Using Badges for Shaping Interactions in Online Learning Environments

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***Abstract*: In this paper, we describe an online course management system (titled Adventures in Emerging Media) designed to allow students to choose their own pathways through learning content (a choose-your-own-adventure online course). In addition to providing students with additional agency and narrative prompts, we also used badges, or achievements, to promote specific types of student behaviors. This study provides data collected from approximately 200 students enrolled in this online digital media course in which badges were used to incentivize targeted student behaviors, such as taking an exam within a certain timeframe or responding to student work with especially helpful feedback. In addition to a brief analysis of relevant achievement assessment data, we also describe our approach to the mechanics of achievement design and show some of the elements of design and layout used to incorporate the achievements into a learning management system.**

Achievements, Badges, online learning, web design

INTRODUCTION

On March 1, 2012, the 4th Annual Digital Media and Learning (DML) Competition, an event co-sponsored by Mozilla, the John D. and Catherine T. MacArthur Foundation, and HASTAC (the Humanities, Arts, Science, and Technology Advanced Collaboratory), announced the winners of its Badges for Lifelong Learning Competition through a press release posted to their web site [1]. In this press release, the DML competition noted that the purpose of the competition was to explore new ways to build badge-based systems in order to "build digital badge systems and explore the ways badges can be used to help people learn, demonstrate skills and knowledge, and unlock job, educational and civic opportunities." Winners were awarded grants ranging from $25,000 to $75,000 to explore this concept and develop prototypes for meeting these objectives through digital, badge-based systems. Four winning proposals selected from a pool of 91 finalists represented teams from a variety of organizations including Disney-Pixar, NASA, the Manufacturing Institute, and the Young Adult Library Services Association.

The DML competition is perhaps the first large scale initiative to bring attention to badges as an important tool for learning and training outside the realm of video games. Badge-based achievements, or trophies, have long been used in commercial video games to alter gameplay behaviors and encourage particular types of interactions within a system. In this way, they provide additional feedback information that the player can then use to adjust his or her behavior. This can happen preemptively, when a player has a particular trophy or achievement in mind, or in real-time, as in the case when a trophy or achievement suddenly becomes "unlockable" within a given session of play.

Because of this feedback function, achievements used in video games encourage players to spend more time within the system and to alter their playing habits in order to unlock particular types of challenges (e.g., find every coin in a given area or unlock a particular puzzle within a certain amount of time). However, badges have now made the transition from entertainment media to other forms of scholarship and pedagogy, particularly in online learning environments [2, 3, 4, 5].

In this paper, we describe the learning management platform supporting our badge delivery system and present data collected from approximately 200 students enrolled in an online digital media course in which badges were used to incentivize certain types of online student behavior (e.g., taking an exam early, or posting particularly helpful feedback to a fellow student on the discussion forums). First, however, we will provide a general background about our course and the unique way in which content is delivered to students.

COURSE DESIGN

Adventures in Emerging Media (AEM) is an online course created by the authors working in the University of

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Central Florida's School of Visual Arts and Design. The premise for the course is to develop new models for online instruction that are not constrained by the same factors as more popular learning management systems (e.g., *Webcourses*, *Blackboard*, or *WebCT*). In particular, we hoped to encourage different types of interactive online behaviors. Recent research shows that increased interactivity has a positive effect both on student motivation and performance [6].

Our course design methodology for AEM, in which we developed our own software and curriculum, created an experimental sandbox in which we deployed new types of interactive features such as adaptive module selection and nonlinear progression through the course. While the course was first offered in fall 2010, achievement badges were not integrated into the experience until the fall 2011 offering of the course. Students in AEM are required to complete one learning module per week and have 3-4 different modules to choose from. Each week's modules are loosely arranged around a general learning objective. For example, week four's learning objective is "study the history of emerging media", and students are able to choose from the four modules "history of video games", "history of the Internet", "history of animation", and "history of interactive entertainment". Most modules consist of a video lecture, supplemental readings, and an activity that is posted to a discussion forum when completed. Twice during the semester (midterm/final), students must complete a multiple-choice adaptive exam that tests only the modules they completed each week. In the case where students decide to complete more than one module per week, they are given the option of which module to be tested on.

The course modules are driven by a narrative that features the animated fictional billionaire, Nelson Von-Berners, that the student (the protagonist in our story) is trying to impress enough to earn a job at the fictional *Tri-Helix Corporation* – a multi-national media conglomerate. Elements of the story include travel to exotic locations, regular video correspondence with Von-Berners and members of his staff, and golfing trips on the moon. Achievements feature prominently into the course and are intended as both a motivator and an indicator of progress. Many of the achievements tie into the narrative by including Von-Berners' likeness in a variety of situations. For example, the "Early to bed, Test Scores Will Rise" badge, which is earned by completing the midterm or final at least two (2) days before it is due, depicts Von Berners at the foot of his bed in pajamas, and "Bern, Baby Bern", which is given when a student posts five (5) constructive comments on a peers' discussion forum, remixes the "I Want You" Uncle Sam profile with Von Berners' image (Figure 1).

Badges become motivators in the achievement section of the course where students can see a leaderboard and compare a list of their badges against their peers. During focus groups conducted at the end of the course, students indicated that seeing peer badges sometimes motivated them to best their friends and climb the leaderboard, and one student made us aware that a special Facebook group was created for the purpose of deducing how hidden badges were awarded. This suggests that badges can motivate students outside of their use as directly supporting learning content [7].

FIGURE 1. SAMPLE ACHIEVEMENT BADGE.

METHODS

In order to examine the effects of the unique design features of the AEM course—particularly the use of badges—we administered surveys to all enrolled students. A total of 138 students completed the survey given at the completion of the course. The survey asked students to report on specific features of the course, such as the embedded narrative and the nonlinear selection of course content, as well as the achievement badges and points.

RESULTS

Overall the response to the design of the course was positive. Similar to the Year 1 implementation of the course, students were highly receptive to the opportunity to choose their own learning modules as well as to the exams that tested them only on the material presented in their chosen modules. Over two-thirds of students reported that they thought these two features were "extremely positive." There was also continued support for the "pursuing your dream job" narrative, with over 50% reporting that this was either extremely positive or mostly positive.

In general, students had only a modest positive response to the achievements. For example, when asked

whether the achievement system had a positive impact on the course, the average student response was 4.14 on a 7-point scale (with 7 being the most positive). The tepid response to achievements was likely due to frustration some students had with not being able to find or complete all the badges offered in the course. Some of the badges were purposefully designed as "hidden" achievements where students had to search for activities that may be rewarded, or wait for a classmate to make this discovery. While we had hoped that this would even further motivate students' positive work habits, there were some hidden badges that proved to be too difficult to achieve, and some that could not even be identified. This was frustrating for some students since part of their grade for the course was based on how many achievements they collected. Nevertheless, there was evidence that the achievements still had the motivational effect that was desired. When asked if they felt that they could get a badge if they worked for it, more than half of the students (63%) said yes. Likewise, exactly half of the students said that they were motivated to get a badge when they saw that one of their friends had earned one. We are confident that these results will be even stronger next year when we scale back the number of hidden achievements and make the system of grading related to achievements more clear.

Despite the somewhat lukewarm response to the badges overall, there was an interesting and promising result in the survey data pertaining to the achievement system. Because this system is based off of video game platforms such as the Xbox, one might predict that the system would have the biggest impact on students who played video games, namely males and people most comfortable using technology. We actually found the trends going in the opposite direction, however. Females generally responded more positively to the achievement system than did males. For example, the graph in Figure 2 shows the responses to the question of whether they were motivated to get a badge after seeing a classmate earn one. The difference between males and females in this sample was marginally significant, $F(1, 125) = 3.63$, $p = .059$. The results indicate that the use of video game conventions in an online course likely does not have the bias effects we feared. We also found that there was generally no difference in attitude toward the achievement system based on how comfortable a participant rated themselves to be with technology. The only difference was that people who rated themselves more comfortable with technology tended to believe that they had a better chance of actually obtaining the achievement, but it did not affect their overall perceptions of the system's value.

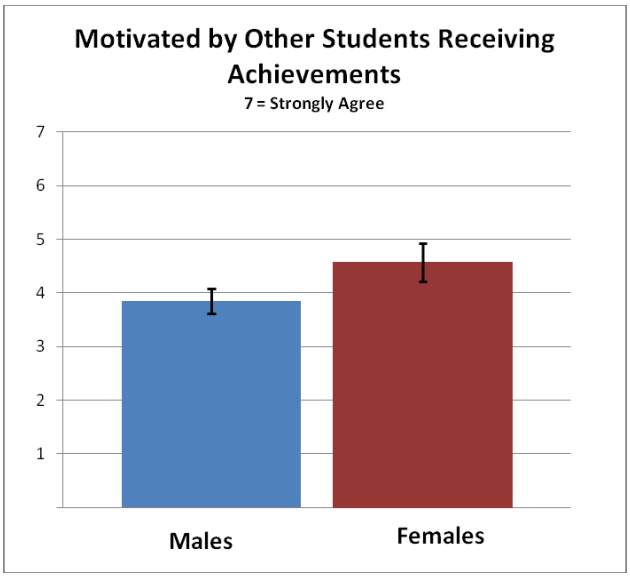

FIGURE 2. MOTIVATION BY GENDER.

FUTURE RESEARCH

The data collected so far in this study suggests that using badges and achievements in online courses is a worthwhile topic for additional study. In particular, gender differences in motivation seems to be an area that merits additional data collection and analysis. Furthermore, the authors believe that the type of achievement (e.g., hidden vs. immediately visible) will also prove to be significant in terms of student satisfaction and motivation when pursuing targeted online tasks.

CONCLUSION

In this paper we described our attempt to apply a video-game-style achievement system to an online learning environment. Students taking a narrative-driven "choose-you-own-adventure" style course were rewarded for productive and pro-social behavior using a system of badges. There was positive response to the overall course design, though there was a mixed response to the use of badges, likely due to the impact that not getting badges had on students' grades in the course. Some interesting trends to follow up on in future studies include the gender differences in attitudes towards achievement systems, which in this study were surprisingly favored by female students. We hope findings such as these will increase interest in the use of badges for promoting positive behavior in online learning environments.

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