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“You Know You’re Going to Fail, Right?”: Learning From Design Flaws in Just Press Play at RIT

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Abstract: In the fall of 2010, faculty in the School of Interactive Games & Media at the Rochester Institute of Technology began the initial planning for an achievement system meant to recognize and reward student engagement in non-curricular activities—specifically activities that successful graduates of the program regularly cited as significant factors in their undergraduate experience. This paper describes the design process used to create the initial version of the Just Press Play system, the results of the implementation during the 2011-12 academic year, and the significant redesign of the system that took place based on assessment of the first year of the system. We focus on the elements that *didn’t* work in our initial design, and how those failures informed our redesign process.

Prologue: “We Should Get Achievements for Being Awesome!”

In the spring of 2010, several faculty members at in the School of Interactive Games and Media at Rochester Institute of Technology had a conversation with students in which the students suggested that they should get achievements to commemorate particularly awesome activities they’d engaged in as students—from participating in school-sponsored game jams to organizing social activities to discovering interesting and out of the way places on and off campus. This idea blossomed into a proposal to Microsoft Research to support the initial exploration of a student achievement system.

During the spring of 2011, the lead faculty on the project met with colleagues at a number of universities to discuss the potential impact of the proposed achievement system, and to engage in dialogue about both the goals and the risks of such a system. In one of these meetings, a well-respected scholar in the field enthusiastically endorsed our idea, but also remarked “You know you’re going to fail, right?” She meant not that we weren’t capable of building the system we imagined, nor that there was no value in building it—but rather that building something so new and untested meant we were nearly guaranteed to encounter significant problems. She was right. While overall the project has resulted in a number of notable successes and continues to evolve in ways that support our students, we have indeed made some poor design choices that are worth discussing, so that we can help other organizations avoid comparable mistakes.

Act I: The Hero’s (Dangerous) Journey

When we pitched our project to the funding organization, we likened the student experience to the hero’s journey—students begin their educational journey with only the vaguest of goals. They know they want to graduate and get a good job—which equates, broadly, to slaying the dragon and acquiring its riches. Along the way they encounter a series of obstacles that seem to them to be arbitrary—difficult professors, classes they have no interest in, unfamiliar environments—but that they later find have been helpful in helping them gain necessary skills. In the context of a game, they recognize that the obstacles serve a larger purpose, and that there’s an underlying structure to the narrative. In college, however, students don’t necessarily recognize that their experience follows a similar narrative arc, or that they could benefit from “walkthroughs” offered by successful upperclassmen and alumni. Our goal was to create a system that could help them identify the landmarks on a successful journey through our university. (Martinez et al., 2012)

But just as our student-heroes encountered risks along their journey, we recognized that there were enormous risks in what we were proposing. Achievement systems, and gamification more broadly, were emerging as what Deterding (2012) recently described as “hot, hyped, oversold, misunderstood, unavoidable, a buzzword, a question mark, a quick fix, a huge unfulfilled potential.” While we chose to focus on the last aspect of that description, the problems with gamification were a major concern for us. We did not want our system to become the kind of “exploitationware” that Bogost had pilloried in his essay and talk “Gamification is Bullshit” (2011). Nor did we want to risk damaging our students’ intrinsic motivation to engage socially, intellectually, or creatively—and the research on motivation made it clear that poorly done reward systems could indeed cause exactly that sort of damage.

We also knew from experience that building a large-scale pervasive game (or game-inspired system) to engage a community was a daunting task; our work on the community game *Picture the Impossible* (Beckett, 2010; Shearing, 2009) had been very successful, but also had required an extraordinary expenditure of time and energy by our faculty and students. Given that we were designing a system for an undergraduate population of nearly 800 undergraduate students, to be maintained over an entire academic year (unlike the seven weeks of the *Picture the Impossible* game), we were concerned about the scalability and sustainability of the system we were proposing.

Despite our warnings of the risks ahead, however, in the late spring of 2012 we were offered—and accepted—funding to develop and test our proposed student achievement system. This is where we made our first mistake; we committed to a launch date of September 2012, which was only three months after we received our funding. We spent the summer designing the mechanics and content for our achievement system, while simultaneously building the web infrastructure to support it. This work was done primarily with two full-time faculty members who were focused on the content and user experience components, and two students who were focused on the infrastructure and technology.

Overall, there were many successes during our first year of production, including an increase in positive and playful student-faculty interactions, and a significant growth in peer tutoring and mentoring activities leading to increased freshman programming class success rates. (Decker & Lawley, 2013) However, for this paper we have chosen to focus on the aspects of the initial implementation that were not successful.

The concurrent development of content and mechanics with infrastructure and interface led to multiple instances of disconnect between our game design and our technology design, setting the stage for the next act of our drama.

Act II: In Which Our Heroes Find Themselves in Grave Peril

In late August of 2012 it became clear we would be unable to complete our work in time to launch with the start of our academic calendar in early September, and we pushed our launch back to mid-October, to coincide with our university's homecoming celebration. This was a non-negotiable date, as high-ranking representatives of our funding agency then made travel plans to attend the launch celebration.

While we were able to launch on our target date, we did so with a number of technical problems, most of which were a result of insufficient time for development and testing. While the problems related to login and security were all correctable, they unfortunately resulted in a negative initial experience for many of our players, which set a poor tone for widespread adoption. These early problems were in fact cited as a reason for hesitance in adoption of the system by many students interviewed during our assessment process later the year.

Login Problems

Access to our web-based system was largely dependent on the single sign-in university login system that ties most of our campus technology together. We hoped that by using an existing and familiar login, we would lower the barrier to entry for players.

When the system launched, logins appeared to be working properly from a user standpoint. However, over the next 24 hours we discovered underlying problems with our ability to connect with the single sign-on system that began to cause our user logins to fail. We had tested our login and new user experience in our local development system, but until we connected to the live credentialing system we were unaware of some of the problems that could occur in the live system. This was exacerbated by the fact that our university was shifting to a new student information system during this period that placed additional strain on the login system, and also resulted in changes to the protocols necessary to connect to it. While we were able to correct these problems, the unreliability of the system during the first few crucial reduced user engagement and confidence in the system.

We also encountered problems with the security of our connection to the university's login server; the validation mechanism between our server and the university's authentication servers had not been sufficiently vetted or tested. After we launched, an anonymous complaint to the university's

information security officer (ISO) resulted in our server being shut down entirely while these security issues were resolved.

Workflow Problems

We had only one server for the project, which was not a problem for a processing load standpoint with only a few hundred users. However, we soon realized this approach was problematic from an updating and maintenance standpoint. Changes to either content or underlying infrastructure were tested on our developers' own computers, but not in a realistic simulation of the live server. As a result, unexpected problems often occurred when pushing new content or technology to our live server. Any significant changes required us to take the live server down for an extended period of time, which further damaged our players' confidence in the system.

Achievement Types

Our achievements in the system took five different forms:

- Internal system triggers (friending another user, completing the tutorial, etc)
- Administratively assigned based on general criteria (e.g. the "Undying" achievement assigned to all players in the system if our 90% of the students in the introductory programming class received passing grades)
- User-submitted content (photos, URLs, etc) reviewed by an admin
- Unique codes printed onto collectible cards distributed at specific events; players received the achievement upon entering the code on our site
- RFID keychains that players could "swipe" at specific locations to receive credit for attending an event or visiting a location



Figure 1: Collectible Card and RFID Keychain

for our cards, and printing the resulting unique coded cards onto cardstock using a duplex color laser printer. The resulting cards looked quite professional, but only if they were cut very carefully on a high quality paper cutter, a workflow that ended up being difficult to maintain. When cutting was outsourced, or assigned to student workers, the cards often ended up irregular in size.

More importantly, the unique codes, which seemed like an elegant solution to ensuring that only one student could get credit for an achievement based on collecting a given card, ended up having some significant disadvantages. First, the codes were cumbersome to enter, and resulted in frustration on the part of the players and a resulting reluctance to take the time to enter them in at all. Second, if they did choose to enter the codes, it was typically long after the event they'd attended to receive the card. Consequently, our statistics on when players received achievements did not accurately reflect when they had engaged in that activity. This combination of problems meant that our achievement data was both incomplete and inaccurate in terms of representing patterns of student use of the system.

Achievements based on internal system triggers, general administrative assignment, and user-submitted content all worked as intended, and have been retained in current versions of the system. The other two mechanisms, however, presented unanticipated problems.

Collectible cards

We modeled our collectible cards on the popular Moo.com "minicards," a half-size business card with a full-bleed image on one side and text on the other. ("MiniCards," n.d.) We worked with faculty in our university's School of Print Media to develop a

workflow for generating unique codes, merging them with the artwork

RFID Keychains

Designing and printing new collectible cards for every activity was unsustainable both financially and functionally, and we wanted the ability to be able to spontaneously add activities for which students could receive achievement credit. We originally considered posting QR codes that students could scan, but user research revealed that a large percentage of our students did not have phones capable of scanning QR codes. QR codes also are quite easy to duplicate and share, which could have damaged the integrity of our recordkeeping. As a result, based on the interest and expertise of one of our students, we decided to purchase small RFID-enabled keychains and several portable RFID readers that could connect via WiFi or ethernet to our network and send scanned data back to our server to automatically assign achievements based on time and location.

Unfortunately, we were unable to find a way—in the very constrained time available to us—to connect the RFID readers to the campus network in a way that met our information security office’s requirements. The student who worked on the project had excellent computer hardware and engineering skills, but did not have sufficient software or programming skills to be able to work with the poorly documented and supported RFID equipment to build appropriate communication protocols for our use. As a result, we were unable to implement the RFID achievement functionality in the system, rendering the keychains that our students carried purely ornamental.

It’s worth noting, however, that students continued to carry the keychains even after it became clear they would never be functional components in the system. Even after the school year had ended and the initial system was retired, many kept the keychain as a tangible reminder of their participation.

Achievement Categories

In our initial design process, we attempted to create a structure for our achievements that reflected our understanding of some of the tensions that our students face. Specifically, the tension between design and development is a critical one throughout our students’ work in our program, as is the tension between individual and collaborative work. We began with a dual-axis quadrant system that used design and development as one axis, and individual and group as another. However, it became clear in trying to place our various activities into the grid that this model was difficult to operationalize, so we shifted to what became our final version; an axis representing breadth and depth (labeled as “exploration” and “mastery”), and another representing individual and social (labeled with icons rather than text). While these breakdowns made sense in the context of our extended discussions on underlying narrative, they failed to resonate with students, most of whom had no idea what the four different quadrants represented, or that achievements were associated with specific vectors based on their content.



Figure 2:
Initial Achievement
Quadrants

We also chose to create a system of levels, based on the concept of a progression within a profession. All players began at the initiate level (a tutorial phase), which required the completion of four achievements, one in each quadrant. Because some of these achievements required the player to pick up items from our departmental offices, this made it impossible for students who were not on campus (including the significant percentage away on co-op job assignments, or recent grads who still feel strongly connected to the program) to be able to participate in any meaningful way.

The combination of a difficult to understand model and a restrictive leveling system that prevented many players from engaging in interesting content led to significant dropoff in use of the system after our initial high enrollment numbers.

Privacy Concerns

In our initial planning for the system, we had hoped to interface more fully with university data systems to give students credit for activities that are already tracked. For instance, using ID cards to enter the residence hall cafeteria in the morning could potentially have triggered an achievement for eating breakfast several times a week. Our goal was in part to expose to students the amount of data being collected about them, so that they could begin to make informed decisions about how to manage that. However, it also raised significant privacy concerns for the achievement system. As a

result, all user-facing data was anonymized; players picked usernames and could only be viewed or searched through those names. Privacy options were (1) Private: only you can see your achievements or profile, (2) Friends Only: only people you've accepted as friends in the system can see your achievements or profile, and (3) All Players: Any logged-in user can see your achievements or profile. There was no public access to the system; all content was limited to logged-in players.

Unsurprisingly, many players kept their default setting, making it impossible for others to see their activity on the system, even when that activity was in no way revealing or problematic. More importantly, because players' real names were not included, it was difficult for them to find their friends and classmates in the system. This reduced the social appeal of the site, and increased user frustration.

Act III: Pick Yourself Up, Dust Yourself Off, and Start All Over Again

As noted earlier, we had a number of notable successes throughout the year. The problems, however, were valuable to us in shaping the current version of our system. While the redesign process and result cannot be properly addressed in this paper, we can share some "lessons learned" from the failures noted above that have shaped our process and resulted in significant changes.

Changes Implemented in Fall of 2012

Login and Security

We realized that it is crucial to thoroughly test the reliability of a live version of any identity management system over a sustained period of time before a launch. We also discovered that tightly-coupling our system to the university's systems created more technical and security complexity than the single-sign-on convenience warranted. We now store our own user IDs and passwords for the system rather than validating players through the university's single sign-on system. We also now coordinate in advance with the ISO to ensure that they are comfortable with our privacy and security before we deploy new code.

Three-Stage Server System

Rather than maintaining a single server for our system, we have moved to a three-server system. There is a development server on which all testing of new technology occurs, there is a staging server where new content is deployed and checked to ensure there are no unexpected conflicts or problems, and there is a live server that players access.

Because user registration occurs on the live server, user data is pushed only from live to staging and development; this includes the players themselves, and all information about their achievement history. New achievement content is added first to staging, and then pushed to live. New technology, backend or frontend, is created on development, pushed to staging in order to test it with current content, and then pushed to live.

RFID→QR

In retrospect, it was unwise for us to rely on unfamiliar and poorly documented technologies for a key piece infrastructure. In the second version of the systems, we committed to using only well-documented and supported technologies that were not dependent on specific vendors or equipment. We settled on QR code technology, but not in the way it is typically used. Rather than having players scan in QR codes, which would create a barrier for students without mobile devices, each player has a unique QR code that they can print out from the system website onto any printer (or display on a mobile device or computer). We provide a workstation in our school office where they can print their code as a sticker, and then either affix it to their ID card or place it in one of the clear plastic keychain fobs we provide. Picking up the keychain from the office staff also yields an early tutorial-stage achievement and associated collectible card.



Figure 3: Personal QR Code

All faculty and staff with the ability to assign achievements have access to a mobile app (iOS or Android) that allows them to select an achievement and then scan a player's code. The achievement is instantly assigned, giving the player quick and positive feedback and also providing us with far

more accurate counts and timestamps for achievement completion. The new approach has been enthusiastically received by both students and faculty.

Collectible Cards

Requiring players to enter lengthy codes was problematic from both a user experience and data integrity standpoint. We no longer use this mechanism for achievements. However, the collectible cards were very popular with students, so we wanted to retain a card component in the system. In the current iteration, every achievement has an associated collectible card, but these cards are printed offsite in playing card format, and distributed to the student after they receive the achievement. We are also implementing a card game using those cards to create additional endogenous value.

Achievement Quadrants

The lack of clarity in our dual-axis quadrant representation resulted in our scrapping those categories entirely, and rethinking the underlying content of our achievements. We eventually chose to keep the quadrant metaphor, but made each quadrant a distance category related to skill sets we were encouraging in our students—Create, Learn, Socialize, and Explore. Each achievement in the system now has four points associated with it, which can be distributed across the various quadrants based on the achievement



Figure 4: Revised Achievement Quadrants

content. Thus an achievement that asks you to recreate a famous tableau with your friends, take a photo of it, and submit the photo might have 2 points in the Create quadrant, and 2 points in the Socialize quadrant. The user interface was modified to make the quadrant point distribution and meaning clearer to the players.

Achievement Levels

Our use of discrete levels to provide players with a sense of progression resulted in highly problematic restrictions on what content new players could access. Because the current system has points associated with achievements, we can show progression and growth within quadrants without imposing dependencies. The current version of the system makes all content visible and available to all players, while still providing them with feedback on their progress in terms of numbers and types of achievements.

Privacy

Based on feedback from our players, we changed the privacy options, defaults, and available information related to players. The full names of all players are now included with their profile, and the list of all players can be seen and searched. User profiles (including photos and achievements earned) are hidden unless the player has explicitly enabled sharing. There are three privacy levels to specify who can see your profile and activity in the system: (1) friends only (the default), (2) any logged-in player, or (3) public. The addition of the third option was a significant change for us, and it was welcomed by our players, who wanted to show off their activities and achievements, and find other people doing similar activities. Players who have set their profiles to public can share their profile URL and individual achievements with others, including through social media.

Happily Ever After?

The current iteration of our system is not without flaws, and our technical and content design continue to be refined and updated. While it will never be perfect, the mistakes we made have most certainly contributed to our own understanding of the challenges and potential of adding game mechanics to the undergraduate student experience, and we expect that over time this system will become a model for other institutions.

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