# Literature Review on Web Application Gamification and Analytics

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# Contents

**Abstract**

As "Gamification" quickly becomes the hot debating topic across a wide range of industries and academia, it deserves more thorough studies and researches both qualitatively and quantitively. This document intends to survey this recent phenonemon of gamification being argued as a world changing layer or a useless buzzword. It provides a comparative review of different school of thoughts on the effectiveness of applying game mechanics to non-game context. Both industry implementations and academia researches are reviewed and analyzed. With the goal of providing a empirical research on effectively gamifying web applications, the current methodology of analytics in gamfication is also surveyed.

# Chapter 1

# Introduction

Wikipedia defines gamification is the use of game play mechanics for non-game applications, particularly consumer-oriented web and mobile sites, in order to encourage people to adopt the applications.

The term is almost not exists until in February 2010, as part of the DICE conference, Game designer and professor from Carnegie Mellon, Jesse Schell gave a presentation about a possible future where games, or elements of games, is and will invade every part of our daily live [ref]. The term becomes prominent as several recent books such as Gabe Zicherman's "Game Based Marketing"[ref], who advocated the use of game mechanics in marketing as a form of loyalty program, and Jane Mcgonical's "Reality is Broken"[ref], who assures us that games will make us better and a solution to the broken reality, and Baron Reeves's "Total Engagement"[ref], who elaborates games and virtual world will change the way people work and business compete. In the SXSW 2011, Google backed startup SCVNGR CEO Seth Priebatsch talks[ref] about game is the new layer that similar to the social layer, "will change the world".

In IT industry research, Gartner [ref1] predicts that by 2015, more than half of companies managing innovation processes will employ Gamification, a process of applying game mechanics to non-game contexts. In that same time frame, M2 Research [ref2] forecasts that the game mechanics production will generate 1.6 billion in revenues and will account for 23 percent of social media marketing budgets.

In the newly release Gartner Hype Cycle report, gamification, along with big data and internet of things, are added to the 2011 hype cycle, that weren't present in 2010. According to Gartner, currently gamification is on the rise to the peak of the hype, the stage of the "peak of inflated expectation", with 5-10 years of mainstream adoption. [see figure 1.1].

Gartner use the hype cycle theory to track technology adoption, after the peak period, the technology will slip into the trough of disillusionment and some technologies will start climbing the slope of enlightenment and eventually reach the plateau of productivity. As any technology, Gamification will inevitably slip into the disillusionment trough where the hype is passed and the mass realize there are a lot of unsolved and criticism will arrive. The question remains if gamification will eventually climb out of the trough and appear in the plateau of the cycle.

In fact, there are already quite a lot critique of gamification in the media. Some called it a merely buzzword, a hype-up version of mileage loyalty program, or a superficial "pointification", where often misses element such as storytelling and experiences which are central to what make games effective.[ref]

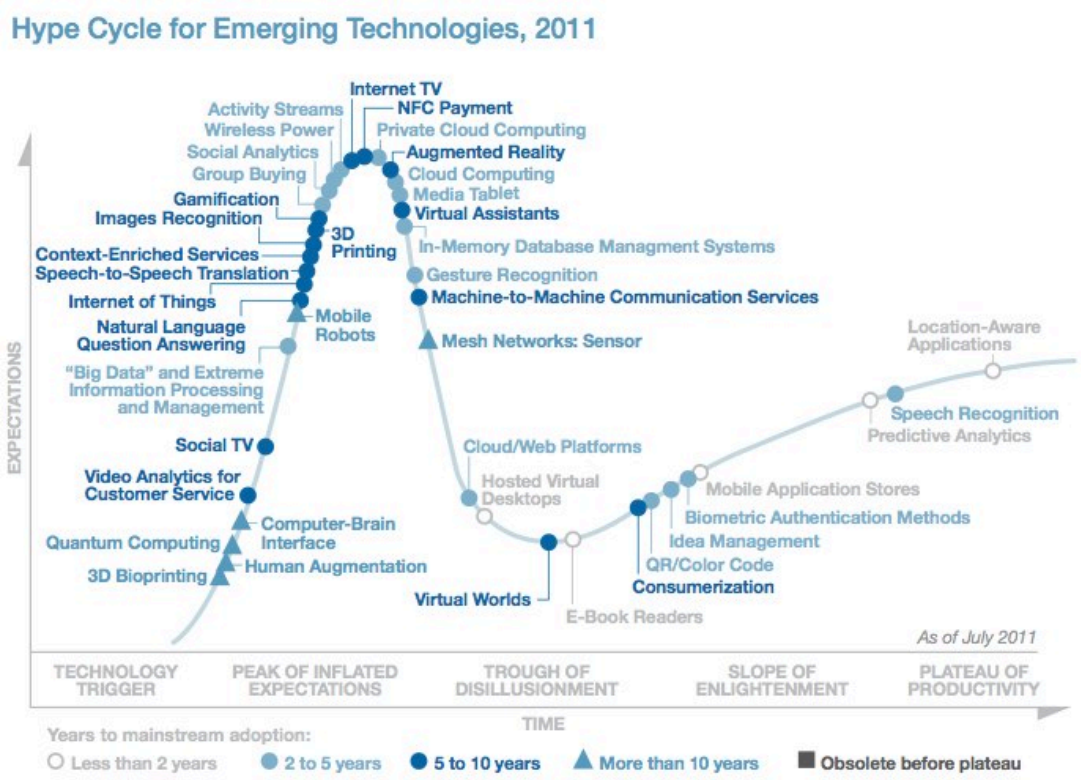


Figure 1.1: 2011 Gartner Hype Cycle

More and more game designers and researchers are looking into the deeper practice of gamification. Amy Jo Kim presents Smart Gamification which focus on designing the effective Player Journey with intrinsic preferred over extrinsic reward.[ref] Jane Mcgonical is emphasizing the aspect of "Playfulness" in an gamification instead of game mechanics.[ref]. Similarly, In his popular google tech talk, researcher Sebastian Deterding criticized the current practice of simple gamification and stress the important of "meaningful play".[ref]

It is surely becoming an IT phenomenon where gamification lie in between a layer that will change the world and a meaningless buzzword".

The goal of this paper is to review the gamification technique in a scientific way, examine most of the commonly employed game mechanics with their usages, effectiveness.

# Chapter 2

# Related Works

## 2.1 Why Games

Gamification is not about games, in fact as a subject gamification is deals with everything else but games. But the research in gamification have to largely base on the studies of games. The games already prove to be an effective engaging media and ubiquitous as every day life. In fact, "video game is everywhere" is the critical thesis of many gamification advocates.

[need more data on game market, player demography]

The following sections will examine a few most popular games and genre to understand what game mechanics give games such power nowaday.

### 2.1.1 Casual Game: Angry Birds

In today's tech world, no gaming platform is completed without the new star game Angry Birds. There are over 50 million individuals have downloaded this simple game. The total number of hours consumed by world-wide players is roughly 200 million minutes a day, that is 1.2 billion hours a year. According to Neiman Journalism Lab[ref], all person-hours spent creating and updating the entire wikipedia totals about 100 million hours. That is half day of the Angry Birds play time. Why is this seemly simple game so massively compelling? Charles Mauro [ref] discussed the cognitive teardown of Angry Birds in Human factor engineering (aka usability engineering) for the sake of answering the more "important" real world question, "why users don't find their company's software or product engaging?": * Simple Engaging Interaction Concept: Angry Birds' simple interaction model is easy to learn and incremental increase of complexity. * Cleverly managed response time: In Angry Birds design, it is not "faster is better", instead, different birds have different trajectory time and the flight path of the bird is intentionally illustrated. It solved one huge problem for user interfaces - error correction.It also take a seemly long time for the pigs to expire once their hours are collapsed, this non-functional time delay increases the playfulness of the game and bring users entertainment.

### 2.1.2 Social Game: Zynga-Ville

With the motto "Connecting the world through games", Zynga who found in 2007 quickly become the top game company catching up to the more traditional establishment such as EA and Activision Blizzard. With the help of socal network platform Facebook, the FarmVille and CityVille quickly

become the most popular games within Facebook. Zynga later expanded the games into other platform such as mobile and new google+ social network. [more research on Zynga's game number, total time played, total player, compared to Angry Birds] One distinct characteristic of Zynga games is that they are social and they are all interconnect through an exchangable virtual currency "Zynga Points". [more on virtual currency's social effect]

### 2.1.3 MMORPG: World of Warcraft

[insert the statistics here for comparision with the above, time, player]

## 2.2 Game Mechanics

There are many game mechanics make game a game.

### 2.2.1 Status

This include experience points(XP), ranks on the leader board, health.

### 2.2.2 Achievement

This normally represents as badge, completed quests.

### 2.2.3 Level progression

### 2.2.4 Mission Quest Journey

### 2.2.5 Social

### 2.2.6 Virtual good or Real-world tangibles reward

### 2.2.7 Immediate feedback

## 2.3 Gamification Debates

### 2.3.1 Can you gamify a suicide hotline?

Can you gamify everything? "No, you can not gamify game". According to Gabe Zichermann, the idea of baking game mechanics into everything you do is fun, but when asked how would you make a suicide hotline fun, he admitted that adding games to a suicide prevention seems distasteful at first, but he could add a game mechanics like a competitive environment in a call center setting.

### 2.3.2 Gamification is bull*it

### 2.3.3 Gamification vs Serious game

Serious game are generally defined[ref], to include games that make use of computer technology and advanced video graphics and that are used for the purposes of learning and training.

## 2.4 How to use game mechanics in gamification

### 2.4.1 Gamification Applications

### 2.4.2 Smart Gamification

## 2.5 Gamification Service or Platform

This section outlines the current industry players that provides gamifcation service via platforms or consultation service. [see figure 2.1]


Figure 2.1: Gamification Service Industry

### 2.5.1 Gamification Analytics

The objective evaluation of Player Experience (PX)[ref] in games is the goal of game metrics and analytics research. With the technology advancement, it is possible to automatically log numerical informations on in-game player behaviour and analyze them in different context. This methodology provides a qualitative and quantitative result of the player experience in games, which in turn affect the result of gamification.

# Chapter 3

# Future Directions