoning of) a very different set of perspectives.

The goal of the design iterations discussed in this paper was to move from the early piloting stage of the game in which players were not necessarily connecting the narratives to wider enduring historical themes. They were also unable to articulate the perspectives of the owners, despite having encountered and conversed with the digital characters, to demonstration of understanding and articulation of the owners’ perspectives.

Antecedents

This study draws on previous research, design, and practice in mobile games for learning, and situated documentary including Klopfer (2011), Klopfer and Squire (2008), Mathews and Squire (2010), Schrier (2005), Gottlieb, Mathews, Schrier, and Sly (2014). James Mathews' situated documentary, *Dow Day* (Mathews, 2005), was particularly instrumental in envisioning the project.

Methods

This study uses methods under the umbrella of Design-Based Research (DBR). DBR is suited for any “rich contextualized setting in which people have agency” (Hoadley, 2013). Design-based research is an iterative, proto-theory-testing approach to developing learning theory and design knowledge. Designer-researchers prototype a learning environment or intervention over the course of a number of iterative cycles comprising design, field trial, data gathering, analysis, and return to theory and re-design. Learning theory is used as a starting point for design, and that theory is held suspect during investigation (see Barab and Squire, 2004; DBRC, 2003; Hoadley, 2004a; Hoadley, 2004b).

The particular methods used in this study included participant observation with video and audio observation, pre and post surveys, semi-structured interviews, and server log data. The log data included player movements and actions. Triangulation of data was conducted by matching player logs to survey, interview, and observational video. Given that the context in between iterations shifts in the case of this study, there is not a control group; however, consistent findings across multiple contexts can bolster suppositions regarding outcomes.

Game Days

Jewish Time Jump: New York game days took place over the course of eight months with five supplementary Hebrew schools. Prior to play on location, learners took a pre-survey, then were given a tutorial in the game system in a nearby staging area. Play was recorded using observational audio and video. Also player movements were tracked and recorded on the back-end of the system through server logs. Following game play (approximately an hour), students returned to the staging area, took a post-survey and participated in discussion and semi-structured interview. Additional follow up interviews were conducted following individual game days.

Sample

Forty-three learners in fifth, sixth, and seventh grade participated in gameplay over the course of six game events and three design iterations (some game days occurred within a few days of each other to allow for more players in each play session, or, in one case, close single-player observation). Group sizes ranged from 18 players to one player (design-based research can be conducted even with individual learners). The single player was followed in a closely monitored late-stage iteration game. The average group size was seven players. In all, 24 girls and 21 boys participated.

Game Day to Iterations Correspondence

There were six game days (not including teacher and administrator meetings and participant observation “hanging out”) referenced in this study. Because there were only a few days between the second and third game days and between the fifth and six game day, there were no iterations done between games two and three or between games five and six. Three iterations were completed after iteration 1, iteration 3, and iteration 5 (see Table 1). Changes were not made for each individual case in all iterations.

	Initial Designs
Game Day 1 (pilot, 5 Learners)	
	Iteration 1
Game Day 2 (4 learners)	
Game Day 3 (4 learners)	
	Iteration 2
Game Day 4 (18 learners)	
	Iteration 3
Game Day 5 (11 learners)	
Game Day 6 (close observation of 1 player with parent)	

Table 1: Timing Amid Iterations of Game Days.

Results: Two Cases

Case A: Seeking Enduring Historical Theme Connections

In initial designs, I drew upon both history education theory (Barton and Levstik, 2004/2012, referred to above) and media and game studies theories, concepts, and techniques (Benayoun and Assayas 1996/2008; Block, 1973; Spector & Smith, 2000; as discussed by Gee, 2007; Vertov, 1929/2002). This led to the use of a self-reflexive design in order to draw connections between the historic narratives in the game and the enduring themes, running through to the present. In particular, towards the conclusion of the game, the connection to modern labor struggles would be revealed through the relevance of the device upon which the game itself is played: the iOS device, meaning the iPhone or iPad. Upon returning to present day, along with two other encounters, learners received a contemporary news story about the labor disputes with Apple’s manufacturer in China, Foxconn, and steps that Apple was making to improve working conditions.

In the pilot, given the sprawling nature of the narrative and the ability for learners to immerse in various historical artifacts, only a few students completed the game, and therefore did not receive the news story. In the first iteration, the game structure was tightened, but in addition, I added an *Afikoman*, referring to a hidden bonus or special event, based on the idea of the “Easter Egg” in video games. The *Afikoman* refers to a game played during the Passover seder in which a piece of matzah is hidden, and the seder may not be complete until it is found or returned by the children. The *Afikoman* held both contemporary videos and the news article. In this way, all players who did not reach the conclusion of the game, would be granted the *Afikoman* by the educators at the end of play so that they could experience them as well.

In field testing of this next iteration, I found that some students picked up, viewed, but did not read the article, but jumped ahead to complete the game. Even when presented with a second chance to read and review the article along with students who received the Afikoman, one girl's short answer in the post-game survey reveals a lack of connection to the enduring historical themes:

[crossed out]: I was kind of rushing to finish, but I think it had to do with the difference between Jewish rights today and 100 years ago [end cross out]. Jewish rights today are very different from 100 years ago. Human rights in general were different! Some people were so high up the hill, they thought they had more rights than other people! Bosses treated workers like scum and would do anything to earn money, even risk lives of workers!

It is possible the learner is not connecting the global present day labor issues with those of the past. Regarding the humane treatment of workers, she writes, "human rights in general were different [than they were 100 years ago]." It is also possible that the article regarding Apple working to improve its conditions provided a contrast to owners' disregard for worker safety in the years prior to the post-Triangle fire labor laws. Given this learner's dual opportunity for exposure to the article, both during gameplay and again during the Afikoman following main play, the persistent lack of connection to the enduring theme signals the need for a better design solution to reach the educational goal.

In the next iteration, I took a different approach, based on Levstik and Barton's (2005/2010) alternative strategies of "start locally, connect globally," and "start globally, connect locally" (Chapter 6, Sections 2 and 3). In this case, I tried what I call a supra-reveal. Rather than the giving away the reveal at the end of the game which was a local to a global strategy, I added a global starting point to frame the entire game. At the beginning of the game, the learners receive an article in the form of a clue prior to meeting their editor. It arrives in the form of a 2013 article about a recent garment factory collapse in Bangladesh and the resulting 1100 deaths (Yardley, 2013). Learners are guided to read just the first two paragraphs of the article and then move onto find their editor.

In field testing this version of the game, the discussions of the factory collapse began immediately as players asked how this related to the game and their mission (they had watched an initial introductory video clip telling them to go to the park to meet their editor, but had not yet departed from the staging area to the park). Questions included "what does this article have to do with Jewish history?" and "what is the date on the article?" There was no evidence in either post-game interviews or open-ended answers on post-game surveys of lack of awareness of the contemporary global issues of worker safety. Neither was there evidence of such a confusion or misunderstanding in the video footage in the Afikoman about Foxxcon.

On the basis of the out-loud pre-game readings and questions and the lack of disconfirming cases of awareness of contemporary labor struggles, it appears that the use of a supra-reveal prior to or at the early stages of play in a mobile ARG can offset issues of lack of attention to contemporary cases as well as provide a conscious frame for the game to come. In addition, the supra-reveal allowed for maintaining the surprise reveal either upon reaching the conclusion of the game, or in receiving the Afikoman.

Case B: Seeking a Best Case, Fair Hearing

In the initial pilot of the game and in two subsequent iterations, players were not able to articulate or understand the motivations of the factory owners. A number of learners were confused as to whether the

owners were workers or owners /bosses (they were both). In the first two iterations, changes included moving the initial encounter with Max Blanck, one of the owners of the Triangle Shirtwaist Factory, earlier in play to try to counteract possible bias in the narrative itself, moving Max Blanck, into a path that was unavoidable in play (as opposed to one of the different branches of the game), locking the players in the conversation with Max Blanck. Some of the dialogue was altered to be more direct, such as “I was a worker” instead of “when I was a worker like you” (to those players who had activated worker garb).

By the end of the second iteration, despite Blanck articulating to all players both his background as an owner who had worked his way up through the most dangerous of sweatshops, and his concerns about business — players remained confused and did not articulate the perspective of either Blanck or Harris (who appears in the game later when Blanck reappears). There was still confusion. The idea that the owners/bosses were once workers was not clear to at least three of the 18 players. Only one player of the group of 18 demonstrated articulation of an understanding of the owners’ profit concerns.

For the third iteration, I returned to theory to determine other possible paths to greater student articulation of the perspective of the owners. Theriault (2013) shows how framing a game (the way in which the game is described prior to play) can accentuate bias and affect player outcomes. Following a similar line of thought, could the learners’ prior knowledge from other museum visits and family discussions (which I learned of through the demographic section of the surveys) have a similar impact? If the tentative assumption is that there may be framing and/or primacy effects interfering with a best case, fair hearing, what design elements might better provide for a best case, fair hearing? I turned to suture theory (Mulvey, 1976 Silverman, 1983) and audience surrogates (David Milch, personal communication, 1998). Suture theory addresses how an audience identifies with characters in the text; audience surrogates are characters placed within the narrative to voice the perspective of the player/audience member. I theorized that perhaps having the non-player character (NPC), Blanck, demonstrate prejudice towards the player might rouse the player from a position of dismissal to one of engagement or consideration.

In the new iteration, a minor dialogue line change was made to the Foreman character removing his claim that the bosses will tell the player who complains about having been shorted pay that “you are lucky to have a job.

In addition, I injected set of three inter-related elements: first, new dialogue so that Blanck would treat the player in a prejudicial way, assuming they were a worker who had already made up her/his mind against Blanck. Also, I injected a line of dialogue for the player-character (an on-rails moment) trying to explain that they were actually a reporter (but Blanck interrupts them and will not listen). “Wait! I need to hear your story. I’m not a worker, I’m a report— “ Previous on-rails moments for the player character (PC) had been paced such that were responses tracking the player’s choices, not enforcing a perspective. This is followed by the narrator explaining that the player will have to gain Blanck’s trust. This set of three moves – paced PC forces, having the NPC mirror the player bias or prejudice, and pointing out the lack of trust by the narrator, I refer to as a whole as “NPC bias mirroring.”

Following the third iteration, in post-play semi-structured discussions, no learners out of 12 expressed confusion regarding Blanck’s or Harris’s perspectives. One sixth grade girl and her brother expressed the perspective of the business owners: that they were once workers themselves and that they felt that the conditions were much better in the modern factories that they had built. The girl expressed the

differences the owners discussed between the sweatshops of the past and the modern factories. This was a marked difference from previous iterations, as no student had previously expressed the owners' position of relative improvement for the workers without also dismissing that position.

A fifth grade boy (Scott, a pseudonym) in an individual interview offered the following when asked about general interest:

Anon Author: What part or parts of the game were most interesting to you?

Scott: Some of the most interesting parts of the game was like talking to all those people and hearing the different perspectives like the bosses were saying 'we're going to go out of business if we raise their wages and the other companies are going to swoop [makes a downward swooping/chopping gesture with hand] in and take everything from us' and meanwhile the workers are saying "they're treating us horribly" so it's kind of [makes balancing gesture with hands, like a scale], trying to balance everything and it's interesting, it's kind of interesting to see how that struggle kind of happened, how the bosses' perspective is actually understandable instead of saying "I just want to make more money," like he just said "we're not doing that well and if we raise the wages then it's not going to work that well for us."

Anon Author: So you found it interesting that there were different perspectives?

Scott: Yeah, and how there was like—I also didn't know like about the bosses having a union—to fight the workers.

Anon Author: [making a distinction] Their [the bosses'] organization.

From the semi-structured group interview data, no students fully demonstrated a best case, fair hearing of an alternative perspective prior to iteration three, and there appears to be some success in iteration three. *No learner indicated confusion in iteration three.* As a result, the responses of the learners suggest that the use of paced NPC forces may deepen player suturing and that NPC bias mirroring techniques may very well open the learner to a fair hearing of competing perspectives. While the slight alteration in the Foreman dialogue is confounded because the change occurred at the same time because it was one of many examples of narrative elements promoting a bias against the owners, its removal is unlikely to be the cause of the shift.

Conclusions

This article delineates two new design principles drawn from the research on a mobile, place-based game. The first is supra—reveals, the use of foreshadowing to establish enduring historical themes early on in gameplay. The second, which aims for enhancing a “best case fair hearing” of alternate perspectives, is the use of non—player character (NPC) bias mirroring. This involves using paced PC (player character) on-rails moments; an NPC to echoing back, through behavior, the player character's bias; and a role enhancing goal orientation provided to the player. Results demonstrated that NPC bias mirroring with paced PC forces yielded less confusion and better articulation of the NPC's perspective despite player bias against those positions.

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