Chapter 4

Gamification in Education and Libraries

In the previous chapter, we saw that even simple-looking games have a complicated structure of game mechanics and dynamics that are designed to generate the desired game aesthetics. Those game aesthetics constitute what we refer to as the "fun" part of gameplay whether it is the sensation of excitement and joy, the emotions of wonder and curiosity from the discovery of a new world that the game presents, the immersive narrative, the challenge that tests our abilities and boosts our confidence, or the chance to release stress and clear the mind from everyday worries.

If we can experience these game aesthetics in real life as well as in front of a video console or a computer screen, why wouldn't we? If everyday drudgery, dull learning experience, and stressful tasks can be ameliorated with the application of game dynamics and mechanics, wouldn't that be a great thing? Talking about Chore Wars and other apps that gamify reality, a game researcher, Jane McGonigal writes that alternate reality games (ARGs), or in this case gamified applications, are games that you play to get more out of your real life as opposed to games that you play to escape it. She believes that gamification enables people to participate in their real lives as fully as they do in their game lives.[1]

Why Gamify? The Power of Gamification

Gamification is a powerful tool due to its ability to capture people's attention, to engage them in a target activity, and even to influence their behavior. We have already had a glimpse of the power of gamification in the examples introduced in chapter 2:

- The Bottle Bank Arcade machine was used by nearly one hundred people over one night. During the same period, the nearby conventional bottle bank was used only twice.[2]
- During the three-day trial period, 24,857 cars passed the Speed Camera Lottery machine. The average driving speed went down from 32 kilometers per hour to 25 kilometers per hour, a 22 percent reduction.[3]
- When the Piano Stairs were installed in Odenplan, Stockholm, 66 percent more people chose the stairs over the escalator.[4]
- The winner of the Biggest Energy Saver Contest by San Diego Gas and Electric achieved as much as 46.5 percent energy savings, equal to 1,356 kilowatt hours for her family of three, and those who used the same energy-saving gaming app achieved 20 percent savings on average, compared to 9 percent by those who used only the device without the app.[5]
- Approximately 18 million people worldwide play Nike+.[6]

These figures and the impact of various gamification projects well illustrate the real power of gamification in motivating people and even enabling them to change their behavior for a goal that they decide to achieve. Gamification can function as a win-win strategy that results in fun, self-improvement for individuals, and even a social good all at the same time when it is carefully designed to create fun and joy with a goal closely aligned with players' own desires and values.

Game-Based Learning and Serious Games

If gamification can help people to save electricity and exercise more, could it help them learn better as well? Game-based learning and serious games had been a topic of much discussion and many studies in education even before gamification became popular.[7] Game-based learning and serious games focus on using commercial video games or creating full-fledged video games for education. Since gamification uses game mechanics and dynamics for educational purposes, serious games and gamification are often discussed together, and their boundaries tend to blur.

We have previously differentiated gamification from a game in that gamification is not a full-fledged game following the distinction made by Deterding et al. and Marczewski.[8] But we also saw that some gamification researchers, such as Kapp, use a broad definition of gamification, including both full-fledged games and playful design under gamification.[9] Serious games tend to give a much stronger role to certain gaming elements, such as avatar, fantasy, story and narrative, and fully virtual environment for play. The discussion on serious games also tends to focus more on the content of learning, while gamification is more broadly applied for motivating and engaging learners. However, in reality it can be tricky to identify the point where gamification ends and a full-fledged serious game begins, as shown in the examples such as New York Public Library's "Find the Future" and the Metropolitan Museum of Art's "Murder at the Met." This is even more so in serious games because just like gamification, a serious game has a purpose that is always more than entertainment. For this reason, some of the examples in this section may appear closer to a serious game than gamification depending on how you see it. With this in mind, now let's take a look at some examples of gamification used in businesses and workplaces, education, and libraries.

New York Public Library: Find the Future
http://exhibitions.nypl.org/100/digital_fun/play_the_game

The Metropolitan Museum of Arts: Murder at the Met
http://metmystery.toursphere.com/pages/

Examples of Gamification of Learning in Businesses and Workplaces

A large consulting company, Deloitte, developed a gamified online training program called Deloitte Leadership Academy. Gamifying this training program resulted in a 37 percent increase in the number of users returning to the site each week while also increasing the amount of time people spent on the program and the number of programs completed.[10] Cisco developed an arcade game called the Binary Game. It teaches the concept of binary numbers and how to think in binary by walking players through from forty to fifty problems in five minutes.[11] Cisco offers several other games related to computer networking as well. IBM created a first-person 3D interactive simulation game called INNOV8, which allows players to practice business decisions by running a fictitious company, After Inc. This game is used in many schools in business and IT programs including University of Southern California, Marshall School of Business. INNOV8 teaches the complex idea of business process management and skills such as business problem solving, prioritization, and consensus building by helping players make decisions that impact a fictitious company.[12]

Gamification is also used at workplaces for recruitment and training as in America's Army, lead generation in marketing, public relations (e.g., intelligence agencies), selection (e.g., problem-based interviewing), training, continuous professional development and up-skilling of the workforce (e.g., health professions), planning, performance and review processes (e.g., public sector), skill-based promotion (e.g., engineering), and development of personal health skills as shown in Keas.[13]

America's Army
http://www.americasarmy.com/

Keas
http://keas.com/

Cisco Binary Game
http://http://forums.cisco.com/CertCom/game/binary_game_page.htm

Cisco: Games and Mobile Apps
https://learningnetwork.cisco.com/community/learning_center/games

IBM INNOV8
http://http://www-01.ibm.com/software/solutions/soa/innov8/index.html

Stack Overflow, a popular question-and-answer forum for programmers, uses gaming elements such as points, badges, and privileges. Stack Overflow users earn points and badges by participating in the forum, answering questions, and gaining votes from other users. The privileges are directly tied to the reputation

points, so that users have to earn their privileges such as voting down an answer, creating a tag, or creating a chat room.[14] Two software companies, Adobe and Microsoft, used gamification to help users learn how to use their software. Adobe created LevelUp, which gamified the process of learning the image-editing software Photoshop by giving players missions to complete and rewarding them with badges and awards.[15] The support and development of *LevelUp*, however, was discontinued in June 2014. Microsoft developed Ribbon Hero, a game that teaches people how to use Microsoft Office software. It takes users through different scenarios that require them to use Microsoft Office skills to solve problems and awards points and levels that are displayed in the corner of their Office application.[16]

Stack Overflow
http://stackoverflow.com

Ribbon Hero
http://ribbonhero.com

Codecademy, an online learning website that offers free computer programming classes in several different programming languages, drew a lot of attention by rolling out its CodeYear program in 2012. CodeYear was designed to encourage people to learn how to code throughout the year. People who signed up for the CodeYear program earned points, badges, and trophies as they progressed and successfully finished courses on the track of their choice. Codecademy released new courses every week to keep learners motivated and encourage them to continue their learning. According to the article about Codecademy in *Wikipedia*, over 450,000 people took courses during the year of 2012, and as of January 2014, over 24 million users completed over 100 million exercises in Codecademy.[17]

Examples of Gamification in Education

Fantasy Geopolitics was developed as an auxiliary tool for ninth grade students taking social studies in 2009. Eric Nelson, a high school teacher at North Lakes Academy Charter School in Forest Lake, Minnesota, developed this lightweight game in order to encourage his students to care about geopolitics and see world news as something relevant to their lives. Fantasy Geopolitics starts with a draft session, during which students select a team of three countries (except the United States and China due to their domination of the news); then the players track stories about those countries in the news and get points for every mention of a country in a particular news source.[18] Fantasy Geopolitics motivates students to learn more about their countries by gamifying news reading, so that it no longer appears to students as a difficult task. Fantasy Geopolitics has been used as a six-month civics course foreign policy primer, a scaffolding tool used while studying the world wars in US and world history, and a creative way to engage students outside class in a middle school humanities seminar.[19] In February 2014, it successfully raised $12,706 for improvement through Kickstarter, a crowdsourcing fundraising website.

Fantasy Geopolitics
www.fantasygeopolitics.com

Cliff Lampe, a professor at the University of Michigan School of Informatics, gamified his undergraduate class. Lampe provided his students with the freedom to choose their options to accomplish the learning goals of the class, encouraged them to participate in "guilds," and gave them rapid feedback on their performance via a monitoring system managed by his teaching assistants to further empower the students. The central theme of this gamification experiment is providing autonomy to students to become more invested in what they learn and how to approach it.[20]

Dartmouth College and Webster University used gamification in order to make their student orientations more informative and interactive. They provided their new students at the orientation with SCVNGR, a location-based mobile gamification app with customizable treks and challenges, instead of a paper handout, so that each student could discover more about the school and the campus in the form of a scavenger hunt using a smartphone.[21] SCVNGR was retired, however, in December 2012.

Purdue University developed its own digital badge platform called Passport. Passport enables instructors to design digital badges and issue them to students. Students can earn and display those digital badges in Passport to demonstrate their competencies and achievements and share them in social media such as LinkedIn and Facebook. Passport was used to give out badges to students who passed an eight-week MOOC-like course in nanotechnology with no credit attached and to give out a badge related to intercultural learning to students for their work in different disciplines and departments.[22] Badges are currently in use or in development at institutions of higher education, such as MIT, Carnegie Mellon, the University of California, Davis, and Seton Hall, and they are also issued by organizations including NASA, the National Oceanic and Atmospheric Administration, the US Departments of Veterans Affairs and Education, the

Corporation for Public Broadcasting, and the movie studio Disney-Pixar.[23]

Recently, Purdue University created a competency degree program, in which students progress at their own rate as they demonstrate mastery of specific skills rather than by performance measured only at fixed calendar intervals of classroom time. Instead of letter grades, this program provides students with their competencies, which will indicate to employers what graduates can do.[24] As more emphasis is given to students' competencies and skills than their general accomplishments in the classroom, digital badges, one of the most prominent gamification elements, will gain more popularity in education.

Passport
www.itap.purdue.edu/studio

NASA: Digital Badges
www.nasa.gov/offices/education/programs/national/dln/special/DigitalBadges.html

In 2014, Nah et al. published a literature review on gamification in the educational and learning contexts and identified fifteen studies that incorporated game design elements into education.[25] The game elements utilized for the gamification of learning in those studies included points, levels, leaderboards, challenges, badges, progress bars, immediate feedback, peer interaction and collaboration, prizes, in-game rewards, onboarding, replay, unlockable content, customization, achievement, storytelling, stages, storyline, visual elements, goals, character upgrade, peer motivation, and scoreboard. The learner outcomes that some of these studies aimed at included engagement, participation, motivation, enjoyment, productive learning experience, sense of achievement, sense of accomplishment, performance, recognition, and interest in course.[26]

Examples of Gamification in Libraries

Libraries provide an interesting platform for gamification. Gamification in libraries can play both an educational and a semi-business role. The educational function of a library clearly lies in its instructional and teaching-support activities. But libraries also have semi-business-like functions such as marketing library services, promoting library programs to boost the attendance, and raising awareness of various learning resources that libraries offer. This function is not directly tied to libraries' revenue since most libraries are nonprofit organizations. Nevertheless, libraries are often asked to justify their operation by providing numbers of visitors, the usage statistics of library books and resources, and the attendance at library programs and events. Libraries are also in constant need of sustaining continuous public funding. For this reason, libraries are naturally interested in using gamification for the purpose of improving the pedagogical efficacy of library instruction as well as both raising library patrons' awareness of available library services and resources and promoting their use.

Gamifying the Summer Reading Program

Canton Public Library in Michigan gamified its summer reading program. This gamified summer reading program, called "Connect Your Summer" runs on a website that provides a variety of badges for library patrons who participate in the program and follow the paths such as Super Bookworm Path, On the Scene Path, and eLectrified Path. Each of these paths feature different activities to earn twelve different badges. If a patron follows each theme on all three paths and earns all thirty-six badges, she is awarded a MEGA badge and entered into a special drawing. If she also completes the online survey, she earns the Super Mega Ultra badge and is entered into a Super Mega Ultra prize drawing. While this program uses an online platform created with Drupal and its 'User Badge' (forked version), Content Construction Kit (CCK), Views, and Rules module, it also offers a way to participate in the program with a paper version.

Canton Public Library: Connect Your Summer
https://www.cantonpl.org/connect-your-summer/2014

Connect Your Summer: Paper Reading Log
https://www.cantonpl.org/sites/default/files/2014CYSReadingLog.pdf

Another library that gamified the summer reading program is Pierce County Library in Washington State. Its "Teen Summer Challenge" website opened in 2012. Anyone can register and participate, but in order to earn prizes, a participant must be a teen with a valid Pierce County library card. As of September 2014, 126 people participated in the Teen Summer Challenge and completed 3,071 activities, thereby earning 21,056 points and 234 badges.[27] Each badge requires the completion of multiple activities such as answering a question after watching a video or visiting a local bird sanctuary. And each activity has certain points assigned to it. You can see the leaderboard and badges at the links in the gray box. Pierce County Library also organizes meet-ups where teens who participate in this summer reading program can get to know one another and work on challenges together.

The content of this gamified summer reading program was created by a team of youth services librarians, and the game platform increased participation in summer reading from about 200 participants county-wide to about 650 with practically no marketing.[28] The online game platform was originally built in-house by a staff member with WordPress and was improved with more customizations by hired programmers as the project grew and got grant funding.

Teen Summer Challenge
http://challengebeta.mypcls.org

Leaderboard
http://challengebeta.mypcls.org/leaderboard

Badges
http://challengebeta.mypcls.org/badge-catalog

Teen Summer Challenge Meet-Ups
http://challengebeta.mypcls.org/teen-summer-challenge-meet-ups

Gamifying the Library Experience

Pierce County Public Library also provides online gamification for adults called "Scout." Scout invites library patrons to explore the library, complete various activities, earn badges, qualify for prizes, and share their experience. The badges belong to one of the four categories, which match the type of prizes: food, do-it-yourself, local, and books. Participants register at the Scout website and can check their statuses in the leaderboard. Scout also provides a forum where participants can ask one another questions about badges and challenges. As of September 2014, 1,693 people participated and completed 28,381 activities, thereby earning 187,003 points and 3,965 badges.[29]

Scout
https://scout.pcls.us

The University of Huddersfield Library in the United Kingdom took a holistic approach in gamifying the library experience. Instead of gamifying a library program or library instruction, it developed a social online game called Lemontree. The primary purpose of this game is increasing engagement around the usage of library resources with the game element of competition.[30] Lemontree gives points and badges for students' library activities, such as visiting the library, checking out a library book, and logging in to use the library's e-resources. Students can display the badges that they earned in social networks such as Facebook and Twitter. The goal of this game was to nudge positive behavior, supporting and increasing intrinsic motivations, and for this reason, Lemontree does not offer any real-world rewards.[31] Also in order to achieve its goal of reducing library anxiety and engaging students who use few library resources, its user interface was designed to look as fun and lighthearted as possible, with no university or library branding visible.[32] According to the student feedback and the evaluation survey results, those students who chose to play Lemontree self-reported an increase in engagement as measured by the reported usage of library resources.[33]

Lemontree
https://library.hud.ac.uk/lemontree/about.php

Gamifying Library Instruction

The North Carolina State University (NCSU) Libraries gamified traditional library instruction. As an alternative to the usual one-shot library instruction, which often consists of showing the library website and explaining how to use the library and its resources to students in a classroom, NCSU Libraries created a mobile scavenger hunt that gets the students out into the library itself and makes them interact with the library staff, explore the library spaces, and discover the library's collections themselves.[34] In this gamified library instruction, students were divided into several four-member teams, each of which was given a packet with a list of fifteen questions and an iPod Touch. Students got twenty-five minutes to submit their answers to the questions using the iPod while roaming the library. These answers were checked by librarians in real time, and each team earned points for correct answers. When the time was up, students came back to the classroom, got to see the photos they took, learn the correct answers to the questions, and find out which team won the game and receive prizes. Both students and faculty responded positively to this gamified library instruction. During two semesters, NCSU Libraries ran over ninety scavenger hunts, thereby reaching more than 1,600 students. Of the surveyed students, 91 percent considered the activity fun and enjoyable, 93 percent said they learned something new about the library, and 95 percent indicated that they felt comfortable asking a staff member for help after having completed the activity. Instructors also praised the activity for its ability to lead students to increased understanding, deeper learning, and almost complete recall of important library functions.[35]

Using the Passport platform for digital badges

developed by Purdue University, University of Arizona Libraries have also undertaken gamifying library instruction to direct student motivation at developing research skills that can be visually demonstrated to instructors and future employers through digital badges, with points serving as feedback and further motivation.[36] For this goal, they are using the ACRL *Information Literacy Competency Standards for Higher Education* as an outline to design the badges such as Research Initiator (Standard 1), Research Assailant (Standard 2), Research Investigator (Standard 3), and Research Warrior (Standard 4) and creating a variety of tasks that will serve as challenges to meet for earning each badge.[37]

ACRL Information Literacy Competency Standards
www.ala.org/acrl/standards/informationliteracycompetency

Portland State University Library created a digital badge system and a digital badge curriculum to certify and acknowledge skills attainment for creativity and critical thinking and deployed this curriculum for a subset of more than 250 undergraduate students in community health in the fall of 2014.[38] The digital badges have been created and administered using the digital badge site Credly. The badges that students are earning in the fall term of 2014 included Web Ninja, Source Sleuth, Keyword Hacker, Recorder, Silver Pen, and Master Info Analyzer, which certify website evaluation, understanding of information formats and audiences, search techniques, citation style, and a peer review and writing exercise, respectively.[39] Students earn these badges through the D2L Learning Management System.

Credly
https://credly.com

Gamifying Library Orientation

Some libraries have also experimented with gamifying library orientation using the mobile app SCVNGR, which was mentioned above and is no longer available. SCVNGR allowed users to find treks within a twenty-five-mile radius, visit their locations to complete challenges such as taking a photo or answering a simple question, and earn points. Organizations could purchase a SCVNGR plan to create their own treks and challenges suitable for their target users. Oregon State University Libraries used SCVNGR for

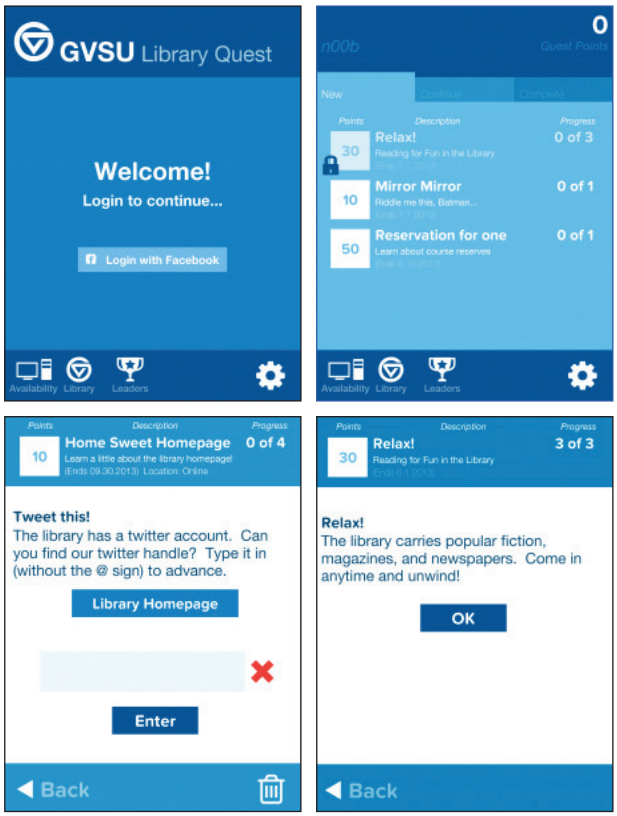

Figure. 4.1
Various screens of the Library Quest app developed by GVSU Libraries. [Images from Kyle Felker, "Library Quest: Developing a Mobile Game App for a Library," *ACRL TechConnect* Blog, September 17, 2013, http://acrl.ala.org/techconnect/?p=3783, licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License, http://creativecommons.org/licenses/by-nc-nd/3.0/.]

the international student orientation to increase the students' awareness of all the library services. Boise State University Library experimented by having students create a SCVNGR trek about the library based upon the previous paper version of a library scavenger hunt, as their final assignment, with great results.[40]

University of California, San Diego, Libraries also launched their own SCVNGR trek in the fall of 2011. University of California, Merced Library ran a similar library orientation using SCVNGR in 2012. In spite of active promotion, the student participation was very low.[41] The result showed that even when students are interested in this type of gamification, a variety of factors, such as an event date, location, and a mobile device required for participation could easily become obstacles.[42] It has been also noted that the reward offered in this case, a chance to win an iPod Shuffle, didn't seem to work as a sufficient incentive to students.[43]

University of Arizona Libraries, mentioned above, also gamified the library orientation using SCVNGR in order to promote the library and increase student

awareness.[44] It was reported that the gamified orientation and instruction had greater success and engagement when the trek was tied to something, such as a class assignment or a required portion of an orientation session that had to be completed.[45]

Building a Library Gamification Mobile App

Grand Valley State University (GVSU) Libraries decided to build a gamification mobile app to engage their library users. The app called "Library Quest" was released in August 2013 for both iPhone and Android smartphones in the Apple App Store and Google Play (figure 4.1). Library Quest offers tasks to students and verifies their progress through multistep tasks by asking users to input alphanumeric codes or to scan QR codes displayed in the library building in order to encourage them to explore the large brand-new library building and to make them aware of various library services.[46] Students earn points for every quest completed in the app, and for every thirty points they earn, they are entered once in a drawing to win an iPad. The first round of the game ran from late August to mid-November, and GVSU Libraries held the drawing, publicized the winner, and then commenced a round of postgame assessment.

Library Quest

Apple App Store
https://itunes.apple.com/us/app/library-quest/id684978642?mt=8

Google Play
https://play.google.com/store/apps/details?id=air.com.yeticgi.libraryquest

This project is a good example of how much investment is necessary for a library to successfully develop and release a mobile library gamification app. Developing this one app cost GVSU Libraries approximately $14,700 without including the library staff time spent on this project.[47] While the actual programming of the app was done by an outside mobile development company, librarians prototyped the game, ran the usability testing, and designed actual quests. Librarians designed from three to five new quests each month while the game was running, and Library Quest offered short-duration quests run at random intervals to encourage students to keep checking the app. GVSU librarians created about thirty quests in total over the course of the game, and each quest was designed with a specific educational objective in mind, such as showing students how a specific library system worked or where something or someone was located in the library building. They discovered that even simple quests required a fair amount of cooperation and coordination. In order to inform the library staff about Library Quest, GVSU Libraries also created a quest write-up sheet called "Raiders of the Lost . . . Bin," which provides information about the name of the quest, points, educational objective, steps, completion codes, and any other information that defined the quest. This Quest Design Worksheet can be downloaded online.

GVSU Library Quest Design Worksheet
http://acrl.ala.org/techconnect/wp-content/uploads/2014/08/Raiders-of-the-Lost%E2%80%A6Bin_.docx

The postgame assessment of GVSU Libraries' Library Quest app revealed some very interesting results. According to the responses to the postgame questionnaire, 90 percent of the respondents to this survey indicated that they had learned something about the library, that they thought the gamification mobile app was a good idea, and that it was something GVSU Libraries should do again.[48] Students' feedback on the game was very positive and showed that students appreciated that the library was trying to teach in nontraditional, self-directed ways. What is most interesting in the postgame assessment results of Library Quest is that students reported that the game changed the way they thought about *themselves* in relation to the library rather than the way they thought about the library.[49] For example, the game made them feel that they are now more aware of, confident to use, and knowledgeable about library services and resources. Students also remembered remarkably well what they learned about GVSU Libraries through the game, such as library-specific lingo and knowledge of specific procedures like document delivery. This matches the findings from NCSU's Scavenger Hunt that the gamified library instruction resulted in the very high recall of library functions by students.

On the other hand, the responses to the midgame survey showed that some students cited a certain quest as their favorite feature of the game while others cited exactly the same quest as their least favorite, often for the same reason.[50] Felker attributes these seemingly contradictory responses to the fact that students had a variety of different reasons for playing Library Quest, ranging from the chance to win an iPad to learning about the library or curiosity about the game itself.[51] This shows that one and the same gamification can be appealing or annoying depending on each player's motivation.

A total of 397 students signed up for Library Quest and completed over 6,000 quests. Felker writes that

although this was close to the number that the project aimed at, the game could have been marketed more effectively to make more students aware of the game considering the fact that the number of FTE students at GVSU is 25,000.[52] More problematic was the low completion rate shown in the fact that only 173 out of 397 registered players actually completed at least one quest. The other 224 players downloaded the app and logged in at least once but failed to complete any quest content. Both technical and nontechnical issues, such as usability, the flow and pacing of new quests, and marketing, were found to be responsible for this.

Notes

1. Jane McGonigal, *Reality Is Broken: Why Games Make Us Better and How They Can Change the World* (New York: Penguin, 2011), 125.
2. "Bottle Bank Arcade," YouTube video, 1:36, posted by "Rolighetsteorin," October 15, 2009, embedded on The Fun Theory website, www.thefuntheory.com.
3. "The Speed Camera Lottery," YouTube video, 2:08, posted by "Rolighetsteorin," November 12, 2010, embedded on The Fun Theory website, www.thefuntheory.com.
4. "Piano Stairs," YouTube video, 1:47, posted by "Rolighetsteorin," October 7, 2009, embedded on The Fun Theory website, www.thefuntheory.com.
5. "SDG&E Celebrates San Diego's Biggest Energy Savers," news release, San Diego Gas and Electric, January 6, 2012, www.sdge.com/newsroom/press-releases/2012-01-06/sdge-celebrates-san-diego's-biggest-energy-savers.
6. Nick Summers, "Nike+ Now Has Over 18 Million Members," *The Next Web Blog,* August 21, 2013, http://thenextweb.com/insider/2013/08/21/nike-now-has-18m-members-logging-their-daily-exercise-with-a-fuelband-sportwatch-or-fitness-app.
7. Richard Van Eck, "Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless," *Educause Review* 41, no. 2 (2006): 16–30; Thomas M. Connolly, Elizabeth A. Boyle, Ewan MacArthur, Thomas Hainey, and James M. Boyle, 2012. "A Systematic Literature Review of Empirical Evidence on Computer Games and Serious Games," *Computers and Education* 59, no. 2 (2012): 661–86, doi:10.1016/j.compedu.2012.03.004.
8. Sebastian Deterding, Dan Dixon, Rilla Khaled, and Lennart Nacke, "From Game Design Elements to Gamefulness: Defining 'Gamification,'" in *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (New York: Association for Computing Machinery, 2011), 9–15, doi:10.1145/2181037.2181040; Andrzej Marczewski, *Gamification: A Simple Introduction and a Bit More*, 2nd ed. (self-published on Amazon Digital Services, 2013), Kindle edition.
9. Karl M. Kapp, *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*, (San Francisco: Pfeiffer, 2012), 17.
10. Heong Weng Mak, "Deloitte Leadership Academy Leads with the Gamification of Training," Gamification Corp., January 11, 2013, www.gamification.co/2013/01/11/deloitte-leadership-academy-leads-with-the-gamification-of-training.
11. Kapp, *Gamification of Learning and Instruction*, 19-20.
12. Ibid., 20.
13. Florin Oprescu, Christian Jones, and Mary Katsikitis, "I PLAY AT WORK—Ten Principles for Transforming Work Processes through Gamification," article 14, *Frontiers in Psychology* 5 (January 2014): 1–2, doi:10.3389/fpsyg.2014.00014.
14. "Badges," Stack Overflow Help Center, accessed October 15, 2014, http://stackoverflow.com/help/badges.
15. "LevelUp for Photoshop," Adobe, accessed October 15, 2014, http://success.adobe.com/microsites/levelup/index.html (page now discontinued).
16. Marczewski, *Gamification*, Loc 767 of 1798.
17. "Codecademy," *Wikipedia*, last updated November 19, 2014, https://en.wikipedia.org/wiki/Codecademy.
18. Alex Magdaleno, "How a High School Teacher Is 'Gamifying' World News," Mashable, February 3, 2014, http://mashable.com/2014/02/02/high-school-fantasy-geopolitics.
19. Eric Nelson, "Fantasy Geopolitics," Kickstarter page, last updated March 31, 2014, https://www.kickstarter.com/projects/nelsonejn/fantasy-geopolitics.
20. Heong Weng Mak, "The Gamification of College Lectures at the University of Michigan," Gamification Corp., February 8, 2013, www.gamification.co/2013/02/08/the-gamification-of-college-lectures-at-the-university-of-michigan.
21. Josh Keller, "Smartphone Game Turns College Tours, Orientations into Scavenger Hunts," *Wired Campus* (blog), *Chronicle of Higher Education,* September 9, 2011, http://chronicle.com/blogs/wiredcampus/mobile-game-turns-college-tours-and-orientations-into-scavenger-hunts/33114.
22. David Raths, "How Badges Really Work in Higher Education," *Campus Technology*, June 20, 2013, http://campustechnology.com/Articles/2013/06/20/How-Badges-Really-Work-in-Higher-Education.aspx.
23. Steve Tally, "Digital Badges Show Students' Skills along with Degree," news release, Purdue University, September 11, 2012, www.purdue.edu/newsroom/releases/2012/Q3/digital-badges-show-students-skills-along-with-degree.html.
24. Haley Dover, "Purdue Creates Competency Degree Program," JConline, *Lafayette Journal and Courier*, September 5, 2014, www.jconline.com/story/news/2014/09/04/purdue-creates-competency-degree-program/15069165.
25. Fiona Fui-Hoon Nah, Qing Zeng, Venkata Rajasekhar Telaprolu, Abhishek Padmanabhuni Ayyappa, and Brenda Eschenbrenner, "Gamification of Education: A Review of Literature," in *HCI in Business*: *First International Conference, HCIB 2014, Held as Part of HCI International 2014, Heraklion, Crete, Greece, June 22–27, 2014, Proceedings,* edited by Fiona Fui-Hoon Nah, 401–9, Lecture Notes in Computer Science 8527 (Cham, Switzerland: Springer International Publishing, 2014), doi:10.1007/978-3-319-07293-7_39.
26. Ibid., 402–403.
27. "Leaderboard," Team Summer Challenge, accessed September 30, 2014, http://challengebeta.mypcls.org/leaderboard.

28. Jami Schwarzwalder, "Gamification of Summer Reading," *YALSAblog*, July 2, 2014, http://yalsa.ala.org/blog/2014/07/02/gamification-of-summer-reading.
29. Scout website, Pierce County Library, accessed September 30, 2014, https://scout.pcls.us.
30. Andrew Walsh, "The Potential for Using Gamification in Academic Libraries in Order to Increase Student Engagement and Achievement," *Nordic Journal of Information Literacy in Higher Education* 6, no. 1 (2014): 42.
31. Ibid., 44.
32. Ibid., 45.
33. Ibid., 48.
34. Anne Burke, "Demystifying the Library with Game-Based Mobile Learning," *ACRL TechConnect Blog*, July 30, 2012, http://acrl.ala.org/techconnect/?p=1418.
35. Ibid.
36. Nicole Pagowsky, "Test-Driving Purdue's Passport Gamification Platform for Library Instruction." *ACRL TechConnect Blog,* January 28, 2013, http://acrl.ala.org/techconnect/?p=2676.
37. Ibid.
38. "Digital Badges for Creativity and Critical Thinking," Portland State University Library, September 30, 2014, http://library.pdx.edu/digital-badges-for-creativity-and-critical-thinking.
39. Ibid.
40. Amy E. Vecchione and Margaret Mellinger, "Beyond FourSquare: Library Treks with SCVNGR," PowerPoint file, ScholarsArchive@OSU, Oregon State University, February 24, 2011, http://hdl.handle.net/1957/20294.
41. Elizabeth McMunn-Tetangco, "If You Build It . . . ? One Campus' Firsthand Account of Gamification in the Academic Library," *College and Research Libraries News* 74, no. 4 (April 2013): 208–10.
42. Ibid., 210.
43. Ibid.
44. Nicole Pagowsky, "Taking a Trek with SCVNGR: Developing Asynchronous, Mobile Orientations and Instruction for Campus," *ACRL TechConnect Blog*, May 13, 2013, http://acrl.ala.org/techconnect/?p=3342.
45. Ibid.
46. Kyle Felker, "Library Quest: Developing a Mobile Game App for a Library," *ACRL TechConnect Blog*, September 17, 2013, http://acrl.ala.org/techconnect/?p=3783.
47. Kyle Felker, "LibraryQuest Levels Up," *ACRL TechConnect Blog*, August 13, 2014, http://acrl.ala.org/techconnect/?p=4566.
48. Ibid.
49. Ibid.
50. Ibid.
51. Ibid.
52. Ibid.