

Gamification

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Abstract

Gamified educational tactics is a trend that has positive and negative aspects to it. Student engagement doesn't necessarily mean that the skills expected to be learned will be mastered in a gamified setting. Often the result is students are more enthralled with the idea of playing a game than they are of learning the material. On the other hand, sometimes, accidental learning is the best learning a student can get. This exploration is an introduction into both sides of gamification. The goal is to come away with an understanding of the pitfalls of gamified learning and recognize different approaches to avoiding them.

Keywords: Gamification, student engagement, homework completion, gender equity, professional skill development.

Gamification

Gamification is an educational tactic that has found a solid foothold in many classrooms across many subjects. Educators of all levels, from kindergarten through high school, are finding ways to implement many aspects of using competition to help students learn the course content. Results have been mixed, however. Critics declare that the negative effects of creating a competitive environment outweigh those of simply educating children in basic knowledge. Gamifying certain content works well for some students and not so well for other students. Differentiating classroom competitions to engage both genders equally has also proven challenging.

Teachers implementing gamification are discovering costly challenges. Materials for classroom competitions are not the main expense. The greatest expense comes in the form of time. Time is a valuable commodity that often eludes teachers. Software, hardware and curriculum are necessary items in preparation for any instruction and teachers are, usually, required to locate or create their own. Vendors are competing for the attention of teachers and school districts by reaching out to offer curriculum and training opportunities. Time, once again, become the villain. But, once the foundation of an effective gamification program is laid, the successful operation leads to increased student engagement and teacher satisfaction.

As technology continues to improve and develop, teachers will be required to adopt new methods and skills to encourage student retention of course material. Ironically, the time needed to develop these new skills will be an initial resource drain but should create a return that more than offsets that cost. Educational institutions have had a difficult time keeping up with all the changes in technological advancements. Early adoption of technology is a risk that many superintendents do not wish to take. This leaves schools in a technological backwash of outdated equipment and instruments almost as soon as it is acquired. Augmented Reality, virtual reality,

mobile devices and automated assistants are more readily available in the private sector to the benefit of only the wealthiest. Society requires an educated populous regardless of socioeconomic status to maintain a healthy culture. Integrating these new technologies into the classroom by creating a gamified environment will benefit the students and make this technology available to all within schools.

Positives of Gamification

Student Engagement. One of the most vexing challenges that a teacher is faced with is how to continually and consistently engage the students. The implementation of gamification addresses this challenge with positive results. The competitive nature within most people makes earning points and badges a technique that may increase the retention of the material.

Participating in a game-like setting allows students to relate to the instruction easier than simply reading a text and doing a worksheet.

Badges, an electronic incentive, have become popular as rewards for completing classes, units and even seminars. I have received a badge for completing a seminar on badges. The tangible benefit of badges lies within the badge itself. The coding contained in the badge hold information that is much vaster than many realize. Not only can an instructor assign a cool looking logo to a badge but may insert information as to the competency of the person who ultimately earns the badge. Individual information is entrusted to the encryptions as well. Once the owner of the badge authorizes the viewing of the electronic talisman, as is the expectation to display ability to a prospective employer, whatever information inside becomes visible. The name, address, phone number, email, date of course completion, grade, prerequisites and future course opportunities (as well as anything else the badge creator had access to) can be uncovered within the badge. Badges are accumulated and badges can be earned for earning badges. Badging

has been gamified. Figure 1 shows a screenshot of 6 badges that I have obtained. Inside each of these badges is a certificate for Professional Development Units (PDUs) that I am required to acquire to maintain my teaching credentials. I can simply share these with my school district and those PDUs will be recorded. Not only do I get the benefit of bragging about earning 6 badges, but it also translates into a professional value. (Madda, 2015) Badging can be used as evidence of student engagement.

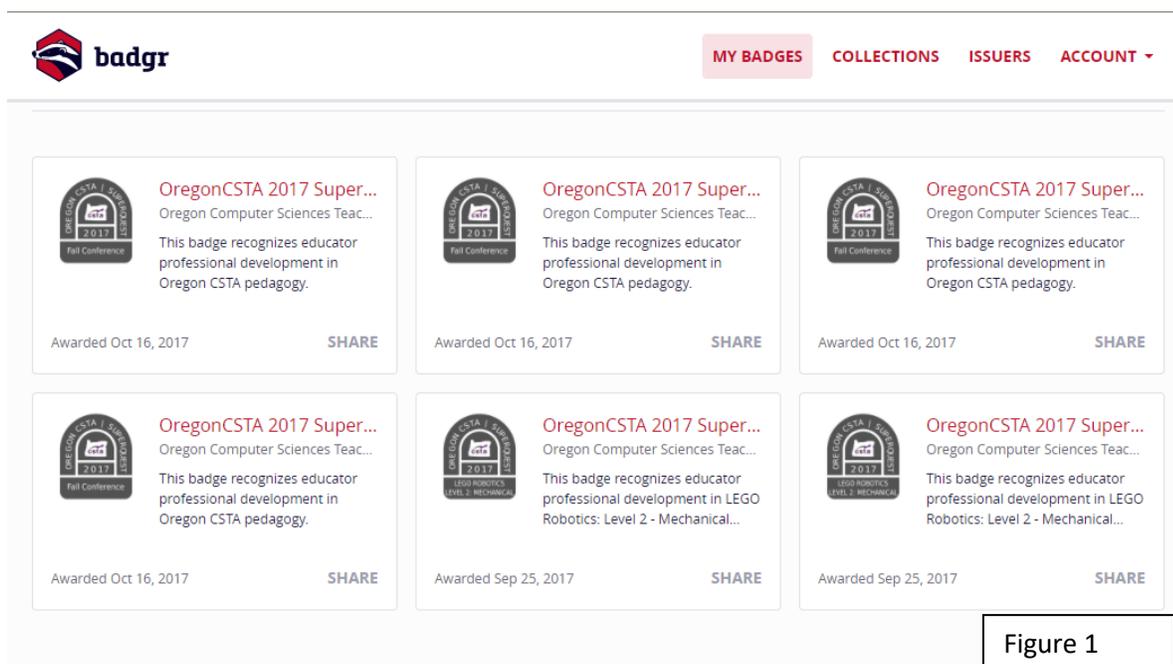
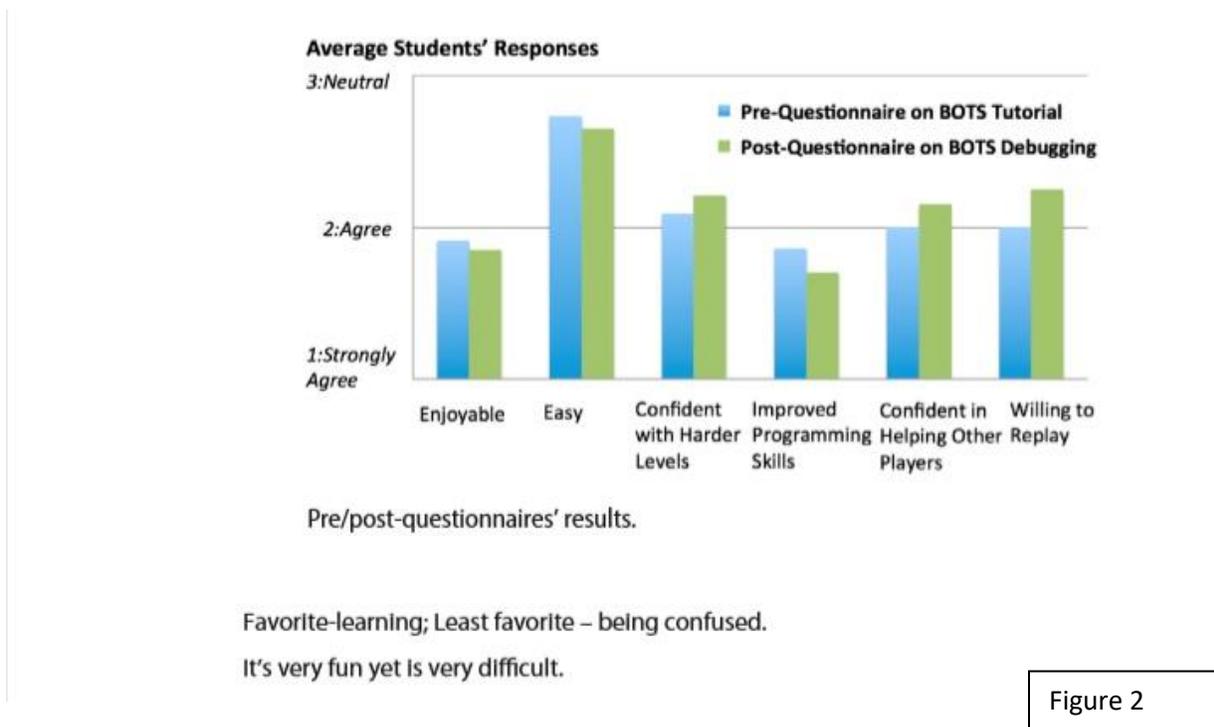


Figure 1

Competitive Nature. Building on the competitive nature of children, using points and levels creates an environment that is fun for the learner. An enjoyable learning experience ensures students will return to the project. A study by Zhongxiu et al () focused on 6th through 8th grade students and compared their pre-assessment scores with their post-assessment scores with regard to the students' expectation of learning and willingness to return to the activities to continue their learning. Figure 2 is a graphical representation of the results acquired in this study. Students anticipated an enjoyable experience when told that they would be playing a game, BOTS, which would challenge their programming skills. The game was to program a character

to overcome obstacle and move objects to increasingly difficult goals. The students were evaluated on their ability to retain the programming knowledge to recreate the game or to find mistakes in the code in a testing environment after participating in the tutorial. This phase was called BOTS Debugging. In most categories students reported an increase in enjoyability and increased programming skills. Not all responses displayed a trend toward a positive outcome as the willingness to replay the game or their confidence in helping others did not improve. Yet, when the data was compared, the students displayed an improvement in coding ability and efficiency.



Homework completion. Another study by Laskowski and Badurowicz from the University of Technology in Poland (2014) showed that gamification increased the completion of homework. The likelihood of students returning to school also showed a marked improvement as gamified groups were characterized with higher attendance levels (over 97%) than regular groups (over 85%).

The relationship between teaching and training is very strong. While teaching requires an educator to respond to the feedback received in the midst of instruction, training requires the learner to respond to feedback provided by the teacher. Gamification provides quicker feedback and students can make appropriate adjustments to improve their performance. When a student adjusts themselves to adapt to the environment--that becomes training. Processes are important for a student to learn and the instant feedback of gaining points or getting a level unlocked helps ingrain those processes. As new levels of content are presented by the teacher, processes can be modified to accommodate the increased cognitive functions. Students also enjoy the feeling of being successful and, by chunking the content into small bites of competitions, they will readily continue on their own to simply “unlock the next level.” This combination of feeling successful, bite-size chunks of information and the expectation of unlocking the next level all fuels the drive to complete homework.

Social Connections. I am repeatedly impressed with the students that take my computer science class in middle school. Often, the 7th and 8th grade kids have never seen programming before and yet they are immediately successful. Part of this I attribute to the gamification of the course as concepts are presented in small chunks using various game type platforms. A well-known coding organization, Code.org, has created a website that allows students to select the level of learning at which they want to begin. Before long, the students are sharing and collaborating with their coding projects and challenging each other to “beat my game”. The added social connections that this creates are definitely a positive effect of gamification. Students that excel at programming are often the less popular kids at school but once in this environment, everyone quickly achieves a similar level on the social ladder. Popular kids and “nerds” are communicating using the same vocabulary and valuing each other’s input. Girls and other girls

tend to gather to compare their progress while boys use their heightened competitiveness to drive themselves further. I feel more like a guide in my students' education rather than a teacher.

Negatives of Gamification

Decreased Attention Span. Critics of gamification point to the apparent lessening of students' attention span as a negative effect. A decrease in attention span correlates with an increase in frustration when achievement is harder to obtain in a shorter time frame. By accessing the pleasure centers in the brain, gamification can create a type of addiction that requires students to continue to switch subjects to constantly provide stimulation. The correlation between switching subjects and attention span has received scholarly attention. Multi-tasking has been demonstrated to be a myth and the skill that looks like multi-tasking is simply the ability to change focus rapidly. Daniel Levitin discussed this extensively in his book, the Organized Mind, (2016). Being able to change focus rapidly, on one hand, might be a positive if one finds oneself in a situation where the environment is unstable. In a classroom, or any venue of study, changing focus prevents information from coding into long term memory storage of the brain.

Preparation Time. Gamifying a subject is a time intensive prospect. Linking the learning targets to the standards and doing it in a way that also creates a sense of competition takes time and resources many teachers cannot afford. Time is a luxury teachers do not often have. Developing lessons that allow for some form of formative or summative assessment and then implementing that lesson also comes with a period of debriefing. Lessons must be evaluated and adjusted to accommodate the failures or twists that always accompany any lesson.

Rebuilding gamified lessons, and their accompanying scoring rubrics, is more complex than simply restructuring a classic style lesson. In conjunction with preparing the actual lesson is creating the necessary assessments. Formative assessments are much easier to manage as these

can be informally obtained. A teacher may make a formative assessment by simple observation and making the appropriate notation to track the formation of knowledge in a student or a group of students. Formal assessments, or summative assessments, are more difficult as these are intended to show the actual growth and understanding achieved by the student. In a competitive scenario, achieving the game may be more important to the student than demonstrating mastery of the subject or skill in question. For these summative evaluations, a departure from the gamified model is necessary. It is considered a best practice to test a student in the same, or as close to the same, setting as the student was in to learn the material in the first place. This puts the student at ease and the expected outcome is that in which the student performs at his/her personal best. As a gamified situation is not the optimal setting for a final assessment, several final assessments should be given to establish a baseline of expected mastery. Creating and grading such assessments is a time intensive endeavor. Gamification might be a fun and engaging method with which to learn material, but it is not a good method with which to demonstrate mastery of the same material for the sake of the teacher's sanity.

One of my most enjoyable lessons is letting my students develop a board game. This works for any subject and I have done it for Life Science and for Art. In both subjects, the preparation time has been, itself, a project. After obtaining the material the students require (cards, dice, spinners, cardboard, large sheets, etc.) further time and resources are required to find storage for all these items. The outcome is mixed. If the learning objective is to master the subject that the game is supposed to be about, then the result of the summative is generally low. If the learning objective, however, is focused more on the development of professional skills (the ability to work together and problem solve), the results of that summative is generally very high.

These are the skills that I find more valuable and prefer to aim for in learning targets so this exercise will continue to be high in value in my teacher toolbox.

Gender Differences in Gamified Learning

Gender Research. Games are traditionally seen as a male dominated event. Research, however, has shown that settings that allow for females to be comfortable can also have a positive impact on girls succeeding at gamified learning (Maria Svedin & Olle Bälter, 2016).

Conclusion

Gamification has been in existence for a long time. Students have compared grades with each other to establish their own hierarchy of leadership. Good grades have often been equated with being a more valuable member of society. Teachers have also used the concept of competition amongst students to encourage student growth and engagement. Under the guise of letting more successful students help and encourage less adept learners, teachers have been using the innate desire to compete to bolster the desire of showing one's worth through successful understanding. Gamification has undergone some transformations since a student has been asked to solve a math problem on the blackboard before the entire class to using a clicker to demonstrate understanding. Regardless of the delivery of the competition, gamification is here to stay.

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