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Case Study Two: Jewish Time Jump: New York

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Jewish Time Jump: New York is a mobile placed-based augmented reality game and simulation in the form of a situated documentary. It is designed to act as a learning intervention, not only to engage learners and spark their curiosity in exploring content knowledge in modern Jewish history, but also to deepen their historical thinking and their civic participation, and in so doing, seek a means by which a short-term intervention might have a longer-term effect on learner engagement with modern Jewish history. The Jewish social justice concern of *Tikkun Olam,* or healing the world, is realized in the game through centering on civic engagement in a pluralist democracy. The game's design is concerned with presenting engrossing historical narratives in which players investigate multiple, conflicting perspectives and they come to explore the constructed nature of historical narrative. They learn about issues based advocacy and organizing, as well as citizen journalism and political power structures in an historical context.

Jewish Time Jump: New York works to push the boundaries of the genre of situated documentary (Mathews & Squire, 2010) in terms of production, game mechanics, and narrative devices. The player's geographic place is directly related to the game theme, events, and setting. The game "augments" reality, so while standing in Washington Square Park, or the buildings nearby. Players receive images based on their GPS location—images from over 100 years earlier—giving a place-based experience of the historical narrative.

In this game and interactive story, players travel back in time to take on the role of reporters working for the fictional *Jewish Time Jump Gazette.* They are tasked with bringing a story back to their editor that was "lost in time." They "travel" back to 1909 in Washington Square Park in Greenwich Village, New York, where they land on the eve of The Uprising of 20,000, a garment workers' strike, led in large part by a number of young Jewish women were among those who led 20,000 shirtwaist workers out into the streets. It remains the largest women-led strike in U.S. History.

The uprising occurred two years before the devastating Triangle Shirtwaist Factory Fire. The Uprising also occurs eleven years before women have the right to vote. Players gather perspectives from digital characters with opposing views, receive items such as digital reproductions of original Yiddish newspapers with a translation feature, and track down elements of their story, trying to complete their quests before time runs out. They face obstacles such as being mistaken for strikers by local shtarkers, who were thugs hired by owners as strikebreakers, and who often attacked the women.

The project that would become *Jewish Time Jump* originated in the desire to bring advances in contemporary research in games for learning to bear on Jewish education. Jim Mathews' *Dow Day* (Mathews & Squire, 2010) served as the jumping off point. *Dow Day*, which takes place on the campus of the University Madison-Wisconsin, is a mobile, augmented reality situated documentary in which players act as reporters during the 1967 student protests against Dow Chemical, who was recruiting on campus. They meet digital characters of protesters, administrators, and police and are fed stills, videos,

and historic artifacts from 1967. For the development of *Jewish Time Jump: New York,* this investigator formed, and led a New York based team of historians, archivists, digital graphic and video artists, and game designers. The New York team also collaborated with Mathews, David Gagnon, and the ARIS Team at the University Wisconsin-Madison.

ARIS, or the Augmented Reality and Interactive Storytelling platform is an open source platform, based out of the University of Wisconsin-Madison, and the inheritor of an early project at MIT. *Dow Day* had been ported to ARIS, and to this day, ARIS remains the only open source, readily available technology for GPS, location-based game-design available for mobile devices. *ARIS* runs on iOS (iPhone and iPad). *ARIS* allows for interactive storytelling and triggers events by GPS location. At the same time, the platform itself has constraints, and so the model of *Dow Day,* which was already running on *ARIS*, was used as a basis for the initial kinds of gameplay that could be devised. While development on *ARIS* was done over the course of *Jewish Time Jump,* the initial design work had to begin from the then-current constraints of *ARIS*. *ARIS* remains in development and *Jewish Time Jump* remains in iterative design. *Jewish Time Jump*'s development has contributed to the *ARIS* platform in a number of ways, including the addition of haptics (vibration scripts), and a variety of new design-editor tools including universal location controls.

Implications for the game are potentially broad, including a variety of player-audiences both inside and outside formal and informal Jewish and secular social studies education settings. For the purposes of the research study, and the focus of design, the initial target audience was fifth to eighth graders and their families,primarily in Reform Hebrew supplementary schools. This choice was to attempt to address a population of Jewish learners with high attrition from secondary schools. Could an intervention potentially impact attrition numbers? The researcher is still working on answering this research question, and understanding how the game may address attrition from formal and informal Jewish education settings. Initial results suggest that numerous design elements can contribute to deepening engagement in perspective-taking, and historical investigation with an emphasis on civic participation in a pluralist democracy, informed by a player's religio-ethnic-communal perspective.

Key Findings

In summary, these frameworks explore and highlight the importance of designing for the variability in personalities, pleasures, motivations, and abilities. These frameworks make a strong case for 1) embedding content within reachable, yet challenging goals, with strong feedback and mastery ability, 2) allowing for delightful and unexpected experiences that could not necessarily be achieved in the real world in the same way, 3) allowing for meaningful interaction with others, in variable ways, and 4) being aware of the accessibility of the designed space, as well as the variability of the audience for which it is being designed.

Learning and audience

In recent times, there has been a bit of a debate about whether commercial and serious games can benefit learning, with several studies on the subject (for example, see Connolly, Boyle, MacArthur, Hainey & Boyle, 2012; McClarty, Orr, Frey, Dolan, Vassileva, & McVay, 2012; Shute & Ke, 2012; Wouters, vanNimwegen, vanOostendorp & vanderSpek, 2013; Young et al., 2012). The most compelling evidence seems to state that games designed for learning (i.e., serious games) are significantly beneficial for learning and retention over traditional instruction, though are not significantly motivating (see Wouters et al., 2013).

The research on learning with digital games has often focused on the motivational and learning properties of games. As such, most of what we know about effective learning with games focuses less on learning styles and more on their multisensory potential (in other words, how effective game mechanics, attributes or design elements aid in learning, motivation or engagement). This may be in part because the research on learning styles has mostly remained inconclusive (Pashler, McDaniel, Rohrer, & Bjork, 2008).

Wounters et al. (2013) suggest that effective learning with serious games needs to 1) be supplemented with other instructional methods, 2) incorporate multiple training sessions, and 3) allow learners/players to work in groups. Their findings are very similar to findings involving other learning technologies, particularly computer-assisted instruction. Wounters et al. (2013) also offer that one reason games may not have been found more motivating than traditional instruction may have been competing outcomes such as "learning versus playing or freedom versus control" (p.13). They cite that the world of instructional design and game design are still in the process of alignment.

Koster (2005) outlines that learning can be problematic, particularly because learners look for shortcuts (or cheats). Cheating, however, does not allow us to fully understand a concept, and is often reflective of problems in the design. Cheating can involve using codes to easily gain money or experience, or downloading modded weapons or armor developed by others so that you can gain an unfair advantage. Exploiting the game, on the other hand, involves very experienced play. It involves finding work-arounds not intended by the developers, which can put certain players at an advantage when used. Someone who has mastered and explored the game system is better able to do this. Koster points out that human beings often want to get better at things and one way to do this is to make things more predictable and easier by exploiting (i.e., taking unintended shortcuts or racking up experience beating weaker opponents). As designers, however, we do not want players/learners to circumvent the challenges we have put in place.

Koster (2005) recommends that the game system can be successfully designed to minimize cheating and exploitation, as well as enhance learning. He recommends incorporating the following elements:

1. **Preparation:** Allowing a player to prepare before a given challenge with choices that can affect their chances of success (i.e., allow them to practice in advance, or heal before facing a strong opponent).
2. **A sense of space:** Create this through the landscape, and players.
3. **A solid core mechanic:** Create an intrinsically interesting rule sets.
4. **A range of challenges:** Vary the challenges they encounter in interesting ways.
5. **A range of abilities required to solve the encounter:** Provide multiple kinds of tools with multiple abilities. In many games, these abilities unfold over time as you play. Koster (2004) provides the example of checkers, where you learn to force the player to make moves that work against her over time, but not the first time you play.
6. **Skill required in using the abilities:** Vary the kinds of elements or tools a player has during play. Different resources and how they are applied can lead to success or failure, and skills develop over time as they learn to apply resources differently.

To ideally make a game a constructive learning experience, it should include:

1. **A variable feedback system:** A player should receive feedback on their performance and ways to improve it.
2. **Ways to deal with the mastery problem:** Finding ways to tailor the game to the player's level of experience. High-level players will not learn anything new from easy experiences and will end up exploiting; inexperienced players cannot learn from games that are too difficult.
3. **Failure should be part of the learning experience:** While Gee (2004) points out that games lower the consequences of failure, Koster (2004) feels that there should be an opportunity cost. You are more likely to learn if you are forced to prepare differently after a failed task.

Creating opportunity costs for failure can take many forms and does not have to involve losing it all. In fact, most contemporary games allow players to start near a particularly difficult part of the game (instead of going all the way back to an earlier or incredibly far point in the game). As Lazzaro (2004) points out, frustration can inspire focus and creativity, but it has to be effectively designed to do so. We do not want learners to abandon the objective, but we want them to understand there is an opportunity cost to not completing the experience as intended. We should try to scaffold that in the form of a learning-oriented goal or activity.

A further and fundamental consideration when designing games for learning is how formal or informal educational content is presented to the learner. "Learning mechanics are patterns of behavior or building blocks of learner interactivity, which may be a single action or a set of interrelated actions that form the essential learning activity that is repeated throughout a game" (Plass, Homer, Kinzer, Frye, & Perlin, 2011, p. 3). In designing for learning, Plass et al. (2011) make the case that learning mechanics must further be intrinsically and meaningfully connected with game mechanics. They argue that the learning mechanic must be grounded in the learning sciences or learning theory.

Learning mechanics describe which kinds of functions and scaffolds are needed in the environment, though not the actual game mechanics involved, which can vary by game design. An example of an ineffective learning mechanic would involve interrupting a racing or shooting game with popup "educational" questions before play could continue (Plass et. al., 2011). An example of an effective learning mechanic might be having a learner select or integrate related objects, though how they select or integrate them through game mechanics could vary by game or interface. For instance, a learner could drag one object onto the other, such as in a simple matching game, or break objects apart and put them back together again in new and meaningful ways, such as in *Minecraft*. The goal of the activity and the game type employed should reflect the learning outcomes desired (i.e., learning related objects or categories versus learning properties of objects that could make new objects).

Designing for inclusive learning

For many years, games were designed for demographics, which often meant designing for stereotypes and assumptions of what people liked according to their gender (Lazzaro, 2008). Female players who enjoyed playing what was considered male-themed games were often not researched or marketed to because they were thought of as "oddities" (Taylor, 2008). Some felt, however, it was important to create a market and design for female play precisely because it would help to create more common ground and encourage development for female interests (Cassel & Jenkins, 1998).

Contemporary research suggests that females and males enjoy more in common in games (Lazzaro, 2008). In fact, recent studies have found that once females are given equal chances to train, gender differences decline and skill sets that often put inexperienced female players at a disadvantage level out (see Feng et al., 2007; Jensen & deCassel, 2011; Vermeulen et al., 2011). For a full review on the evolution of this literature, see Richard (2013a).

Research highlights that more is going on than differences in assumed gender preferences. Recent events and research suggests that females experience a significant amount of harassment online. In fact, they are three times more likely to experience harassment when using voice chat to play online (Kuznekoff & Rose, 2013). Harassment and gender discrimination can play a large role in discouraging females from playing and participating equally in gaming and learning opportunities from games (Richard, 2013c; Richard & Hoadley, 2013).

Less has been studied regarding ethnicity and race. Studies have found that ethnic minorities do not have the same access to high tech computer equipment as Whites (DiSalvo & Bruckman, 2010) and that they are more likely to experience racial harassment when playing online (Nakamura, 2009; Gray, 2012; Richard, 2013c). Studies have found that ethnic minorities can be profiled by the way they speak or by their avatars. Studies have also found that players want to have the opportunity to play as their ethnicity, and minorities are not always allowed to choose avatars that look like them (Kafai et. al. 2010).

Shaw's studies (2012a; 2012b) have found that LGBTQ (Lesbian, Gay, Bisexual, Transgender, and Queer), gamers (also known as "gaymers") are more concerned about finding places where they can express their experiences, than the lack of LGBTQ characters. She attributes this in part to the need to find safe spaces from bigotry, as well as anxiety over exploiting gay identity.

Overall, research demonstrates that marginalized gamers, who are overwhelmingly female, minority, and LGBTQ, are more likely to be negatively affected by exclusionary practices in game spaces (Gray, 2012; Kuznekoff & Rose, 2013; Richard, 2013c; Richard, 2013d; Shaw, 2012a; Shaw, 2012b), which affects their ability to identify with gaming (Richard, 2013d; Richard & Hoadley, 2013; Shaw, 2012a; Shaw, 2012b), develop confidence in their skills (Richard, 2013d; Richard & Hoadley, 2013), and ultimately learn from games (Richard, 2013c; Richard, 2013d; Richard & Hoadley, 2013).

Research shows that the absence of female and ethnic minority characters in games makes female and ethnic minority players feel they do not belong and reinforces others feeling they do not belong (Lee & Park, 2011; Behm-Morawitz & Mastro, 2009). Further, research shows that stereotypes of ethnic minorities and sexualized female characters make female and minority players feel less confident in their abilities, and reinforce stereotypes that are negative in general (Dill & Burgess, 2013; Miller & Summers, 2007).

Richard (2013d) conducted a mixed-methods study of game players and online communities where she looked at players' gender, ethnicity, sexuality (among other demographics), gaming identification, and gaming sense of ability. She found that female and ethnic minority players were more vulnerable to stereotype threat (stress caused by negative stereotypes aimed at your gender or ethnic group), which would affect their performance and confidence with games and learning from games.

Specifically, through her three-year ethnography, which involved playing and participating in online and offline console and PC gaming, she found that harassment was a persistent and prevalent gatekeeping activity that marginalized female and ethnic minority play and participation in the space. Females were more likely to be harassed, though ethnic minorities (specifically, African Americans and Latinos) also experienced harassment around ethnic characteristics, when they were easy to discern, typically through "linguistic profiling" (Gray, 2012) or through profile stalking (i.e., the act of looking up another player's profile to figure out their gender, cultural background, or sexuality (Richard, 2013c)). Richard (2013d) further found that a female-supportive (yet co-ed) community reduced stereotype threat vulnerability for females, as well as increased confidence across gender (Richard, 2013d; Richard & Hoadley, 2013). Her data showed support that harassment and negative stereotypes in games could affect players differently (specifically females and ethnic minorities). When designing games for learning, stereotype threat is particularly important because it can affect how people perform on learning tasks along with long-term identification with that potential learning medium.

Assessment Considerations

There is not necessarily one way to understand player experience, but prevailing methods have used quantitative measures (typically through surveys), qualitative measures (typically through interviews or ethnography), or a combination of both. Survey measures can come in various forms and depend on what is being measured. When investigators are interested in how a specific game might affect player or learner outcomes, they may be applied concurrently (or at some point during game play), or retrospectively, involving reflecting upon game play. Some survey measures are more interested in overall characteristics of players or their views on their overall experiences, so measuring how one particular game affects them may not be as important as players' sense of how certain games or experiences around games shape them or motivate them.

Many survey measures, however, as well as interviews and related measures (e.g., think alouds), are considered subjective, because individuals have to reflect on their conscious meaning making around their experiences. Survey measures, interviews, and similar reflective measures are useful in understanding player experiences, especially when point of view is important. When measuring social experiences around play, for example, point of view and personal experience may be important.

Particularly when dealing with survey data, issues of validity and reliability are important. Validity issues concern whether an instrument is measuring what it is intended to, while reliability issues concern whether the instrument remains dependable over time. Yee's critique of both Bartle's player types (2006) and the Big Five personality traits (2005) highlight issues of validity. For example, Yee (2005) makes the case that there's actually a large amount of inter-correlation among the Big Five factors (except for neuroticism), demonstrating that they are not truly independently measuring discrete parts of our personality. Similar critiques of independence have been made about Bartle's player types, as discussed earlier.

Ethnographic methods have been used extensively in research on virtual worlds and online games (particularly massively multiplayer ones) to understand player experience in socially complex game spaces. Boellstorff, Nardi, Pearce, and Taylor (2012), who have all conducted large-scale ethnographies on player experiences in these kinds of spaces, have written an extensive and thorough guide to online ethnographic methods. Typically, researchers take on the role of participant and observer, taking in and participating in play practices, as well as cultural practices. Analysis is still highly negotiated through the individual researchers' experiences and perspectives, but ethnography, like many rich qualitative methods, can often offer great insights into social interactions, particularly when wanting to understand contexts of play and meaning making, as well as where and how play or learning may be different for different groups of players, due to context or differential experiences.

There are also measures that are considered less subjective, such as those that use eye tracking, galvanic skin response (GSR), functional magnetic resonance imaging *(fMRI),* Electroencephalography (EEG), and facial or body expressions. Some of these seemingly objective measures, however, are still subject to interpretation, and may measure physiological or emotional responses to stimuli, but not necessarily learning outcomes in personal accounts or reflections on experience. Other forms of objective measures can involve implicit response tests, such as the implicit association test, where individuals rapidly respond to stimuli in a way that gets at underlying biases or associations.

Increasingly, scholars have argued for "stealth assessment" (Shute, 2011), or embedded and responsive assessment measures in games, so that games can be tailored for individual needs (e.g., Shute, 2011). For example, a game could vary its difficulty, provide just-in-time help, or offer dynamic feedback. It could also provide the teacher or instructor with feedback to help tailor instruction to students in other ways. Individual tailoring, however, may be complicated by collaborative, cooperative, or other kinds of multi-configurational play or learning. Furthermore, complex kinds of social experiences may be lost on these kinds of quantitative measures. Also increasingly, studies have relied on blending multiple methods to provide both detailed outcome measures (e.g., performance or learning outcomes), along with detailed case studies, interviews, or ethnographies, to give nuance and richness to the findings.

Future Needs

We are still uncovering which factors may derive motivations or pleasures from players, as well as the ways that social interactions and expectations influence and shape play. Researchers are starting to uncover and explore the relationships between large-scale interactions and individual experiences in context to further understand learning outcomes. As we start to learn more about who is playing, how much, and in what ways, especially in the ways that they play, learn and engage as compared to others with different backgrounds, pleasures, motivations and experiences, we will understand further about additional design consideration for addressing diverse players.