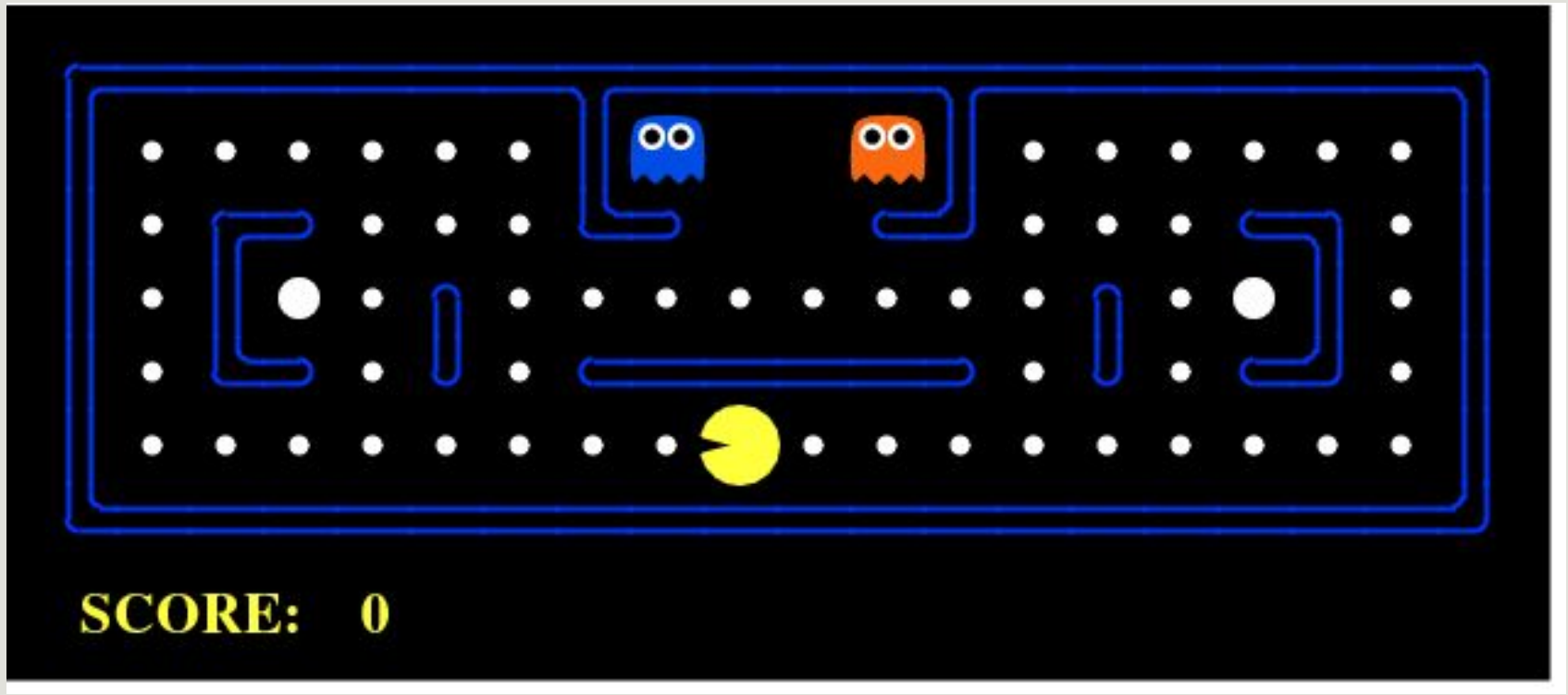
# Game Based Learning

**“Good Learning via Gaming…”**



# Outline

1. Using the video entitled “Principles on Gaming” (Gee), I will choose 3 of the 13 Principles of Learning that “good games” use to hook people on learning, briefly describe them and explain why they appeal to me as a learner.

2. I will differentiate between the following terms:
   - - Gamification
   - - Game based learning
   - - Serious game
   - - Simulation
   - - Commercial off the shelf game (COTS)

# Gee's Thirteen Principles of Learning

**Category 1 – Agency**

1. Agent / Co-design
2. Customization
3. Identity
4. Manipulation

**Category 2 – Problem Solving**

1. Well ordered problems
2. Pleasantly frustrating
3. Cycle of expertise
4. Just in time & On demand
5. Fish tank
6. Sandbox
7. Skills under strategies

**Category 3 – Deep Understanding**

1. System thinking
2. Situated meaning

# The Customization Principle

Not all people learn in the same way or at the same speed. As teachers, we recognize and try to accommodate for a variety of interests and learning styles, including the most common of auditory, visual and kinesthetic.

Customization is a means of differentiated learning in that it allows students choice in how they want to engage with the subject matter, as well as provides variety in learning materials that speak to individual interests and styles.

Gee explains that a lack of customization within learning lowers a person's sense of worth or 'agency.' Learners must be afforded the opportunity to solve problems in various ways and work at a difficulty level within their own comfort level and ability.

Image retrieved from: https://pcdnetwork.org/blogs/do-we-live-life-without-choice/

# Pleasantly Frustrating Principle

Everyone loves a good challenge, especially when doing something they enjoy. In fact, the challenge is often key to that enjoyment. Image someone who loved playing basketball and wanted to improve their dunk; it would get boring for them rather quickly if the hoop they used for practice was only 6 feet tall.

Gee states that people learn best when the learning is “pleasantly frustrating.” This frustration is not caused by, nor does it cause stress as the learner understands that if they put in the effort, they will eventually be able to do the task or arrive at a solution. This state of being pleasantly frustrated has also been referred to as the learner’s “regime of competence,” whereby the task feels challenging but achievable.

When a learner is working within their regime of competence, it often leads to them being in something known as “flow.” This is when someone is so fully immersed in what they are doing that they often lose track of time or even what is happening around them. Many athletes refer to this as being “in the zone.”

# The Sandbox Principle

We have all felt overwhelmed at one time or another, especially when confronted with a situation we feel is greater than our ability to handle. Being in a place of fear or anxiety does not allow a person to be in the necessary frame of mind for healthy exploration, experimentation or risk taking.

In Maslow's *Hierarchy of Needs*, once a person's physiological needs have been met, the need to feel safe is the next basic, primitive need that all human beings require.

The idea behind Gee's Sandbox Principle is to provide learners a safe and bounded space to explore, take risks, make mistakes and try again. This is a space where learners are protected from situations where they may feel anxious or fearful, and can focus on exploratory learning at their own pace and comfort level.

Image retrieved from: https://dailyfintech.com/2018/04/05/regulatorysandbox/

# What is the appeal?

In Gee's Thirteen Principles of Learning, James Gee shares thirteen of what he considers to be some of the best learning principles that are built into good video & computer games. While they all appeal to me as a learner, the Customization, Pleasantly Frustrating and Sandbox Principles spoke to me most directly.

I consider myself to be an avid, life-long learner and I certainly enjoy a good challenge! That said, I also like a safe space to practice something new, occasionally trying to put my own spin on it. I enjoy learning at my own pace, sometimes reading/viewing information more than once so that I can really wrap my mind around it, while at other times just skimming the material as it is something I am already familiar with or am simply not that interested in.

These three principles allow for a learning experience that is done in a safe space and at the learner's own pace, but still offers the challenge that is desired when engrossed in learning something new.

Delving into Gee's Thirteen Principle has helped to further my understanding of the possibilities that 'good games' can offer in a learning environment, and I look forward to using more 'good games' in my own classroom.

# Gamification vs. Game Based Learning

## What's the difference?


Image retrieved from: http://www.theknowledgeguru.com/gamification-vs-game-based-learning/

# Gamification

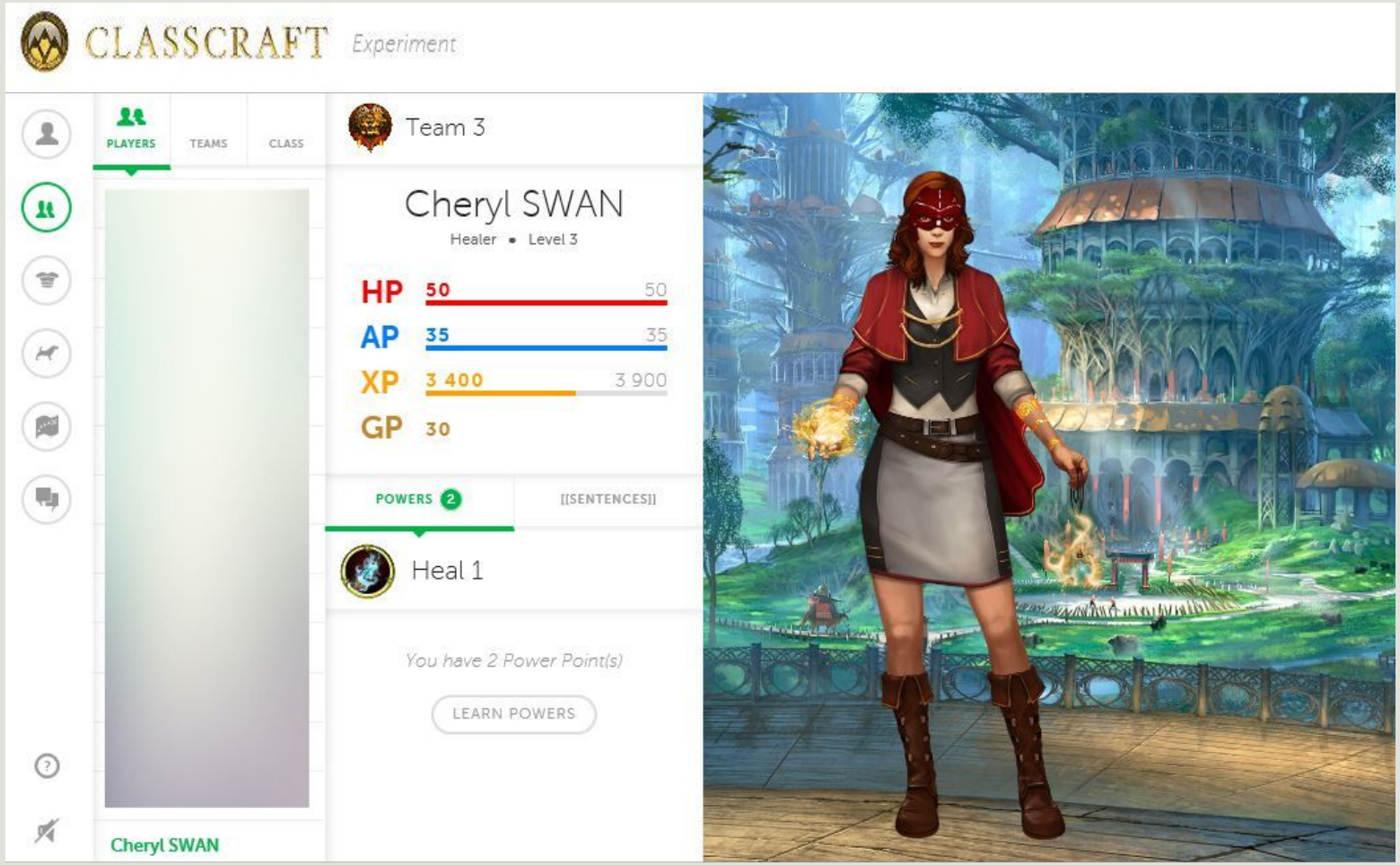


Karl Kapp describes gamification as “an emergent approach to instruction which facilitates learning and encourages motivation through the use of game elements, mechanics and game-based thinking” (Kapp, 2013).

The purpose of gamification is to engage learners in the learning process by utilizing gaming elements, such as points, levels, badges and leaderboards, in non-game situations and learning activities. It allows for more personalized learning, provides instant feedback, allows students to track their progress, fosters communication and friendly competition (especially when students ‘play’ as teams), and is fun!

**Classcraft** is a great example of a ready-made commercial gamification platform that educators can use in the classroom or online (https://www.classcraft.com/).

Allowances for differentiated learning is built right into Classcraft as different paths can be created (by the teacher) and taken (by the student) to achieve the same goal.




Screenshot by Cheryl Swan

# Game Based Learning


Image retrieved from: https://home.gamer.com.tw/creationDetail.php?sn=2915341


Image retrieved from: https://www.gamespot.com/minecraft/

Game based learning (GBL) provides students an opportunity to engage in learning through game play, and is designed with specific instructional goals in mind (Bradbury, 2017).

With Game Based Learning, the learning comes from *playing the game*. Teachers have been using game play in the classroom for many years, and with good reason. The value of 'play' is well understood in that it provides "a means by which children develop their physical, intellectual, emotional, social, and moral capacities" (Gray, 2008). It helps to create and preserve friendships, and, according to Gray, "provides a state of mind that, in adults as well as children, is uniquely suited for high-level reasoning, insightful problem solving, and all sorts of creative endeavors." By bringing Game Based Learning into the classroom, whether digitally or otherwise, educators are utilizing the power of play to achieve specific goals in the students' learning.

Video games such as Minecraft, Portal, Civilization and SimCity are Commercial Off the shelf Games that are categorized as GBL games and can be powerful learning tools if used in the right way. As Game Based Learning and its benefits becomes more well known, more and more teachers are being to use GBL to enhance learning in the classroom.

# Types of Games

- Serious Games
- Simulation Games
- Commercial Off the Shelf Games (COTS)

## Serious Games
### (Amnesty – The Game)


Image retrieve from: https://www.gamespot.com/amnesty-the-game/

## Simulation Games
### (Flight Sim World)

Image retrieve from: https://simcatalog.com/649-top-10-simulation-games-2017-2018.html

## COTS Games
### (Resident Evil 4)

Image retrieve from: https://www.giantbomb.com/resident-evil-4/3030-1578/

# Serious Games



A common definition for Serious Games found across the internet is “games that are designed for a primary purpose other than pure entertainment.”

Serious games are educational in nature, but are also designed to train, heal, empower, call attention to important issues, and elicit positive change in the world. Serious games typically imitate real life situations and even allow for practical skills development through realistic simulation exercises. They have been embraced by the medical and aviation industries, as well as in education, engineering, defense, politics and scientific exploration (Fedwa, Mohamad, & Abdulmotaleb, 2015).

Foldit is an example of a Serious Game that was created as part of an experimental research project, and is a puzzle game about protein folding. According to their website, “Foldit attempts to predict the structure of a protein by taking advantage of humans' puzzle-solving intuitions and having people play competitively to fold the best proteins. (https://fold.it/portal/info/about, 2018). In 2011, Foldit gamers were given three weeks and challenged to figure out the detailed molecular structure of a protein-cutting enzyme from an AIDS-like virus found in rhesus monkeys: a monkey virus which causes human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS). This was a scientific problem that had been unsolved for 15 years. The gamers were able to find it in less than 10 days (Boyle, 2011).

Images retrieved from: https://mediabuzz.com.sg/asian-emarketing/1681-foldit-solving-scientific-problems-with-gamificationabf8.html and https://www.businessinsider.com/scientists-use-video-games-cure-aids-proteins-contenders-2015-5

# Simulation Games

Simulation games are interactive games that simulate a real life situation or activity in some way. Sometimes falling under the category of Serious Games, simulation games are often used for training purposes or to practice a specific skill. Flight and medical simulators are examples of games used for this purpose. In align with Gee's Sandbox Principle, these types of games allow learners to practice in a safe, risk-free environment, and to experiment with situations that could be dangerous to try in real life.

While often educational in nature, many simulation games are created and played simply for entertainment purposes. Examples of these include: Civilization, Project Cars, Football Manager, Rising Storm, ARMA 3, Kerbal Space Program, and SimCity (https://www.gamesradar.com/best-sim-games/, 2017).

SimCity is an open-ended urban planning game that utilizes a virtual environment to help teach things such as mathematics, budgeting, taxes, basic economics, environmental studies, and more. Perhaps one of the most well known simulation games out there, the developers of SimCity have created numerous sequels and other "Sim" versions of the game, including SimFarm, SimCopter, and SimVille (https://en.wikipedia.org/wiki/SimCity).


Image retrieve from: https://www.ea.com/games/simcity

# Commercial Off the Shelf Games (COTS)

Image retrieved from:
https://nerdist.com/guitar-hero-through-the-fire-and-flames-perfect-score-150-percent-speed/


Image retrieved from: https://www.epicgames.com/fortnite/en-US/buy-now/battle-royale

Commercial off the shelf games are what most people think of when they hear the words *video games*. COTS fall into a number of different genres, including: Massive Multiplayer Online (MMOs), Simulation, Adventure, Real-Time Strategy (RTS), Puzzle, Action, Stealth Shooter, Combat, First Person Shooter(FPS), Sports, and Role-Playing (RPG) (Hurst, 2015). While not a comprehensive list, these genres are fairly well known in the gaming community and can further be broken down into numerous sub-genres.

Although created mainly for the purpose of entertainment, many COTS games provide gamers unique, and often invaluable learning experiences simply by engaging in game play. This, of course, does not mean that most COTS games on the market are suitable for the classroom, however, many are. Educators just need to have specific learning outcomes in mind when choosing a video game and make certain it is suitable for the particular age group of their students, as they should with all learning tools. It is also advisable that teachers actually play the game themselves and become familiar with it, in order to be able to answer questions and assist with troubleshooting or frustrations that students may have with the game (Charsky & Mims, 2008).


Image retrieved from: https://www.vecteezy.com/vector-art/105216-pacman-game-over-free-vector

# References


Boniwell, I. (2008, November 7). Living in flow: What is it and how to enter the flow state? Retrieved September 25, 2018 from

- http://positivepsychology.org.uk/living-in-flow/

Bradbury, H. (2017, March 21). Gamification vs. game-based learning: What's the difference? Retrieved September 26, 2018 from

- http://www.theknowledgeguru.com/gamification-vs-game-based-learning/

Boyle, A. (2011, September 18). Gamers solve molecular puzzle that baffled scientists. Retrieved October 7, 2018 from https://www.nbcnews.com/sciencemain/gamers-

- solve-molecular-puzzle-baffled-scientists-6C10402813

Charsky, D., Mims, C. (2008). Integrating commercial off-the-shelf video games into school curriculums. *TechTrends: Linking Research and Practice to Improve Learning,*

- 52(5), 38-44. Retrieved from http://web.b.ebscohost.com.ezproxy.viu.ca/ehost/pdfviewer/pdfviewer?vid=4&sid=730716a0-eb07-455b-aa85-678f20c8a387%40sessionmgr104

Fedwa L., Mohamad E., & Abdulmotaleb E. S. (2015). An overview of serious games. *International Journal of Computer Games Technology*, *2014*, 1-15.

- http://dx.doi.org/10.1155/2014/358152

Gee, J. [Chris Thorn]. (2013, November 13). *Jim Gee Principles on Gaming* [Video File]. Retrieved from

- https://www.youtube.com/watch?v=4aQAgAjTozk

Gray, P. (2008, November 19). The value of play I: The definition of play gives insights [Web log post]. Retrieved October 6, 2018 from

- https://www.psychologytoday.com/us/blog/freedom-learn/200811/the-value-play-i-the-definition-play-gives-insights

# References continued


Growth Engineering. (2018). 10 serious games that changed the world. Retrieved October 6, 2018 from http://www.growthengineering.co.uk/10-serious-games-that-changed-the-world/

Gupta, P. (2016, February 2). Tools, tips & resources teachers must know to learn about gamification of education. Retrieved October 6, 2018 from http://edtechreview.in/trends-insights/insights/2293-gamification-of-education

Herold, B. (2013). Popular SimCity video game, now a classroom assessment. Retrieved October 7, 2018 from http://blogs.edweek.org/edweek/DigitalEducation/2013/11/popular_simcity_video_game_now.html

Hurst, J. (2015, February 18), 12 types of computer games every gamer should know about. Retrieved October 7, 2018 from https://thoughtcatalog.com/jane-hurst/2015/02/12-types-of-computer-games-every-gamer-should-know-about/

Isaacs, S. (2015, January 15). The difference between gamification and game-based learning. Retrieved September 26, 2018 from http://inservice.ascd.org/the-difference-between-gamification-and-game-based-learning/

Kapp, K. (2013, December 10). Thinking about gamification in learning and instruction. Retrieved September 27, 2018 from http://karlkapp.com/thinking-about-gamification-in-learning-and-instruction/

McLeod, S. (2018). Maslow's hierarchy of needs. Retrieved September 25, 2018 from https://www.simplypsychology.org/maslow.html

Siddiqi, A. (2012, August). Foldit: Solving scientific problems with gamification. Retrieved October 7, 2018 from https://mediabuzz.com.sg/asian-emarketing/1681-foldit-solving-scientific-problems-with-gamificationabf8.html