

# The *Lit2Quit* Mobile App: Evoking Game-based Physiological Effects that Mimic Smoking

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**Abstract:** Well-designed games are not only engaging and enjoyable, but they can also provoke cognitive and affective engagement that may promote behavioral change. This is in fact the mission of the *Lit2Quit* mobile game designers and researchers. Drawing on cognitive and behavioral change research, *Lit2Quit* has designed a health game with an innovative breath-control design element, which by mimicking the physiological and perceived effects of nicotine could help smokers reduce or quit their smoking habit.

## Introduction

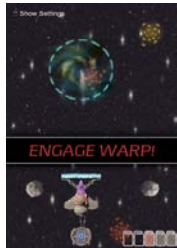
Tobacco is one of the leading problems the world faces today. Although tobacco use may have decreased, it remains the leading cause of preventable death in the United States (RWJ Foundation, 2009). Among adult smokers, 68.8% report that they want to quit completely, and more than 52.4% tried to quit in 2010 (Malarcher, Dube, Shaw, Babb, & Kaufmann, 2011). Regardless of many available behavioral, physiological, and medical interventions, many smokers still struggle with quitting or reducing their smoking habits (Lancaster, Stead, Silagy & Sowden, 2000); thus, the necessity of new approaches to this problem is evident. Can a mobile game become an option for smokers to change their behavior and reduce their smoking habits? Incorporating breath as an innovative game control, *Lit2Quit* aims to mimic similar emotional and physiological effects as of smoking. Ideally, when smokers crave a cigarette, they can reach their pockets to play *Lit2Quit* instead of lighting a cigarette!

Breath therapy has been proven to be an effective intervention for reducing smoking habits (O'Connell, Hossein, Shwartz & Leibowitz, 2007). Breath therapy interventions for smoking cessation focus on guiding smokers in regulating their breath mechanism in a way that slows down the pace of their whole body and therefore promotes general relaxation (American Lung Association, 2009). Compared to other interventions, breath therapy allows greater scope for physiological effects and has been shown to be an effective intervention for smokers in other contexts since it mimics the physical behavior of smoking (O'Connell et al., 2007). However, a major drawback of breath therapy is the low motivation on the part of participants to continue the process. Thus, new approaches are needed to motivate smokers to persist in the intervention and to support them throughout the process. *Lit2Quit* offers an engaging game-play that could be an effective behavioral coping strategy, motivating smokers to adhere to the self-regulated process of smoking reduction, while providing similar physiological and perceived effects of smoking.

Research shows that smokers perceive smoking as a sedative or stimulating experience depending on their state of mind (Donovan & Marlatt, 2007). However, physiologically, nicotine is a stimulating substance that increases heart rate and raises the skin conductance level. Mirroring the perceived stimulating and sedating physiological effects of nicotine, *Lit2Quit* is designed in two modes, Rush and Relax. These modes use specific breath patterns and game-design challenges to either excite or relax the player, depending on the mode of the game.

The Rush mode of the game (see Figure 1.a) provides a stimulant effect through breath control, fast paced game-play, warm colors, and energetic sounds. Playing Rush, the player is on a mission to bring light to the galaxy by creating stars while avoiding obstacles in the universe. In connection with certain obstacles encountered during play, players periodically perform quick inhale and exhale cycles- called "Breath of Fire" (BoF). For each BoF, players exhale quickly and repeatedly with high pressure into the device's microphone. The frequency and duration of BoF, and number of breaths for each BoF are adjusted based on the player's natural breath rate and their level of expertise in the game. BoF has been proven (Gilbert, 1999) to stimulate the body, increases the heart rate, and to create a sensation of "light headed"—a feeling similar to stimulated effect of smoking.

On the other hand, the Relax mode (see Figure 1.b) provides calming effect through breath control, slow paced game-play, cool colors, and relaxing sounds. In this mode, the player is a speck of light and has the mission to gather stardust from the earth and bring it back to the sky. In order to control the movement of the stardust, the player breathes slowly and consistently during the 5-minute game-play. The game automatically adjusts the in-game breath rate to half of player's natural breath rate, measured prior to the game-play. Deep, slow, and consistent breath has been proven to relax the body and provides a sense of calmness (Courtney, 2009)—a feeling similar to sedative effect of smoking.



**Figure 1a: Rush mode of Lit2Quit**



**Figure 1b: Relax mode of Lit2Quit**

A review of experiments into color and emotions concludes that red colors are more physiologically arousing than blue colors (Valdez & Mehrabian, 1994). A combination of red color and loud sound in the game will lead to higher levels of arousal and perceptions of excitement; whereas a combination of blue color and soft sound in the game will lead to a calm and soothing experience (Valdez & Mehrabian, 1994). Accordingly, warm colors and energetic sounds are used in the Rush mode, and cool colors and soothing music in the Relax mode of *Lit2Quit*.

In this poster session, we will discuss *Lit2Quit* game design and challenges, present data confirming that *Lit2Quit* partially mimics perceived and physiological effects of smoking nicotine, and talk about future plans to test whether *Lit2Quit* changes smokers' behavior long-term and helps them reduce their smoking. The hope is that smokers craving a cigarette reach for their mobile device to play *Lit2Quit* instead of lighting a cigarette!

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# Student Perceptions: A Game-Based Achievement System in an Online Undergraduate Course

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**Abstract:** We examined student perceptions of an achievement system used in *Adventures in Emerging Media*, a novel online course design that allows students to choose what topics they wish to learn in an attempt to acquire their dream job from a fictional media CEO. Modeled after the achievement systems used in contemporary video game platforms, this system rewarded students for completing both standard course requirements, as well as performance considered above and beyond minimal requirements. Students responded to Likert-scale survey questions asking them to assess how much of an impact achievements had on their effort and performance. Results indicate an overall positive response towards the use of achievements.

## Background

The ever-growing popularity of video games has spurred interest in their use in education. Gee's (2003) eleventh principle of what education can appropriate from video games is *Achievement*. Video games, Gee argues, contain rewards and achievements that also indicate the player's increased skill (2003). Video games as simple as Pac Man contain more intrinsic rewards than traditional schooling, giving players a sense of empowerment and increased skill within the game that educators should attempt to mimic (Squire, 2003).

## Course Design

*Adventures in Emerging Media*, offered online at the University of Central Florida, is a unique course designed with the explicit goal of targeting student motivation. Students were given an increased amount of autonomy and agency in several aspects of this course which included choices in modules and assignments, aspects that are analyzed in detail in other papers (Lindgren & McDaniel, in press). In an effort to help the instructor to encourage specific online behaviors that may not occur naturally in a course designed to encourage choice and agency, achievements were designed as control structures to promote productive and pro-social class activity. At the outset of the course, students were informed that an achievement system would be used, not only as a fun way to track individual accomplishments in the course, but also as a component of their participation grade.

Achievements were stored on individual student pages within the course website and can be categorized into two types: visible and hidden. As the categories indicate, students were able to see the visible achievements prior to completing them. The hidden achievement badges only became visible after a student completed the required tasks to obtain these achievements. Because students could at any time compare their achievements with those of another classmate, theoretically, once one student had acquired a hidden achievement, it became visible to all other students comparing their achievements to those of the student who had obtained it.

Styled to look like plaques, the achievements were given interesting titles and graphics (Figure 1). Student achievements were displayed in a grid format on the student's course page (Figure 2). Five visible achievements were received automatically for: posting a required student introduction on the course discussion forum, successfully completing the first three weeks of the course, successfully completing two-thirds of the modules, successfully completing all required modules, and turning in the Week Twelve Milestone for the Final Project. The course also included six hidden achievements for: being the first person to post a project each week, answering a peer's course-related question on the discussion forum, turning in a project with exceptional detail or technical skill, completing three modules for one week (rather than just the required one), completing four modules for one week, and for watching at least some of the video contained in each module for a given week. These hidden achievements, especially, were designed to reward students for exploring additional course content and performing tasks that increase their quality of learning, such as revisiting previous weeks' material, engaging with peers, achieving higher levels of mastery, and using their time more effectively (such as taking a quiz early). These are behaviors in which naturally intrinsically-motivated students intuitively engage; the assigning of extrinsic rewards to these activities was done with the

anticipation of teaching less motivated students that these behaviors can be beneficial, reinforcing these behaviors in students innately performing them.



**Figure 1: Example Achievement Badges.**



**Figure 2: Achievement Grid.**

## Student Perceptions

It was our expectation that these achievements would operate in a similar manner to reward systems in video games, prolonging student engagement, increasing motivation, and providing satisfaction in accomplishments. One way to assess the effectiveness of these goals is to directly ask students for their opinions. A total of 138 students enrolled in the Adventures in Emerging Media course during the Fall of 2011 completed an online survey upon the completion of the course. Students were asked to use a Likert-scale from one to seven to self-evaluate the impact that the course’s achievements had on both the effort they put forth in their course assignments as well as their overall performance in the course. An additional limited-response question on this survey asked students to indicate their primary motivation to obtain achievements during the course.

The Likert-scale responses were averaged and suggest a generally positive response to the course achievements. Students agreed most strongly, with an average of 4.78, with the statement indicating that they believed the achievements were realistically obtainable. Students averaged an agreement level of 4.14 in response to the achievements having a positive impact on the course. While these levels lean toward a generally positive perception of the awards system, they are lower than might be expected. This was likely the result of frustration about the hidden achievements being difficult to identify. This was confirmed in a small-group interview at the end of the semester where participating students expressed discomfort with having a component of their grade tied to rewards that were not always apparent. On the limited-response question, 48% of students specified that their acquisition of achievements was motivated by the impact of achievements on their grades. Nine percent indicated that they earned the achievements in an attempt to improve the perception of their work by the instructor, and, 8% attributed achievements to the perception of their work by their classmates. Interestingly, females responded more favorably to achievements, averaging .68 higher on the Likert scale than their male peers. Finally, 15% of students indicated that they wanted achievements but could not articulate their exact motive for doing so, and the final 23% of students claimed they were simply not motivated to earn achievements. These results indicate that game-based achievement systems show potential for use in formal university courses as one method of student motivation and deserve further study and, perhaps, alternative implementations.

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