Epic Fail: Why is it ok to fail in Videogames?

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Abstract: Failure, the state or condition of not meeting a desirable or intended objective, is a promising area of study that could give insight into learning and allow for the creation of more effective learning spaces. Unfortunately, failure has transformed from simply not succeeding to something that determines future opportunities. In order to leverage failure, one must understand not only the metacognitive processes that are taking place, but also the learners' interpretations of failure and how those interpretations might impact their future performance.

Epic Fail

Most people avoid failure. In an age of constant assessment, failure has transformed from simply the state or condition of not meeting a desirable or intended objective, to something that determines the opportunities available to students. Failure becomes a label by which a student's mental faculties are assessed. In its most malicious form, a failure can even manifests itself as a learning disability. At this point it has devastating effects on how the student views themselves, and how society views the student (McDermott, Goldman, & Varenne, 2006). With so much at stake it is no surprise that students do not wish to fail.

Unhelpful, and often negative, feedback may be a reason that students avoid failure in the classroom. In a 1984 study, Harriet D. Semke concluded that feedback consisting only of whether there was an error, was interpreted as negative and unhelpful by students, even when the correct forms were supplied (Semke, 1984). Modern day classrooms still mark incorrect answers without supplying constructive feedback, a critical component that allows a student to progress. As a result, students see a failure with no suggestions on how they can improve. This lack of constructive feedback is alive and well in the form of multiple-choice and high stakes assessments, which simply require a student to get the right answer.

Traditional classrooms do not allow for much exploration of subject material. Instead, most classrooms employ direct instruction in which the teacher lectures the students about a given topic. This is unfortunate considering there are methods of instruction that have been found to be more effective than direct instruction, especially when it comes to understanding a topic (Schwartz, Chase, Oppezzo & Chin, In review). It is recommended that students experiment within a subject so that students become familiar with the deep structure that lies within the problem instead of being distracted by inconsequential features (Schwartz, Chang, & Martin, 2006). In this approach, rather than being told what the correct answer is, students come to understand the subject by reflecting on what they have tried, what worked, and just as important, what failed.

The fact that students are avoiding failure is troubling. Researchers, such as Kevin Dunbar, believe that failure is the key to innovation and discovery. Dunbar sought to gain a deeper understanding of scientific study and experimentation by observing scientists at work. During this time he discovered that most innovations occurred when experiments did not go as planned (Dunbar, 1999). An unexpected outcome indicates many things about the model used to predict the outcome of the experiment; Mainly, that the model used may be incorrect, or incomplete. The resolution of this failure leads to stronger and more accurate models (Andersson, 1982). It makes sense that new knowledge would spawn from behaviors and models that we don't completely understand.

Seymour Papert also appreciated experimentation and failure within a space in order to become familiar with it. Microworlds, self-contained worlds with discreet rules, were proposed as such a space in which students could experiment (Papert, 1993). Papert created the famous mathematical microworld of logo, a computer program that allowed students control a virtual turtle with simple commands. The commands, which were mathematical in nature, could then be strung together in a program that would allow the turtle to draw a picture. Papert argued that by testing the bounds of this world, and subsequently finding what doesn't work, students were able to experience the language of math in an immersive way. James Gee found similar learning environments in videogames.

The sandbox principle, as Gee describes it, is one of the necessary elements found in good video games (Gee, 2003, 2005). In a sandbox, players are allowed to work within a space where risk and

danger is mitigated. This experience and definition is similar to that of Papert's microworlds. Industry has also come to understand that exploring the state space of a game is a key component to creating a fun game. In other words, failing is part of the fun. Koster gives the example of Tic-Tac-Toe, and how the game becomes boring once all possible moves have been realized (including those that do not result in a win state) (Koster, 2005). Schell also notes that that the complexity of the state space, and the resulting exploration of this space, allows for the creation of a good game by keeping the player interested (Schell, 2008). Because exploration, and in turn failure, is a necessary component of good games, we might be able to look to videogames when creating a space where assessment is present but still allows for a student to fail.

Players fail a great deal before they become proficient in any sense. Most modern videogames now have a ranking systems of some sort built in as a measure of proficiency. These can come in the shape of leaderboards, statistics, or levels. Often times these statistics can be unfavorable; however, rather than discouraging players, they serve to drive a player to succeed. This remains true in games where players receive negative, sometimes degrading feedback. In *Katamari*, the King of All Cosmos constantly berates the player's progress, even when s/he meets the game's objectives and completes a level (Namco, 2004). More recently, *Portal 2*'s main antagonist, GlaDos, can also be heard criticizing a player's performance (Valve, 2011). Obviously, failure and negative feedback does not effect the player in the same way that it would a student in a classroom. Most of the time, this failure actually leads to "recursive play" where players reflect on performance and hypothesize ways to do better (Squire, 2011). This begs the questions: How might we capture this positive feeling towards assessment and failure that commercial games seem to possess? Why is this feedback not interpreted in a negative light?

I believe the answers to these questions will be critical to our understanding of why failure is avoided in schools, but sought out in games. It is my hope that we consider how failure is presented in commercial games when creating learning environments in the future.

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Acknowledgments

This publication was made possible in part by grant number R25 GM08352 from the National Institutes of Health, National Institute of General Medical Sciences and funding from the Gates Millennium Foundation. It's contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIGMS, the NIH, or the Gates Millennium Foundation.

Gameful Learning and Global Social Problems

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Abstract: In Fall 2011, we taught an experimental course pilot for a required undergraduate course in Global Social Problems. We designed this course using a gameful approach that was heavily inspired by the work of Jane McGonigal. Students were given the opportunity to take heroic action through three course missions to research and take action to deal with various global social problems. Ten heroic character traits were used to frame course activities. A peer review process was used to assign scores and award student profile badges based on each trait.

Gameful Learning

What does it mean to be gameful, or to be a part of a gameful activity? According to Webster's, to be gameful means to be, "Full of game or games" (Webster's, 2012). Jane McGonigal's perspective is more nuanced; being gameful is synonymous with serious play—to confront a serious challenge and to "learn and improve" in some way as a result (McGonigal, 2011, Chapter 1). Moreover, McGonigal challenges us to rethink and reinvent our notion of everyday participation in ways that are gameful. To do this in an educational context means providing students with the chance to, "turn intellectual strengths into superpowers, tackle epic challenges, and fail without fear" (McGonigal, 2011, Chapter 7). Gameful learning empowers learners through challenge in ways that are constructive and learner-centered, that guide students through thoughtful reflection, and that motivates students to "change the world in meaningful ways" (McGonigal, 2011, Chapter 11). Gameful course designs can thereby help students to build agency and confidence, and inspire critical evaluation of the world in which they live. McGonigal used a gameful approach to design the real-life alternate reality games *World Without Oil* and *Evoke*. This approach enabled players to participate in ways that motivated them to work at community levels to address serious social problems. Similarly, we provided students with the time and tools to address social issues through social media participation, as well as through involvement with local community organizations. Students collectively created blog entries, reflections, tweets, posted a YouTube video, commented on online news articles, volunteered their time and engaged in fundraising and awareness activities. We adopted a gameful framework by which student activities were grounded through a set of ten "heroic" character traits (our course values). A peer review process provided a scoring system by which students earned character trait points, and 'superhero-themed' badges were posted on public profile pages. It was our hope that a gameful approach to learning about global social problems could provide opportunities for "epic wins" by encouraging students to tackle projects important to them, and to encourage participation that was "heroic" and "satisfying". (McGonigal, 2011, Chapter 12).

Course As Superstructure

Students do not often get the chance to tackle real global social problems within the context of a required class. However, such perspectives are essential if we aim to help students gain global perspectives. Attaining these perspectives requires that we respond to "an ethical call to action", to "reach beyond the classroom to the larger community…and to connect theory with the insights gained from practice" (Hovland, 2006; AAC&U, 2002 as cited in Hovland, 2006). We were thus determined to reinvent the *idea* of what a class could look like, and in doing so adopted what McGonigal refers to as a "superstructure" for our class to foster a highly participatory learning environment (McGonigal, 2011, Chapter 14). The Global Social Problems course at St. Edward's University was heavily inspired by the ideas and superstructure that drives *Evoke*. *Evoke* is organized into a series of weekly missions; each mission challenges players to respond a 'call to action' to address a given social issue. We similarly organized our class using a mission-based framework. Students had to complete three missions in the class: to Research a global social issue, take Action to address the issue, and Imagine a solution to a chosen social problem. Unlike Evoke, students were able to select any global social problem to address, and student teams formed during the Action mission to tackle a broad social problem. Teams tackled issues ranging from Consumerism to Water Security, Poverty, War in the Democratic Republic of the Congo, and Gender Inequality. The overarching goal for this class was to offer students the opportunity to take heroic action to address real social issues through in-depth research, inquiry and action through social media and non-profit volunteer channels.

Game Mechanics

Ten heroic character traits served as the foundation for all course activities and include: Cooperation, Courage, Creativity, Credibility, Empathy, Perspective, Persuasion, Clarity, Precision and Tenacity. In addition, students were asked to contribute their perspectives on each character trait in a live in-class brainstorm using the online tool, Answergarden.com (a collaborative brainstorming tool). The Global Social Problems course site can be found by visiting http://academic.stedwards.edu/globalsocialproblems/, and a listing of character traits, associated attributes and links to Answergarden brainstorms can be found by visiting http://academic.stedwards.edu/globalsocialproblems/page/character-trait-attributes.

Students were asked to provide scores for each of these traits to two other classmates, based on a review of their blog syntheses (http://academic.stedwards.edu/globalsocialproblems/blog). Ratings were accompanied by constructive and critical feedback, which was sent to each student via email. Five peer reviews were conducted over the term after blog syntheses were due, and scores were posted to student profiles (http://academic.stedwards.edu/globalsocialproblems/page/peer-review). Students were instructed to award a maximum of 5 points (on a 0 to 5 scale) per trait, with a maximum of 25 points awarded overall for each peer review. Superhero-themed badges (custom-created for the course by professional artists) were then awarded based on points earned. Three levels of badges were created for each Character Trait based on three corresponding attributes for each trait. Badge Levels were awarded at 8-point intervals (see Table 1). Other examples can be found by visiting student profiles on the course site at http://academic.stedwards.edu/globalsocialproblems/users. In addition to Superhero badges, other custom badges were also awarded for other course activities, such as Twitter participation.

	Credibility Level 1	Credibility Level 2	Credibility Level 3
			
Superpower	Accuracy	Trustworthiness	Verifiability
Points needed	8 points	16 points	24 points

***Table 1*: Credibility Character Trait Badge Levels and Superpowers.**

Limitations

Students participated to varying degrees in the peer review process. While some students provided reviews for two other students, others did not. Therefore, point adjustments had to be made to ensure that people were not penalized in the badge award process. Likewise, student attitudes towards the Superhero-themed elements of the class were mixed. While some students asked their badges and visited their profiles during class, others did not. Further research is needed to determine the extent of student interest in this format. Whatever their attitudes are towards the superhero gaming genre, students demonstrated a high level of engagement in this course overall, as evidenced by their social media participation, participation in their local Action mission projects, and through anecdotal feedback.

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Sometimes Paper IS Better: The Case of The Field Museum's Biodiversity Scavenger Hunt

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Abstract: Members' Night is an annual event at which The Field Museum gives members a peek behind-the-scenes with access to collections and laboratories throughout the Museum. Museum staff have collaborated to author and run museum-wide scavenger hunts in 2010 (photo) and 2011-2012 (paper). Directed at families, scavenger hunts give visitors a learning-based mission when exploring the behind-the-scenes. Technology was found to be a barrier to participation in the 2010 photo hunt, with many families lacking the ability to take photos or unwilling/unable to share photos. Feedback and technical difficulties from 2010 forced a shift to paper-based hunts of 2011-2012. Feedback from all years was positive, but the paper hunts of 2011-2012 had higher participation rates and more positive feedback than the photo hunt. Over three iterations, more than 1,000 families have participated in the hunts. Lowering barriers to participation has resulted in a rewarding experience for families at this annual event.

Introduction

As with most museums, less than 1% of The Field Museum's collections are on display at any point in time. Started in 1951, Museum's Members' Night is an annual event that gives special access to members, guests, and their families with a goal of showcasing the Museum's science, research, collections, exhibits, and educational programs. During this two-night event, members can explore a portion of the collections that are normally closed to public viewing, interact with Museum staff, learn about cutting edge research, tour new exhibitions, and take part in activities and games. Music, art, food, and games are used to make the event an enjoyable family experience that celebrates science.

Typical annual attendance for both nights approaches 10,000 visitors. The event attracts a large spectrum of guests, from toddlers to senior citizens, although demographic data indicates that the average attendee is an adult aged 30-40 with children between the ages of 8 to 10.

Biodiversity Scavenger Hunt

Increases in access, options, and visitorship can make Members' Night overwhelming for some guests. To address this, the Museum's departments of Biodiversity Synthesis and Education collaborated to design and offer museum-wide biodiversity scavenger hunt activities that serve as both a learning opportunity and a guide to navigate the event. The Field Museum has extensive experience in developing scavenger hunts for family and teen audiences, both in paper and digital forms. Presently, paper scavenger hunts can be downloaded from the Museum's website and are often available for pick up at multiple information desks in the Museum's main hall. Digital scavenger hunts that incorporate QR codes and multimedia content for smartphones or other mobile devices are also available, but are typically geared toward our teen audiences. Past successes have included introducing audiences to content or areas of the Museum previously unknown to the visitor. Failures have included loss of visitor retention resulting in incomplete scavenger hunts and our observation that digital scavenger hunts that require smartphones are ill-used or unused for a variety of reasons including access to technology and inappropriate fit for audience type.

Offered since 2010, each biodiversity scavenger hunt has two versions: a Behind-the-Scenes Hunt and a Museum-Wide Hunt. The behind-the-scenes areas are the most popular aspect of Members' Night and can be crowded, so the museum-wide option allows players to participate no matter how popular the event becomes. In the Behind-the-Scenes Hunt, players are given clues leading them to specific specimens on display in the behind-the-scenes areas. These specimens are chosen in collaboration with the Museum's scientific staff and showcase current research, important results, or local species of interest. The Museum-Wide Hunt consists of open-ended questions in which players can use the entire Museum to find answers. These questions challenge players to use their science

knowledge and apply it to the Museum's exhibitions and collections. The two versions are as equally popular with players and most elect to try both. Completed hunts are returned to stations for small prize rewards (such as Museum-branded pencils, water bottles, or stickers) for correct answers.

Each year, the scavenger hunt is widely promoted prior to the event with email and Facebook blasts, in the Member's Night guidebook, and within the Field Museum website. The hunts are broadly promoted during the event with banners and signs, and staff members recruit participants at Museum entrances.

In the 2010 pilot year, hunters were tasked with taking digital photos to answer to each question. The photo hunt was designed to leverage the Museum's involvement in the Encyclopedia of Life project with the best visitor photos showcased on EOL species pages. More than 100 families participated during the two-night event, taking over 600 digital photos. While feedback from those who participated was positive, many families did not have cameras with them or were hesitant to use their phones to take the necessary photos. Digital photography became an unexpected barrier to participation for the majority of people who expressed interest in the scavenger hunt activity. Many people declined to participate because they did not have a camera or did not want to email images taken with their phones. Visitors who did participate often had trouble getting their images submitted; problems included difficulty locating the correct images on their memory cards and Museum card readers not accepting their memory cards. Demographic data revealed that most participants were adults and young adults who considered themselves active amateur photographers.

In 2011, to simplify participation and address the barrier that digital photography appeared to present, the scavenger hunts were re-designed for paper and pencil only, with both paper and pencil provided by Museum staff. Players simply had to write down the correct specimen name and location for the answers. The reward system shifted from being showcased on the Encyclopedia of Life to only providing prizes of small Museum-branded items. Over 400 families participated over both nights, and demographic data revealed that the median participant had dropped from adult to youth (2011 median age = 9). The 400% increase in participation from 2010 to 2011 suggests that a major barrier to participation was addressed, although repeat players indicate that some of this difference can probably be attributed to the scavenger hunt activity becoming an established event. The paper-based hunts were increasingly popular in 2012 with over 640 families participating over the two nights; the median age continued to reach the youth demographic (2012 median age = 10). The paper-based scavenger hunts were able to reach and engage large numbers of youth and families, where the photo-hunt did not.

Feedback for the scavenger hunts from all years has been extremely positive. Most participants describe the hunts as a helpful way to guide their route around Members' Night and a fun activity for the entire family. Participants said that the scavenger hunts gave them a clear plan of action, allowed them to learn new things, and allowed them to see areas of the museum they had never visited before. Larger families or groups describe splitting themselves into teams to race against each other, an unforeseen modification that may have helped to increase the popularity of the activity. Comparing player feedback from 2010 with feedback from 2011-2012, the paper hunt is more uniformly described as fun and educational than the photo hunt. Common feedback themes were that the paper hunts allowed players to more freely explore the museum without the concerns of worrying about lighting or getting the best shot. Additionally, 80% of players indicated that the paper-based scavenger hunts helped them learn while 64% indicated that it helped them to navigate the Museum. Table 1 contains direct quotes from players who provided feedback on the 2012 paper-based hunts.

"Yes, by doing the hunt I learned about Antarctic dinos, species of birds, tarantulas, fish, komodo dragons, snakes, sharks, Audubon book, amazed at size of some birds! This is the best way to see behind-the-scenes!"
"It got you to places we have never been, even though we come here a lot, we saw new places and learned new facts."
"I learn many new things and I like the prizes. I did photo hunt in the past but it was time consuming to download and share photos, and it was also difficult to take photos because it's so crowded and busy. I liked photo hunt, especially being part of Encyclopedia of Life, but paper hunt is easier to do."

***Table 1*: Sample player feedback from the 2012 paper-based scavenger hunts.**

Paper-based activities have certain advantages that digital technologies, despite their increasing ubiquity, cannot yet replicate. Paper-based scavenger hunts are a familiar and popular activity with a

low-barrier to participation. Digital photo-based scavenger hunts were more difficult for family play because the family may have to share a piece of equipment that certain family members might not know how to use, or that equipment is viewed as personal and not wanted to be shared. The context of Members' Night may also play a role in the popularity of paper-based scavenger hunts. Members' Night is full of new sights, sounds, events, experiences, and learning moments that can result in over stimulation. Adding a camera, smartphone, or other device with a new set of mechanics might be seen as a distraction. The familiarity and simplicity of paper might be the best way to add to an already action-packed event.

Conclusion

While digital technology will become increasingly ubiquitous and barriers to participation will lower with each passing year, for the immediate future, we still need to take technological barriers into consideration when designing games and activities. Activity design must consider what or if technology is really adding to participation and potential learning. Digital technology should be used in the appropriate context and when it adds unique affordances to an activity. Despite the temptation offered by digital technology, sometimes paper is the best medium to engage audiences in an informal learning experience.