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# Gamifying Course Content with SmashFact

Britt Carr

## Introduction

The annual report, *Grade Change: Tracking Online Education in the United States, 2013* (Allen & Seaman, 2014) revealed an important and surprising trend: an increasing proportion of educational leaders view online courses as requiring greater discipline in order to be successful than face-to-face learning. In fact, more than 2/3 of those surveyed believe that students who are taking courses online face greater barriers. This poses a potential problem for both learners and institutions. For learners, this means the responsibility for completion of a degree requires exceptional intrinsic motivation and initiative in figuring out the key concepts they need to master in order to be successful. For institutions, students who are not successful drop out, and degree completion rates are a key metric of success, and academic leaders identify the issue of student retention for online courses as a serious concern. Therefore, identifying ways to enhance student success in an online environment is not just a concern for students themselves, it's an important challenge for all of higher education.

Those who take online courses require greater self-discipline for reasons outside of the learning environment, with many students choosing this type of learning environment because they are also juggling things like full-time jobs and family obligations while also trying to pursue a degree. As a result, online students already face an uphill battle because they have less time than traditional students for their courses.

However, they also face the limitation that they do not have the face-to-face feedback from instructors to learn which key concepts they need to master. As we look to the future of online learning, a majority of higher education students can expect to take at least one online course. In order to enhance online students' abilities to utilize the time they have available for their courses, and instructors' success in meeting their students' educational needs, we need solutions that isolate the most important concepts and help students master them faster.

This article describes one particular solution that fills this need, a new product introduced in November of 2013 called SmashFact. SmashFact was designed as a solution for faculty to reduce time making rudimentary terms and concepts more engaging and spend less time on remedial learning. The tool facilitates the learning process by "gamify-ing" basic course content and reduces the barriers to success. By allowing teachers to transfer course content into a study-game app, students are able to use the app on any of their devices: phones, tablets or desktop computers.

## Background

Beginning in 1994, I began developing interactive learning solutions for higher education. As an instructional designer and educational technologist at a university, my job facilitated an opportunity to meet with faculty and delve deeply into their educational problems for which they were seeking solutions.

**Video 1.** A timed theater lighting simulation that would allow students to diagnose lighting system problems  
<https://www.youtube.com/watch?v=96amweDM6Xo>

Early on, I was called upon to help solve instructional problems brought to me by faculty that required students to learn complex procedures or analyze a situation and act accordingly. I quickly became efficient at developing truly engaging tools that helped reduce the key barriers to learning for which faculty and administrators were seeking technological solutions.

These unique educational problems rarely lent themselves to “point-and-click the answer” solutions. Multiple-choice activities were only an extension of “point-and-click.” In fact, the byline of my learning activities blog was “Multiple Choice is Boring.” I was in a professional role where I could approach a learning problem with whatever I could dream up, and each solution provided an opportunity to push the boundaries with how each activity could be employed to enhance the educational goals and student outcomes.

In 2005, a faculty member in a the-

atre department approached me to create a timed theater lighting simulation that would allow students to diagnose lighting system problems without hurting the theater’s equipment or themselves. I developed a photorealistic simulation of the theater for which students could navigate and find a non-working light and fix the problem before the show started. The result was students having substantially more opportunities to practice learning this important skill they needed (see *Video 1*).

In another example, I was asked by a biology department to design a fetal pig dissection, to allow online nursing students to be able to dissect a photorealistic fetal pig. The costs associated with bringing online students into a lab, having clean, sharp instruments, and storing pig fetuses, and dealing with the sour smell of formaldehyde was no longer an issue. In addition to making the learning experience more convenient, students were able to practice the dissection

**Video 2.** An interactive fetal pig dissection  
<https://www.youtube.com/watch?v=vDuRi2buAFk>

**Video 3.** Jazz by Ear game  
<https://www.youtube.com/watch?v=N2IvfunjnFI>

process, something rarely possible when working with a fetal pig in a lab (see *Video 2*). *Note: Video contains graphic material.*

In 2006, the then Dean of Fine Arts at Miami University, Dr. Jose Bowen (author of *Teach Naked*) came to me with a request for an activity to support his popular Jazz History course. His class was a face-to-face course, and he was interested in developing a teaching activity that facilitated the “inverted classroom” approach. Prior to this time, I was not familiar with the term, despite the fact that my most effective learning activities also effectively facilitated the process of moving the content delivery out of the classroom, to save time for more meaningful activities during class.

The activity, *Jazz by Ear*, provided the inspiration to *SmashFact*. This activity was a learning game version of the popular game “Name That Tune” tailored for Dr. Bowen’s Jazz History students. The activity was designed to teach students with no musical ability or training, the skill of analyzing jazz styles and famous pieces. The solution saved both students and Dr. Bowen valuable time. Students could study (play) at their own pace, remediate where necessary, and they knew that they were studying exactly what the Dr. Bowen needed them to study. *Jazz by Ear*’s level design spelled out what the student needed to know and let them practice as often as needed to prepare them for the exam (see below).

Faculty could not possibly repurpose these learning tools unless they had a programmer on staff. *Jazz by Ear* was developed in Adobe Flash and delivered to students via browsers. Its reuse by other faculty would require two things:

1. In order to use *Jazz by Ear* in another jazz history class, faculty members would need to align their courses with the way the game levels were laid out ac-

ording to Dr. Bowen’s semester plan.

2. For faculty in other disciplines wishing to repurpose the *Jazz by Ear* style game, a Flash Developer would need to sift through the code, make appropriate changes and prepare media to be in the proper format for delivery.

With these barriers, I determined that a system was needed that could allow faculty to create an activity that could be customized for their curricula. I determined that the interface needed to be simple enough to be employed on smartphones and to allow different types of content (audio, images and text) to be used. Perhaps most importantly, I decided it needed to offer a method for faculty to get their course content into the game without great effort.

In level 1, students learn instrument recognition. Level 2 teaches the student to listen for the most prominent or solo instrument. Each subsequent level became progressively more difficult, and was aligned with Dr. Bowen’s curriculum. In order to advance in the game, the current level had to be mastered. Mastery was achieved by randomizing the sounds in question, as well as the answers on the screen. Each incorrectly answered question was then returned to the queue until it was answered correctly. By level 32, students were asked to determine the jazz style by listening to a particular artist.

Since I was the only instructional technologist working for the university at that time, planning for an activity to be reused was critically important. By changing the artwork and swapping the sound files, I was able to reuse *Jazz By Ear* for another Fine Arts faculty who taught phonetics.

This time, I developed a game that associated each sound with the appropriate symbol. The game was called “Phun with Phonetics”.

SmashFact website address: <http://www.smashfact.com/iljDemo/index2.html>

## SmashFact

The solution I developed was SmashFact. This educational tool provides teachers/professors a way to “gamify” study material by quickly turning course content into a customized app without having to write any code. Like the other activities I had developed, SmashFact provides a platform for faculty members to engage students while letting them practice exactly what they need them to know. SmashFact is flexible, allowing faculty members to include audio, images or simply use text.

### How SmashFact Works:

1. Teachers transfer study content from their course lectures on SmashFact.com. Content can include text, audio or images.
2. Teachers send a ‘SmashFact Code’ to their students
3. Students purchase the app (for any smartphone, tablet or laptop) and paste

in SmashFact code. Students play by “Smashing” the correct answer as fast as they can.

4. Teachers get usage data to share with administration or to use as attendance, grades for extra credit or participation points.

After registering on [smashfact.com](http://smashfact.com) teachers and faculty are walked through the activity creation process by a step-by-step ‘wizard’ which introduces them to the terminology and requirements for creating their own study app. Faculty need to:

1. Provide a title - This allows students to identify your activity in their app.
2. Add a ‘Level’ - levels can be levels of difficulty or they can align with your curriculum (i.e, Chapter 1: Level 1, Chapter 2: Level 2, etc. ).
3. Fill the level with a Question / Answer pair- Questions can be text, audio or images. Add a question and its answer. Faculty can even specify three custom

distractors for each level. A minimum of four question / answer pairs are required for each level.

4. Specify a course to use the activity in. Assigning an activity to a 'Course' helps faculty keep tracking information organized.

SmashFact offers a means by which to track and produce customized analytics via detailed reports on students' progress, which can be imported into MS Excel or most learning management systems.

A 'Dashboard' keeps activities organized, and lets the faculty know how many students are using their activity.

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## Testing Assumptions

SmashFact.com launched on November 26th, 2013, and the student apps became available for download from Amazon, Google Play and iTunes on January 8th, 2014. As of January 8, 2015 (on year to the date of the app release) SmashFact now has over 428 faculty users and is in 102 colleges and universities institutions across the U.S. and Canada.

The app itself is designed to refresh activity data every time it is opened on the student's device. This was intended to let faculty add, adjust or rewrite questions as the semester progresses. Faculty can use this feature to progressively build the activity as the semester moves forward, customizing and modifying the content as needed along the way. One approach is to add a level for each lecture or chapter or week covered in class, giving faculty the means to stay ahead of the course's delivery without

having to design the whole activity upfront. Each time students re-launch the SmashFact app, the new information is refreshed.

SmashFact is suitable for most subjects and for most grade levels. The purpose of the activity is to facilitate lower-level learning, focusing on drill and practice of facts, terms and their definitions, and recognition of ideas and concepts. The app is also helpful for bringing students back up to speed after a long and academically lazy summer. SmashFact activities can also be designed for one course and reused for remediation in later semesters during higher-level course work.

Although the app was designed primarily for college students, the structure and purpose of the product lends itself to learning that occurs in the K-12 environment as well. During beta testing, I created a simple SmashFact activity for my first grader. "Addition and Subtraction" has helped my son and his peers drill simple math problems. In one week, these simple drills helped my son achieve a perfect score on his timed math tests, where he was having difficulty even finishing before.

SmashFact has been modified to facilitate 508-compliance. The SmashFact app interface by design was to aid those with poor vision, by using big buttons and bold contrasting type for questions and answers. Student feedback is delivered in traditional color form (green for correct and red for incorrect) and also delivered audibly. A smash sound indicates a right answer while a golf club swing/miss indicates a wrong answer. Faculty click a link to have all of their SmashFact content (with the exception of images) exported in a standard HTML file which can be read by most screen readers, top to bottom, left to right. The activity can be refreshed by the student to allow the answers and distractors to be randomly delivered for further practice.

## Future Directions

Future versions of SmashFact will address several learning challenges raised by faculty members. The first issue is related to scoring. Currently, students have 10 seconds to answer each question. For every second that passes, students lose 10 points from the allowable score for each question. Missed questions are thrown back into the “unanswered” queue. No additional points are added for replaying a level. Future versions will adjust replay scoring to allow students to improve their score by practicing more.

In addition, future versions will offer the ability for students and faculty to track incorrect answers. Faculty members will be able to customize game feedback to prompt student to replay levels with a high number of incorrect answers. This feature will also help faculty identify poorly written questions or course content for which students are experiencing particular difficulty. In the next version, SmashFact will offer adjustable font size to increase the amount of characters a question can contain. Currently the limit is 56 characters. Fourth, we will consider the settings for previewing questions. Faculty can currently press a button and see a preview of how their question will appear in the SmashFact app. However, in the next version, a thumbnail image and speaker indicator will be available in the Question/Answer settings.

Finally, faculty members will be offered the opportunity to share their activity with others. This feature may be particularly useful as a kind of open source educational solution. Faculty members can make available their app for colleagues or teaching assistants so they can begin the development of the own version by building on an existing activity. A “Duplicate” function will allow faculty in the same program to share the same root activity, and each faculty will be able to customize questions or make an easier/more

advanced versions.

## Conclusions

Higher education is facing new challenges as a growing proportion of higher education learning is occurring online. In fact, as of Fall 2012, 7.1 million students were taking one online course, indicating that 1 in 3 courses are now occurring online, and this number continues to grow. In order to increase the success of student outcomes, and increase degree completion for online students, we need to employ educational interventions that facilitate mastery of key concepts, particularly in introductory and “weed-out” courses — the most common type that are taken online. SmashFact offers one solution designed to decrease barriers to learning for both students and instructors.

## Reference

Allen, E. & Seaman, J. (2014). *Grade Change: Tracking Online Education in the United States, 2013*. Babson Survey Research Group, Babson Park, MA.

## About the Author

**Britt Carr** is the co-founder of Advanced Authoring and developer of SmashFact, has been developing interactive learning since 1992. In addition to helping solve teaching and learning challenges for universities across the country, he has served as a consultant to interactive software giants Macromedia and Adobe Inc. From 2008 - 2013, Britt was nominated as a Higher Education Leader and in 2009 received the “Impact Award” from Adobe for contributions to education. He lives in San Martin, California with his wife and two children.