

Taking learning to the next level

How can we encourage our students to persevere, even when learning becomes challenging? **Matthew Farber** looks to the gaming industry, with an exploration of how game-based reward structures such as badges, leaderboards and Easter eggs can boost motivation and engage students in mastering vital 'real-world' skills.

A recent trend in the business world has been to bring game world elements into the real world. This is referred to as 'gamification'. According to a Pew Research Center report, gamification is 'interactive online design that plays on people's competitive instincts and often incorporates the use of rewards to drive action – these include virtual rewards such as points, payments, badges, discounts and free gifts, and status indicators such as friend counts, retweets, leaderboards, achievement data, progress bars and the ability to level up.'



Non-game companies like Amazon, Nike and Salesforce.com gamify in this way to increase customer engagement, while corporations such as Samsung award badges internally to motivate their employees.

Educators, also, are beginning to incorporate the reward structures of video games, such as badges for meaningful achievements, into their lesson planning. Integrating gamification into the classroom is best accomplished when teachers begin to think of themselves as not just educators, but also game designers.

Game-based learning (GBL) places a strong emphasis on mastering skills. In a gamified classroom, students start at the 'newbie' level, and then build skills and 'level up' to become masters. The 'boss level' is when students apply all of the skills mastered to overcome a difficult task.

GBL does not necessarily mean that students are simply playing video games in school. A variety of non-digital games, including boards, cards or dice, can 'gamify' learning as well. Problem-based learning and challenge-based learning units can be gamified by adding game mechanics, such as rules, missions and leaderboards. Problem and challenge-based learning both lend themselves well to gamification because they present students with authentic tasks to perform using accumulated skill sets. Teachers can also 'mod', or modify, pre-existing games to fit skills and content.

Feedback and badges

Feedback is an integral part of GBL. It provides students with a chance to reflect on their learning. Conversely, their answers help us teachers improve their learning experience. I had unintended success by posting leaderboards with total earned scores – there was a spike in iteration, with students redoing work to make it better.

Skill mastery can also be acknowledged with a digital badging system. Badge accumulation can occur in a non-linear fashion – some students may earn different badges than others. This strategy, known as embedded assessment, is built into the overall learning experience. In other words, teacher can award badges during a gamified unit, rather than at the end. In this respect, badges can support differentiated learning, with students earning badges at any time during a long-term unit.

The first week of school, my students created an account on our virtual classroom's digital badge website. Badges are not used as grades, but rather as a check along the way. There is an element of fun in badging. This system is designed to award intrinsic accomplishments and is not the focal part of the learning experience.

For example, my students helped develop some badges, including the 'Proofreader Badge' for catching mistakes in handouts or websites, and the 'Outside-the-Box Thinker Badge' for creative responses. Badges level up in difficulty to earn, from 'Noob' (newbie, or beginner) to 'Master'.

Badges recognise the achievements that produce intrinsic satisfaction. Basically, when a student enjoys a task, learning feels less like work and more like fun. Intrinsic motivation differs from the extrinsic goals that are traditionally associated with school (grades) and with work (paychecks). The teacher's role is to scaffold knowledge and skills as the student progresses through the content. The difficulty for acquiring badges should increase, or level up, as skills build up. The boss level badge represents mastery of a skill. Students who earn boss level badges should perform well on formative and summative assessments because they have enjoyed the journey of learning. A badge



system can bring fun to the process of learning and mastering new skills.

Students can also create badges as part of the curriculum. For instance, students can design check-in badges for Civil War battle locations or create achievements for career accomplishments of notable authors. One pupil suggested a project where students design a series of badges that a historical figure would have won.

Useful sites

In a badge system, there are three interconnected participants – the issuer, the earner and the displayer. In the classroom, the teacher is the issuer and the student is the earner. There are many options for badge displayers, including **Youtopia** and **ForAllBadges**. Many of these sites let teachers create virtual classrooms and also provide pre-designed artwork.

ClassBadges and the educational social media site, **Edmodo**, provide pre-made badges, and also allow teachers to upload their own. **Mozilla's Open Badges project** gives everyone the tools to create and share their own badges while **ClassDojo** provides a badge system designed to modify behaviour.

Download [this PDF](#) for a helpful side-by-side comparison chart contrasting the features of each badge-displayer platform.



Using wikis

A few years ago, my seventh grade students collaborated online to create a 'Virtual Student Constitution' on a collaborative wiki (a wiki is basically an online document that more than one person can edit – [this video](#) explains it really well). The project was framed around a then-current event, based on an article in the Guardian – 'Mob rule: Iceland crowdsources its next constitution'², which describes how Iceland, in the process of recovering from a collapse of its banks and government, decided to use social media to get citizens to share their ideas for a new constitution.

My students were each given a laptop and met online (rather than face-to-face) in cooperative groups, with the task of

rewriting the school's student handbook – our 'constitution'. The Edmodo social network was the virtual meeting place, because, although it has the look and feel of Facebook, it's private and secure. Students were given five other student handbooks from middle schools around the state as a reference.

Each group edited a portion of the wiki, which included both text and embedded talking avatars made using **Voki**. There was one wiki for each of my four seventh grade class sections. Over a five day period, there were 415 revisions from 94 students. The game began as students competed to control editing the wiki page (only one person can edit a wiki at a time). The final revision of their wiki can be found [here](#).

Following the project, students voted via **SMART Response System interactive remote** whether to ratify their Virtual Student Constitution wiki. The result at the end of the day was that the Virtual Student Constitution did not pass. Only 40.5 per cent voted to ratify. Two-thirds (66.7 per cent) of the vote was required to pass it. After the vote, we compared the US Constitution with Iceland's new draft of their constitution.

Scaffolding challenges

Video games frequently do not include how-to instructions for players. The first level or mission is typically a tutorial. As the game progresses, the player is given more information and increasingly complex tasks – the challenges are increased and

scaffolded. Massively multiplayer online games (MMOs), such as *World of Warcraft*, feature avatars that improve as they succeed. In the game world, this is referred to as 'levelling-up'.

'Boss levels' are where all of the learning comes together. It is at this point that gamers feel the intrinsic reward from an earned satisfaction. An example of this in the classroom setting might be using Edmodo to deliver blended instruction and then scaffolding with a how-to post on a wiki the next day. By the end of the week, students would be at the 'boss' or mastery level.

Some games, such as *Minecraft*, encourage players to modify, or 'mod', the virtual world environment. At the 2012 Games for Change Festival, Valve announced the **Teach with Portals** website, where players are given the tools to modify their own puzzles, or levels, for the game, Portal 2 – a single-player game applying authentic physics, mathematics, and technology concepts. Both the game and the Teach with Portals tool would make an excellent addition to any maths or science classroom.

Students can also 'mod' non-digital games (board and dice games, for instance) by adding or subtracting existing rules. Giving students tools for 'modding' assignments and projects will empower them to take ownership of their learning and tackle even greater challenges.



Easter eggs and in-game economics

'Easter eggs' are hidden objects left by the coders in websites, video games and sometimes, DVDs. *Super Mario Brothers* was among the first to popularise hidden objects and secret rooms. Hiding Easter egg challenges within problem-based learning units is more engaging than simple extra credit or extension tasks and questions.

Uncovered Easter eggs can also be acknowledged with badges. For example, as part of a podcasting project I do, I award a 'Magical Mystery Badge' once the student deciphers a backwards recording of an inspirational message from Steve Jobs. The student must figure out on their own how to use the tools available to decipher the recording. A hint, written in reverse, is part of the badge's description.

Easter eggs empower the student to test the boundaries of the learning system.

Another way to hide Easter eggs is by using QR codes. QR codes are like bar codes that are read with a mobile device and take the user directly to a website or a picture.

Many games feature an 'in-game economy'. In the *Assassin's Creed* series for example, opponents can be looted and pick-pocketed. Money can be found by unlocking hidden treasure chests. The currency is historically accurate, depending on the time period and location of the game setting. That money can be used to improve buildings, upgrade the avatar or purchase maps featuring hidden locations of desirable objects. The game *Mass Effect 3* awards currency known as Paragon Points. These points are earned by helping other characters in the game. Paragon Points can be used to purchase better weapons, health and armour.

Likewise, an 'in-class economy' can award students who progress in a meaningful way, while also integrating maths and financial literacy lessons.

Teaching game design (No coding knowledge required!)

Video game design is engaging and challenges learners to consider how to teach the topic they are tasked to study. Students can use game creation tools, such as **Scratch**, to remix, 'mod', or create brand new flash-based video games. Scratch teaches practical knowledge of mathematics (angles, degrees, x, y plane), using interlocking blocks as code commands and enabling users to remix each other's published codes. This **video** fully explains Scratch's potential as a learning tool. You can download Scratch for free from MIT Media Labs **here**.

Code.org was launched to promote coding in the classroom. **CodeAcademy** teaches programming in a self-directed, gamified way, complete with badges to award achievements. CodeAcademy provides tutorials on HTML, JavaScript, and much more. There are also downloadable PDFs to use it as an extracurricular program.

The Khan Academy recently added coding to its site, including a remix and share feature called **Spin-offs**. Younger learners can also learn basic coding via the iPad app, **Daisy the Dinosaur**. This free app has two simple ways to create – one is 'free play', the other 'challenge mode', which teaches basic coding using game-based concepts.

Last year, my social studies students conducted research about medieval European topics, and then they each remixed, modified or created brand new flash-based video games. They also wrote a reflective essay that explained how their game relates to their researched findings.

I used a completely constructivist teaching style, only giving students a short overview, then links to a YouTube tutorial and a PDF step-by-step guide. No actual coding was required – programming commands occur when matching colour-coded bricks are interlocked.

Applying GBL to the curriculum

'Inspired by historical events and characters.' This is how each game in the popular open-world, third person, role-playing game series, *Assassin's Creed*, available on PC, Xbox and Playstation, begins. We often use historical fiction in the form of books and films such as *Titanic* and *Saving Private Ryan* to make history more 'real' and relatable to our students – why not games? *Assassin's Creed* is essentially historical fiction. Check out **this clip** in which *Assassin's Creed: Revelations*' lead script writer, Darby McDevitt, talks about the historical setting and people that lead character, Ezio, meets in the game.

This spring, I constructed a project titled '*Assassin's Creed: Renaissance* Character Web Project'. This project is framed around creating additional Renaissance-era characters to further integrate into the video game series via downloadable content. The students were asked, 'What if Ubisoft (the game's developers) decided to integrate other real Renaissance figures as characters in the game?' The project culminated in students creating a page about their character on a wiki.

In his book, James Paul points out that gamers interact and collaborate beyond the game world in 'affinity groups'³. It is on sites like Wikia that affinity groups flourish. Wikia is a community site, similar to Wikipedia, that anyone can contribute to. It

specialises in topics such as games, movies, and television characters and is added to and updated by users. **Assassin's Creed Wikia fan page** has over 4,000 subpages. Tasking students to create a (much) smaller version of this encourages them to work together to create rich and realistic historical characters, developing their research and critical thinking skills along the way.

Screenshot from Assassin's Creed II. The game's main player-controlled character, Ezio, meets a young Leonardo Da Vinci who's not yet finished painting the Mona Lisa.



Game on!

Video games encourage players to learn as they go. Tutorial levels teach players the rules 'on the job', then the challenges are increased and scaffolded. Boss levels are where all of the learning comes together. It is at this point where gamers feel the intrinsic reward, or 'flow', as psychologists term it, from an earned satisfaction.

This – mastering skills through experience – is the very definition of constructivism. Constructivism makes learning meaningful and satisfying. By adding some simple gamification elements, lessons and activities will become more engaging, meaningful, and fun.

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References

1. Anderson, J. and Rainie, L. (2012) The future of gamification. Washington: Pew Research Center's Internet & American Life Project. Available at <www.pewinternet.org/2012/05/18/the-future-of-gamification/> [Accessed 31/03/2014]/
2. Siddique, H. (2011). Mob rule: Iceland crowdsources its next constitution. The Guardian [online] 9 June. Available at: <www.theguardian.com/world/2011/jun/09/iceland-crowdsourcing-constitution-facebook> [Accessed 31/03/2014].
3. Paul, J. (2007) What video games have to teach us about learning and literacy. Hampshire: Palgrave Macmillan.

Knowledge trails

- 1) **Game-based learning in the classroom** – Alistair Smith explains the motivational benefits of GBL, and how it can make learning a more stimulating and interactive experience. library.teachingtimes.com/articles/gblintheclassroom
- 2) **Are you game for a new learning experience?** – Three educators from the UK, America and Australia share their inspirational experiences using GBL in their lessons. library.teachingtimes.com/articles/areyougame