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GAMIFICATION:
CONCEPTS, ENABLING TECHNOLOGIES
AND IMPLEMENTATION

ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ

του

ΘΕΟΔΩΡΟΥ ΟΙΚΟΝΟΜΟΥ

Βόλος, Ιούνιος 2012

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(Υπογραφή)

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ΘΕΟΔΩΡΟΣ ΟΙΚΟΝΟΜΟΥ

Διπλωματούχος Μηχανικός Ηλεκτρονικών Υπολογιστών, Τηλεπικοινωνιών & Δικτύων Πανεπιστημίου Θεσσαλίας

Βόλος, Ιούνιος 2012

gamification

Pronunciation: /ˌɡeɪmɪfɪˈkeɪʃ(ə)n/

noun
[mass noun]

the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service.

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Introduction

Recent years have seen a rapid proliferation of applications and services that apply game mechanics to improve user experience (UX), drive user behavior, increase user engagement and retention outside the realm of, what can traditionally be perceived as, games. The concept of enhancing services with game-like features and elements is usually summarized under the term "*gamification*". Gamification is a neologism, a newly invented term that's becoming commonly used. Although fresh as a concept, gamification has reached mass audiences, is increasingly catching the attention of researchers and is becoming a hot topic in the business and technology world. In the following chapters we are going to investigate and analyze the roots of gamification, its background, the elements it leverages, current uses of gamification and the existing industry state.

1.1 Definition

Although the first documented use of gamification dates back to 2008, it only received widespread adoption in the second half of 2010, when it was mentioned in several conferences and industry vendors and consultants started employing it. Therefore not many academic papers exist, that explicitly refer to the term. Since the academic background is not deep, we will present several interpretations and definitions given by recognized experts and researchers:

In "*"Gamification" from the perspective of service marketing*" [1] researchers define gamification in the following way:

"Gamification is a form of service packaging where a core service is enhanced by a rules-based service system that provides feedback and interaction

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mechanisms to the user with an aim to facilitate and support the users' overall value creation".

Gamification is also described [2] as "the adoption of game technology and game design methods outside of game industry".

Gabe Zichermann, a widely recognized advocate of gamification and the author of *Game Based Marketing* and *Gamification by design* [3] defines the term gamification as the "process of using game thinking and mechanics to engage audiences and solve problems".

"Integrating game dynamics into your site, service, community, content or campaign, in order to drive participation" [4] is another definition.

Wikipedia [5] defines the concept thus:

"Gamification is the use of game play mechanics for non-game applications (also known as 'funware'), particularly consumer-oriented web and mobile sites, in order to encourage people to adopt the applications. It also strives to encourage users to engage in desired behaviors in connection with the applications. Gamification works by making technology more engaging, and by encouraging desired behaviors, taking advantage of humans' psychological predisposition to engage in gaming. The technique can encourage people to perform chores that they ordinarily consider boring, such as completing surveys, shopping, or reading websites".

Amy Jo Kim, an internationally recognized expert in online social architecture and author of the book *Community Building on the Web* [6] describes gamification as "using game techniques to make activities more engaging and fun".

The Gartner Group, a consulting firm defines gamification [7] as "the broad trend of employing game mechanics to non-game environments such as innovation, marketing, training, employee performance, health and social change".

In the book, "*The Gamification of Learning and Instruction*" [8] gamification is similarly defined as "using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems".

Probably the most complete and solid definition proposed has been from Deterding, Dixon, Khaled and Nacke [9] in "*From Game Design Elements to Gamefulness: Defining "Gamification"* " who define gamification as "the use of game design elements in non-game contexts". With this definition the researchers aim to separate gamification from toys, playful design and (serious) games in terms of two dimensions, one that distinguishes between

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playing and gaming and the other between whole and parts. In this way gamification can be seen as relating closer to games (i.e. structured and with explicit rules) rather than design that incorporates elements of play (i.e. unstructured and spontaneous).
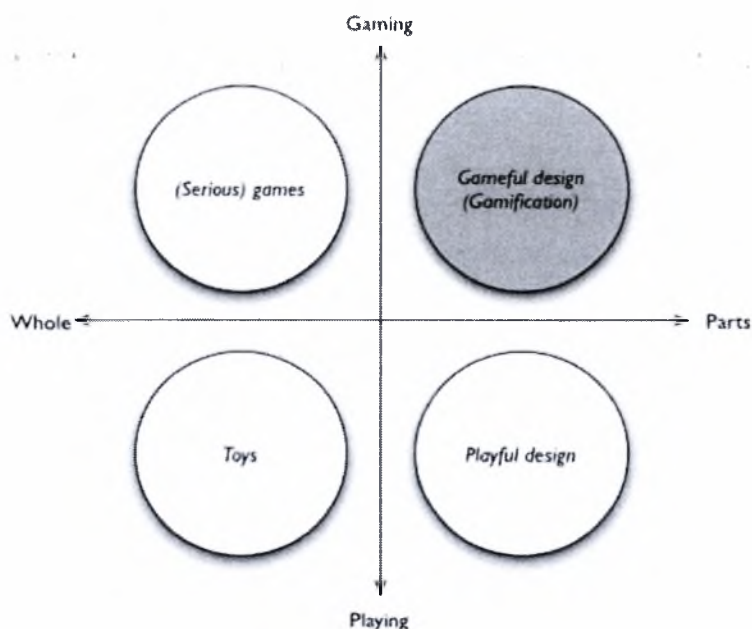
Figure 1-1. "Gamification" between game and play, whole and parts

Most of the definitions proposed, consist of the following elements:

Game-based: Similarly to games, the goal is to create a system in which players and consumers engage in abstract challenges, defined by rules, interactivity and feedback, that results in a quantifiable outcome eliciting an emotional reaction.

Game Thinking: It is the idea of enhancing user's experience with elements of competition, cooperation, exploration and achievement.

Mechanics: Mechanics are constructs or tactics commonly used in games to encourage gameplay. They consist of design elements that are characteristic to games - elements that are found in most games or readily associated with games. Some tangible examples of game mechanics are ranks and levels; badges and rewards; points systems and virtual economies. Mechanics do not have the power to transform a boring experience into a blissful one; the system must always provide a meaningful core experience to the users.

Aesthetics: The user interface of the system, i.e. its look and feel, is highly contributing to the overall experience of the users. A gamified system heavily relies its success in the aesthetic outcome of the experience it delivers to players.

Non-game: Gamification uses elements of games for purposes other than their normal expected use as part of an entertainment game.

Engage: User engagement and retention is the primary goal of gamification. Gamified systems are designed to gain people's attention, involve them in the system and build loyalty.

1.2 What Gamification is Not

Gamification is not the mere outcome of using badges, points and rewards. The real power of gamification is the game thinking it leverages using elements of games such as engagement, visualization of characters, problem solving and storytelling. These are the core components upon which gamification is built. Unfortunately many novice designers and others only look at the mechanics of the game such as scores, points, rewards and badges, while neglecting the aforementioned critical elements of effective gamification. In fact, the definition of gamification as merely adding game mechanics to non-game situations to encourage engagement is a narrow approach; an approach that does not lead to learning, engagement, or productivity improvements.

Gamification should never be confused with game design. We are not creating a deep, immersive experience like *Call of Duty*[1] or *The Sims*[2], instead, we are "gamifying", or integrating game mechanics into our site, content, online community with the goal of increasing participation. Gamification works to satisfy some of the most fundamental human desires like recognition and status, reward, achievement, competition, collaboration, self-expression and altruism. People are hungry for these things both in their everyday world and online. Gamification taps directly into this. It's

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[1] A first-person and third-person video game series franchise
[2] A strategic, life simulation video game

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commonsense that our service needs to stand on its own and be compelling for visitors. Game mechanics cannot be our core experience and the feature with the most meaningful value for our users. Game mechanics revolve around our core features and enhance them by adding an element of community, competition and fun that engages our users. For example, no amount of gamification is going to enhance a news site with outdated news. Gamification usually requires a supporting community. The fundamental human desires we mentioned, such as status and self-expression, are bolstered when others bear witness to it. It is also important to have other people with whom to compete and compare accomplishments. There are special cases where gamification can live without the surrounding community but as a general rule, humans want to interact and compete with others.

Although the majority of current incorporations of gamification are digital (web sites or mobile applications) **the term should not be limited to digital technology**. Beyond consumer applications, game mechanics are being adopted for uses like corporate and vocational training, e-learning, helping children learn at school, financial services, local retail, eCommerse, motivating employees in wellness programs, and even collaborating to solve social issues like poverty and dependence on oil. Non-traditional environments that could possibly embrace gamification practices are the ones seen below (Figure 1-2)[10]:
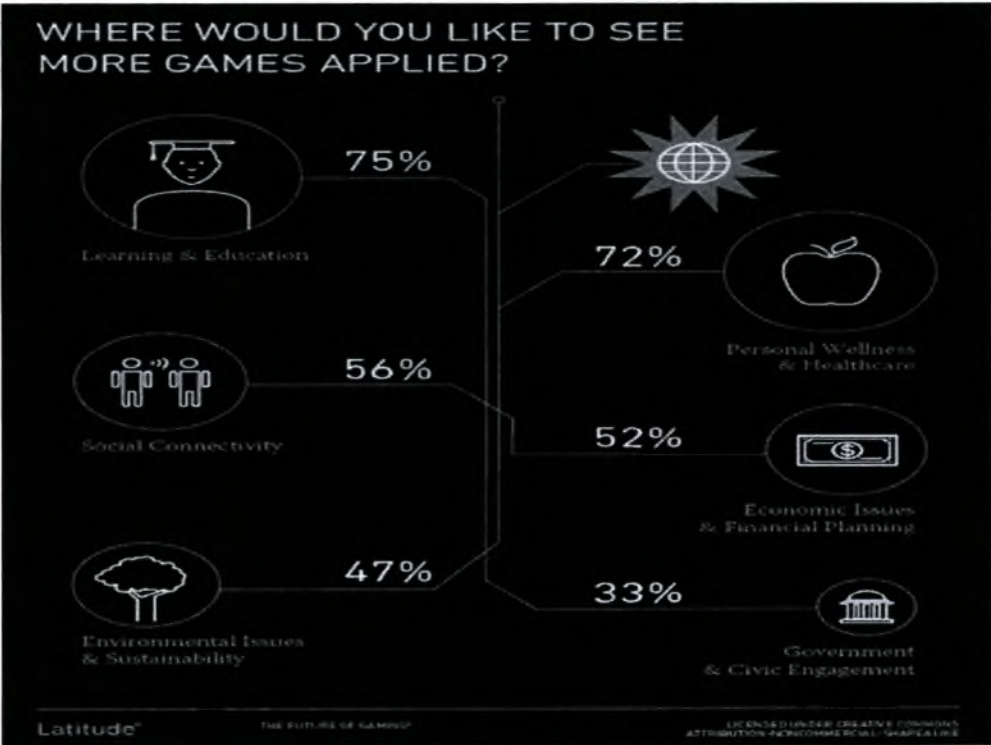
Figure 1-2. Non-traditional environments to which gamification could be applied

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1.3 Gamification's Growth

According to a 2011 report, Gartner Research estimates that by 2015, more than 50 percent of organizations that manage innovation processes will gamify those processes. The report also notes that by 2014, a gamified service for consumer goods marketing and customer retention will become as important as Facebook, eBay, or Amazon, and more than 70 percent of Global 2000[3] organizations will have at least one gamified application. Gartner also added gamification to its yearly-published hype cycle of emerging technologies (Figure 1-3).

Figure 1-3. Gartner's Hype Cycle for emerging technologies, 2011

Gamification has become one of the most talked trends in Silicon Valley[4], with Google Trends (Figure 1-4) depicting the explosive growth continuing to accelerate:

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[3] An annual ranking of the top 2000 public companies in the world by Forbes magazine

[4] A region in the southern part of the San Francisco Bay Area in Northern California in the United States where many of the world's largest technology corporations have their offices

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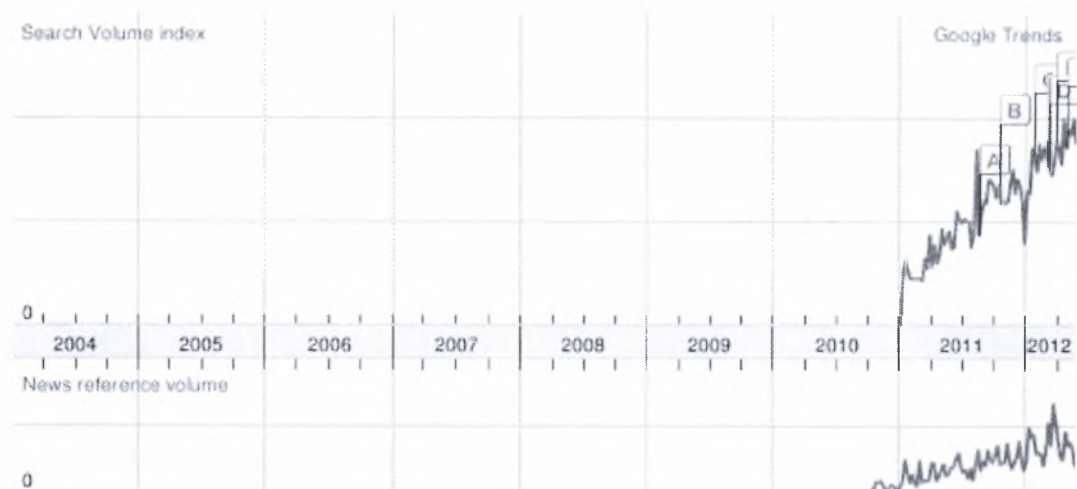
Figure 1-4. Google Trend's search volume index graph for gamification

Moreover, M2 Research [5] forecasts the market spend on gamification solutions, applying game mechanics and behavioral analytics in non-traditional applications will reach $242 million by the end of 2012, which is more than double from 2011 (Figure 1-5)[11].
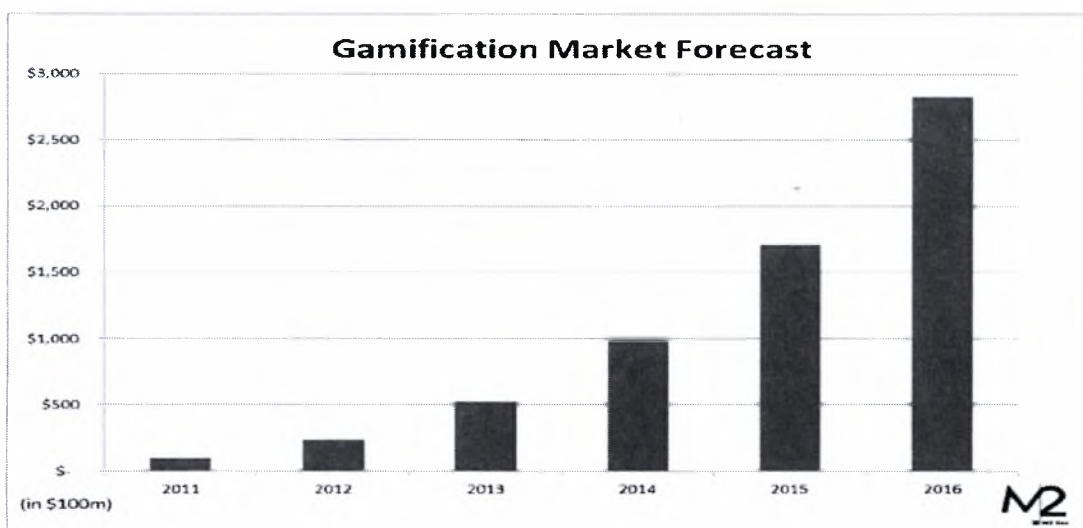
(in millions)	2011	2012	2013	2014	2015	2016
Total	$100	$242	$522	$980	$1,707	$2,830

Figure 1-5. Gamification market forecast according to M2 Research

In the same report M2 Research is also predicting that the gamification market will reach $2.8 billion in direct spending by 2016.

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[5] A market research and strategic consulting company tracking and reporting on digital entertainment

Big Door[6] summarizes the growing popularity and success of gamification and its implementations in the following infographic (Figure 1-6).
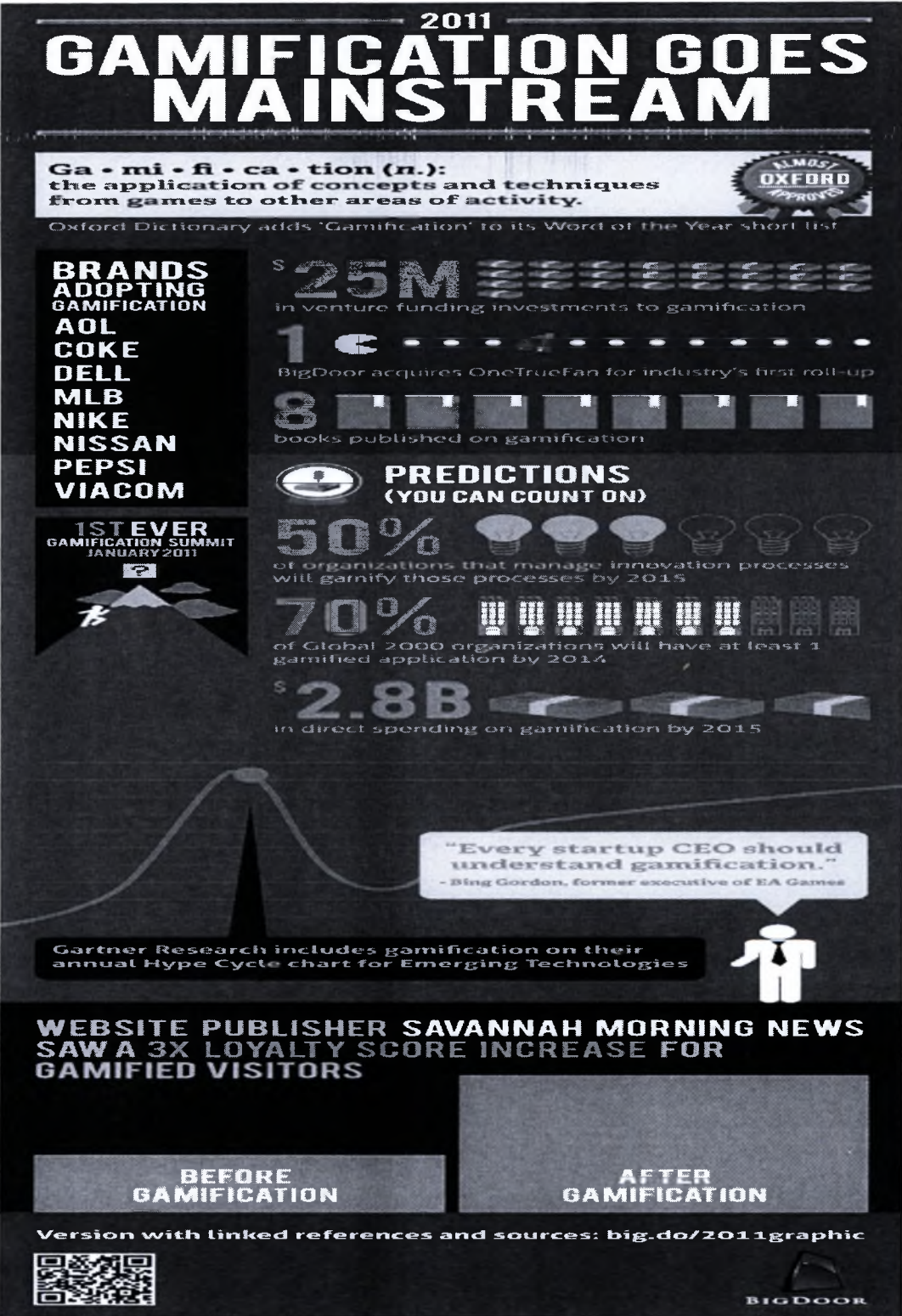
Figure 1-6. *Growing popularity and success of gamification*

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[6] An internet company which offers gamification services to online publishers

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2

Background on Games

2.1 Player motivation

Motivational models have always been central to game design, because without motivation a player will not be interested in processing further within a game. The motivational structure of games is also central to the gamified systems, which seek to apply game-based motivation into their environment.

Mihaly Csikszentmihalyi, a psychology professor who is noted for his work in the study of happiness and creativity is best known for as the architect of flow. In his seminar work, *Flow: The Psychology of Optimal Experience*, he outlines his theory that people are happiest when they are in a state of flow or being "in the zone" or being "in the groove"- a state of concentration or complete absorption with the activity at hand and the situation. Flow is a positive, highly enjoyable state of consciousness that occurs when our perceived skills match the perceived challenges we are undertaking. When our goals are clear, our skills are up to the challenge, and feedback is immediate, we become involved in the activity. We can become so involved that we lose our sense of self and time distorts. The experience becomes autotelic or intrinsically rewarding; we do it for its own sake. Achieving flow also indicates a player's state between anxiety and boredom, a state in which he is completely involved in an activity for it's own sake and he is using his skills to the utmost.
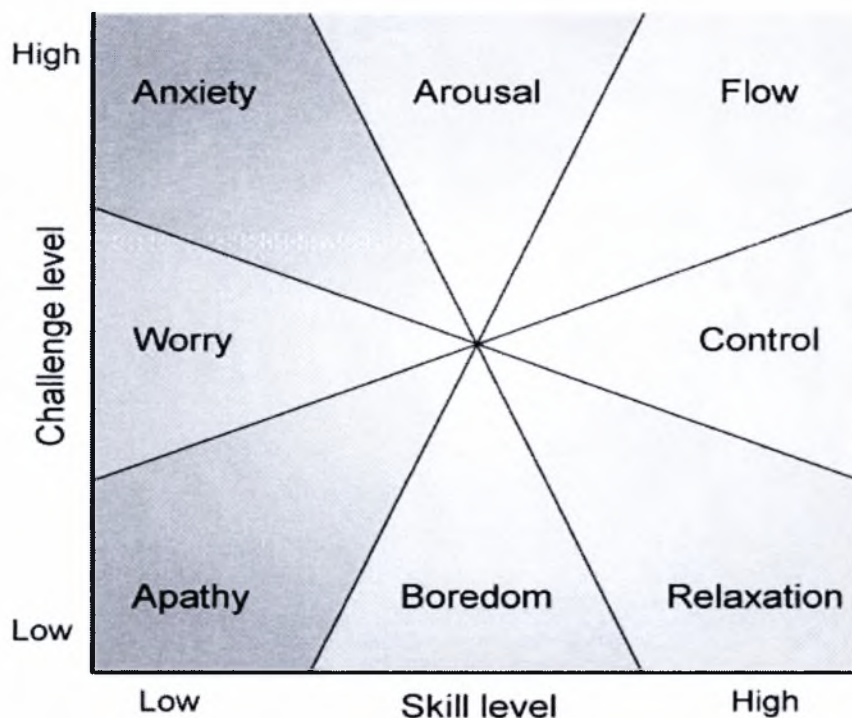
Figure 2-1 : Mental state in terms of challenge level and skill level according to Mihaly Csikszentmihalyi

Game designers are obsessed and always seek to create this state. Nevertheless in order to achieve a flow state, a balance must be struck between the challenge of the task and the skill of the performer. If the task is too easy or too difficult, flow cannot occur. This is why game designers, design the game environment is such a way that an expected reward is converted into player action by varying the quantity and delivery schedule of the reward.

2.1.1 Bartle's Player Types

Bartle, a professor and forerunner in the development of the massively multiplayer online games industry developed a well-established body of research that can help us produce a simple player topology. Bartle observed that many players were interested in the world of game, whereas others were more interested in the other players in the game. Furthermore, some players appeared to be more interested in "acting" (doing things to something or someone), whereas others were willing to "interact" (do things with something or someone). These interests can be plotted on a simple graph, as shown in Figure 2-2.

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```
                          ACTING
                            |
                            |
       KILLERS              |        ACHIEVERS
                            |
                            |
                            |
PLAYERS ————————————————————+———————————————— WORLD
                            |
                            |
       SOCIALIZERS          |        EXPLORERS
                            |
                            |
                            |
                       INTERACTING
```
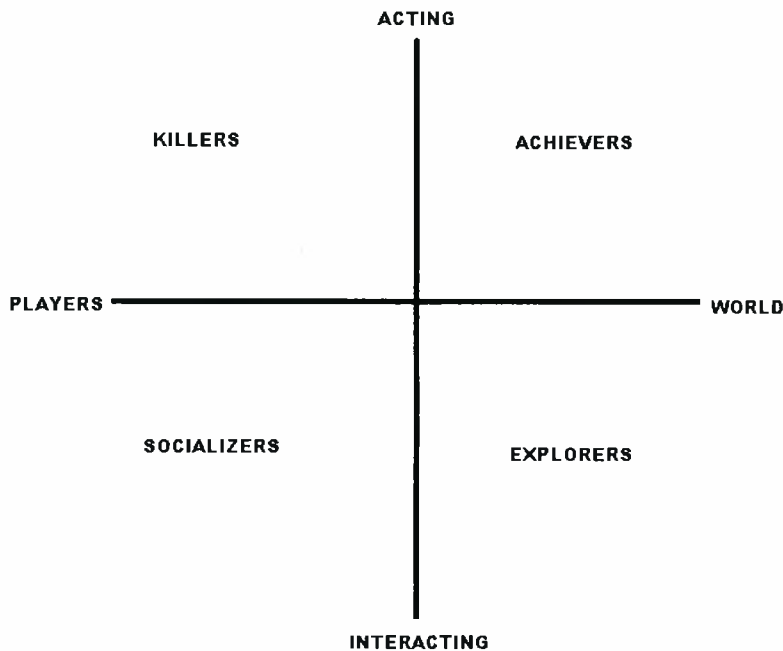
Figure 2-2. Bartle's player types and their interests

As depicted above, the general player types are:
- Achievers
- Explorers
- Socializers
- Killers

Achievers

Achievers (also known as "Diamonds") are players who are motivated by a sense of mastery over the game world. They like the sense that they can become more powerful, making progress or advancing certain concrete goals. They are principally driven by a desire to get points, achieve goals, and hit their mark. For this player, winning may even be less important than playing well.

Explorers

Explorers (also known as "Spades") like to learn about their environment and experience every side of it. This type of players, has a tendency to dig around and prefers discovering areas, creating maps and learning about places that nobody else knows about.

In a social gaming situation, explorers enjoy nothing more than to be able to share the detailed and sometimes unusual information they have uncovered about the game. For the explorer, the game is all about the journey, never the destination.

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Socializers

Socializers are people who play games for the benefit of social interaction. They like to gain friends and influence people, gossip, be loved and organize cooperative activities. Their instinct is less competitive and more cooperative. Socializers are less likely to play a game in order to show off their skills than to build meaningful communal interaction.

Killers

Killers(also known as clubs) thrive on competition with other players and are highly motivated by the joy they experience when they beat them. For this special type of players winning is not enough. They must win and someone else must lose. What killers realy enjoy is being at the top of the learderboards, express pride and feel the physical sensation of adrenaline.

2.1.2 Yee's motivational taxonomy

Exploring the different reasons for playing and the varying pleasures that players engage in while playing games is important given the growing trend of incorporating game-based mechanisms in non-gaming contexts. While Bartle(1996) provided one of the earliest taxonomies of player styles, Yee(2006) has further investigated those models, to account for the more complex interests players might bring to their play styles. The data analysis of the survey he conducted on a large number of MMORPG[7] players , revealed the following (Figure 2-3) components.

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[7] Massive multiplayer online role-playing game

Achievement	Social	Immersion
Advancement Progress, Power, Accumulation, Status	**Socializing** Casual Chat, Helping Others, Making Friends	**Discovery** Exploration, Lore, Finding Hidden Things
Mechanics Numbers, Optimization, Templating, Analysis	**Relationship** Personal, Self-Disclosure, Find and Give Support	**Role-Playing** Story Line, Character History, Roles, Fantasy
Competition Challenging Others, Provocation, Domination	**Teamwork** Collaboration, Groups, Group Achievements	**Customization** Appearances, Accessories, Style, Color Schemes
		Escapism Relax, Escape from RL, Avoid RL Problems

Figure 2-3. Common player interests categorized into components

We will describe the main components briefly below, principally taking into account Yee's assessments.

The Achievement Component

Advancement: The desire to earn prestige, progress rapidly, collect things or gain levels or badges.

Mechanics: Having an interest in analyzing the underlying rules in order to optimize character performance.

Competition: The desire to compete and challenge with other players. Competition may also involve an interest to win scare resources inside the game.

The Social Component

Socializing: Having an interest to make friends, chat with other players and help them.

Relationship: Having an interest to make deeper social interaction with other players.

Teamwork: Gaining pleasure from being part of group and achieving goals through cooperation with other players.

The Immersion Component

Discovery: The desire to find and reveal knowledge through exploration of the game environment.

Role-Playing: Creating a virtual persona with a background history and interacting with other players to create story involving the personas.

Customization: Having an interest in making their character special by customizing it.

Escapism: Using the game environment to escape from real life problems.

According to "*Game On*" [12] Yee's and Bartle's observations on in-game motivational styles can form the following diagram (Figure 2-4) when combined, that categorizes them into four quadrants:
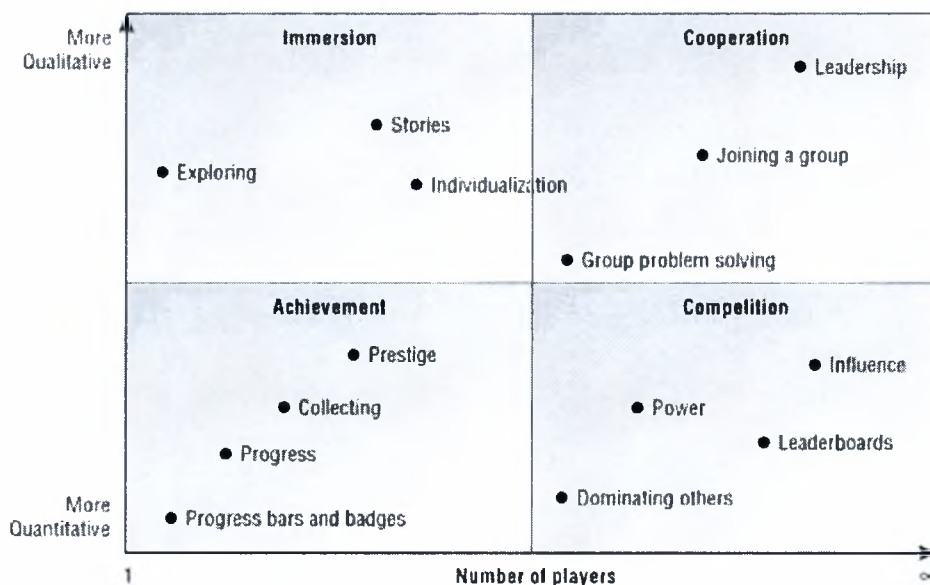
Figure 2-4. Combination of Yee's and Bartle's observation on player's motivational styles

2.2 Game Mechanics

Game mechanics are composed of multiple facets of "gameplay" that can be assembled to ensure that the user is engaged and keeps interacting with our web product. They consist of rules that make gameplay possible and encourage the user to explore and learn the properties of the game space through the use of feedback mechanisms. According to the MDA-framework[8], game mechanics are [13] "the various actions, behaviors, and control mechanisms afforded to the player within a game context".

Before we apply gaming concepts to our context we have to thoroughly think about the outcome we are thriving to achieve. We should decide which behaviors we want to nurture and apply the suitable design patterns to deliver

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[8] A famous formal approach to understanding games that divides a game into three layers, Mechanics(M), Dynamics(D) and Aesthetics(A)

desired experiences. Do we want to make people try out a certain feature, or strive for higher quality contributions, or log endless hours interacting with others? Questions like these will help us in our decision picking the right design elements for our gamified system.

In this chapter we will explore some of the key interface design patterns, which are found in nearly every successful gamified service.

Points

The *point* game mechanic relies on rewarding the user for completing any single action or combination of actions with a numeric value that is added to their overall point total. The cumulative nature of points drives users to continue to remain active.

This game element should be used when the environment is highly competitive and the activities that users engage in are competitive in nature (e.g. player-versus-player). Moreover it's better to award points in order to congratulate user performance (e.g. winning a game against an opponent) and not user activity (e.g. 10 points for every message posted). Points should be avoided when the activities that users engage in are not competitive in nature (e.g. sharing photos in a photo sharing application). We should bare in mind that awarding points may devalue the activity that they are meant to reward by replacing a user's intrinsic motivation (blissful interaction) with an extrinsic one (point collection).

There is a variety of point designs that we can leverage to incorporate in our system. We will briefly describe some of them:

Experience points

Experience points are awarded to the user every time he completes an activity. The amount of experience points always increases as long as the player continues the interaction with the system and cannot be redeemed.

Redeemable points

Unlike experience points redeemable points as its name implies can be redeemed. In most cases redeemable points can be exchanged for an award within the system making their amount decrease. They form the foundation of virtual economy and are often given named related to money e.g. cash, coins, etc.

Skill points

Skill points form a bonus set of points usually assigned to specific activities that are peripheral to the core activity. In other words, they are leveraged to motivate the players to complete alternative tasks. For example, in a question-answer site players may earn some points for the quality of their answers to questions posted and other points for the number of their answers.

Reputation points

This point system is best applied when the application requires trust between two parties that it cannot explicitly guarantee or manage. At such circumstances, reputation points take action and act as a proxy for trust between the users.
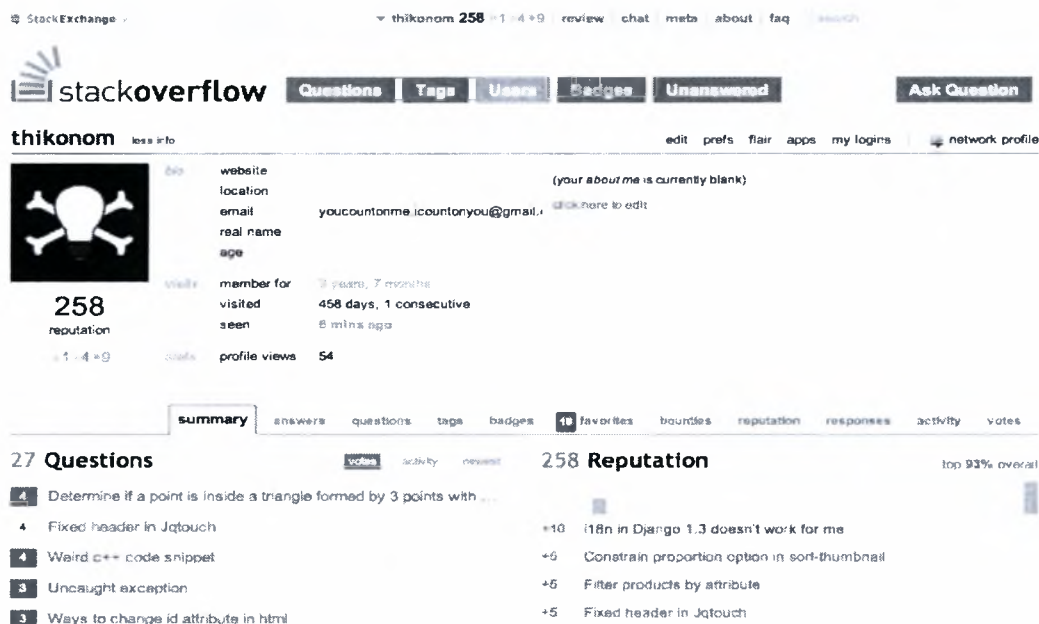
Figure 2-5. Stackoverflow[9] displays user's reputation points prominently on her profile

Levels

 Nearly all games involve the idea of progress and levels are a common used pattern to indicate it. Some of the reasons why levels are so popular is that they help users track their personal development within the system, how far they have progressed or how deeply they've interacted with it.

From the design perspective, it is useful to integrate level systems in such a way that requirements are increased as each level increases. Nonetheless level

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[9] *www.stackoverflow.com*

difficulty should not be linear but instead have a curvilinear form. In other words, it should not take 100 points to get to level one, 200 points to level two and so on. Leveraging this technique, we serves users need for immediate gratification, while slowing down progress whey they are more experienced. We can define two types of levels, which are:

Named Levels

Named levels can help users discover and identify high-quality contributors and track their progress within the community. They are effectively used in cases where the environment is competitive but not highly competitive.

Named levels should be given unique names that can give them a fun 'tone', although comparison between levels may become less trivial. In gamified systems where understanding of the level hierarchy is more important than fun, context-specific names we should choose names well and easily understood (e.g. 'Bronze', 'Silver', 'Gold'). However, there are contexts that fun or thematically named levels fit better e.g. in an application that is based on a movie, it's efficient to use actors names for the levels.

Generally, levels need to be easily understood by the players and extensible so that we can add new levels easily.

Loyalty program

The more you order, the more you win. Score points and unlock coupons at every level

How to get Foodie Points:		Level & Foodie Points needed		Rewards For Leveling Up
Register/Log In	500	Level 1: Nibbler	0	
FB/Twitter Connect	500	Level 2: Forager	1500	$2.00 off
Share Order	200	Level 3: Grazer	4000	$3.00 off
Tweet Order	200	Level 4: Sampler	7500	10% off
Order Size		Level 5: Nosher	15000	10% off
$0 - $9.99	100	Level 6: Snacker	30000	10% off
$10 - $14.99	200	Level 7: Slurper	75000	$3.00 off
$15 - $19.99	500	Level 8: Muncher	150000	$4.00 off
$20 - $29.99	1000	Level 9: Chomper	300000	$5.00 off
$30 - $49.99	1500	Level 10: Gobbler	500000	$5.00 off
$50 - $99.99	2000	Level 11: Feaster	750000	$5.00 off
$100+	2500	Level 12: Savorer	1000000	$5.00 off

Figure 2-6. Campusfood[10] explains its system of named levels, how levels are tied to points and the benefits gained at higher levels

Numbered Levels

All levels, both named and numbered, are inherently numerical or can be represented numerically. Numbered levels are the right choice when we

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[10] *www.campusfood.com*

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decide that we want to expose the number in our interface. Since they are referred to by their number, comparisons between levels become more straightforward and easy to do (At a glance, Level 1 is more junior than Level 5). This is why they are suitable when we want to promote competitiveness in the system.

Numbered levels are easily extensible (we just need to add a level with a number greater than the existing maximum) but are considered as less personalized compared to Named levels.
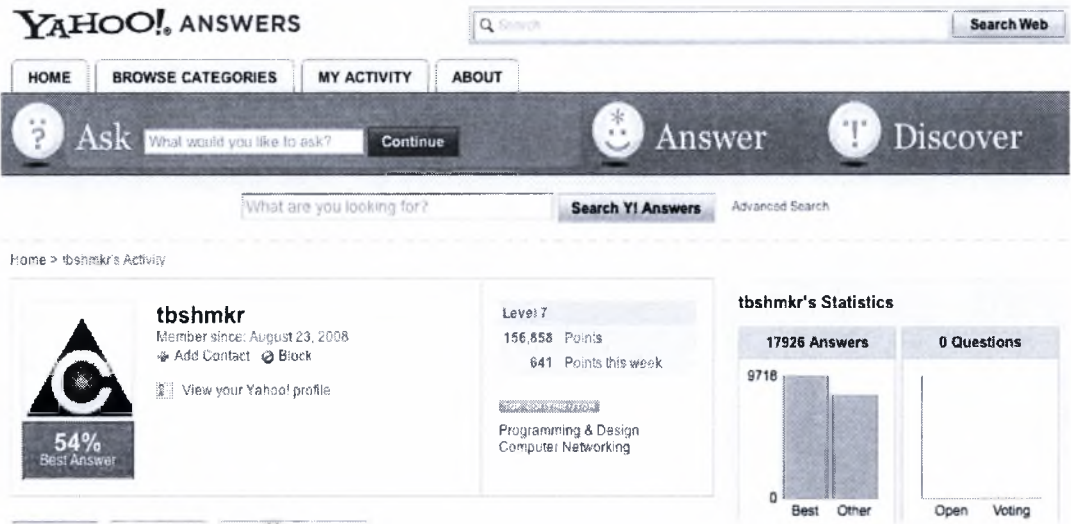
Figure 2-7. Yahoo! Answers[11] displays numbered level on user's profile

Badges

Representing achievements as badges is a standard practice in online gaming. Awarding badges has also become a key ingredient in "gamifying" online experiences. Perhaps the most obvious function of badges is as goal-setting device. They challenge users to advance and achieve the goal that is implicitly set by the badge. Additionally badges can provide instruction about what types of activities, features and content can exist within the system. By viewing a list of possible badges, users come to understand individual valued activities and are motivated to further explore them. Generally, examining an other user's badges can provide valuable information about the level of his engagement, interests, skillset, expertise and therefore can make it easy to determine his trustworthiness and

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[11] http://answers.yahoo.com

status. Badges also provide a neat way to track progress for people who enjoy collecting things. Some users are also attracted to badges due to their visually appealing and eye-catching appearance.

A good badge system often consists of several elements:

➢ Similar to levels, badges should start off easily obtainable. As the game progresses they should get progressively harder to gain, acting as long-term goals.

➢ Badges tied to different features, intended to introduce users to different features of the system they might not otherwise try.

Figure 2-8. Foursquare's[12] badges, one of the most pioneering and notable examples of a badge system applied to a web and mobile application
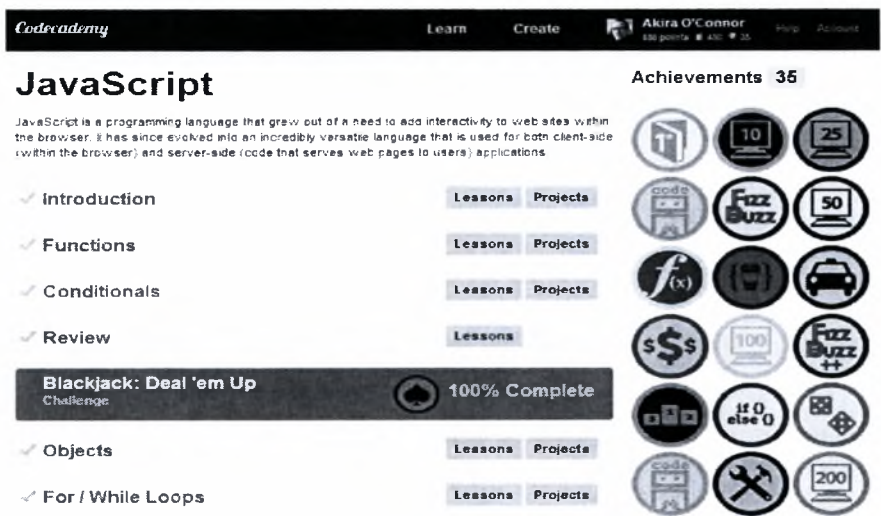

Figure 2-9. Codeacademy[13] uses badges to motivate users to complete their programming exercises and challenges

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[12] https://foursquare.com

[13] http://www.codeacademy.com

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Leaderboards

Most of the successful games ever created have implemented a 'high-score table'. In the context of gamification, a leaderboard is a list displaying a fixed number of top users, raked by score from highest to lowest.
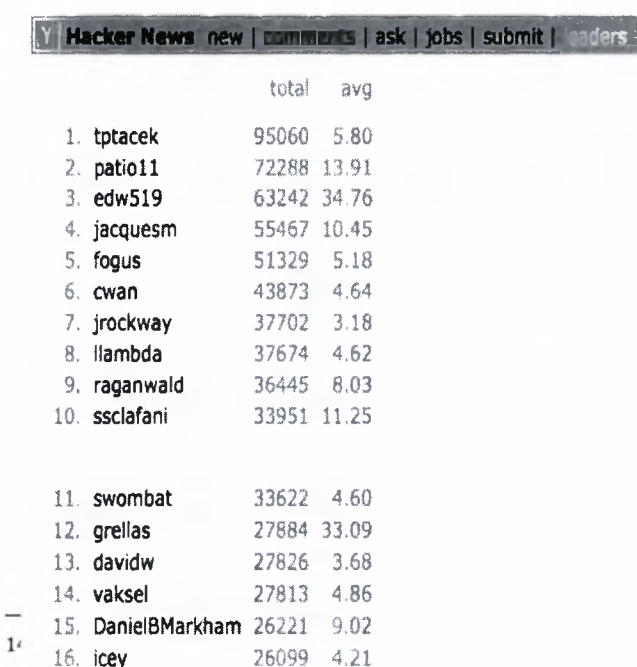
This game mechanic is best used when the activities the users engage in are competitive. Also it is suitable in cases where we want to enable comparisons between the players and promote questions like 'Who is the best?' by the users. When the system is not competitive (e.g. recipes sharing site), it is better to avoid this pattern.

A leaderboards can be:

Indirectly competitive, that pits players against each other based on everyone's relative progress through the game. Players don't have a way to negatively impact other player's scores but can see how close they are passing other players.

Directly competitive, that encourages users to compete against each other. If one player loses, the other wins, and their ranks on the leaderboards are affected accordingly

A correctly designed leaderboard should provide multiple views, including all-time standings (overall rankings) and weekly or daily standings. Showing only the overall rankings can be sometimes daunting for some players. A commonly used technique is to take the player and put him right in the middle regardless of the ranking order he falls in. Whether he is #100 or #1000 the player will see himself right in the middle of the leaderboard. Also it is convenient for the users to be able to filter the leaderboard, perhaps showing only his friends and contacts or groups he belongs to.

		total	avg
1.	tptacek	95060	5.80
2.	patio11	72288	13.91
3.	edw519	63242	34.76
4.	jacquesm	55467	10.45
5.	fogus	51329	5.18
6.	cwan	43873	4.64
7.	jrockway	37702	3.18
8.	llambda	37674	4.62
9.	raganwald	36445	8.03
10.	ssclafani	33951	11.25
11.	swombat	33622	4.60
12.	grellas	27884	33.09
13.	davidw	27826	3.68
14.	vaksel	27813	4.86
15.	DanielBMarkham	26221	9.02
16.	icey	26099	4.21

Figure 2-10. Hacker News[14] uses leaderboards to display the most valuable contributors of its community

Progress Bars

Progress bar are met in many web applications. In most cases, they use percentages to inform a user of how close he is to complete a certain task. The percentage acts as a motivator for the user making the completion of the task and therefore the 100% percentage as a reward itself. Principally they are used to encourage new players to add personal information to a site or to create a deeper core experience. The most know implementation of a progress bar is seen in LinkedIn[15] (Figure 2-11), which motivates users to complete their personal details in their profile.
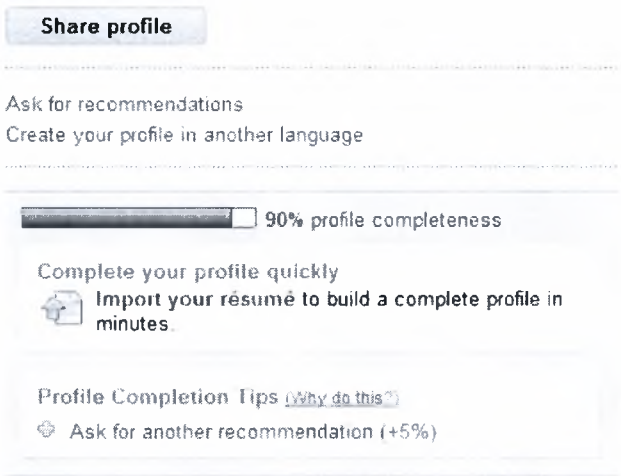

Figure 2-11. Linkedin uses progress bars to speed profile completion

GetGlue (left) and Grubwithus (right) are also incentivizing their users to complete their profiles by using a progress bar.
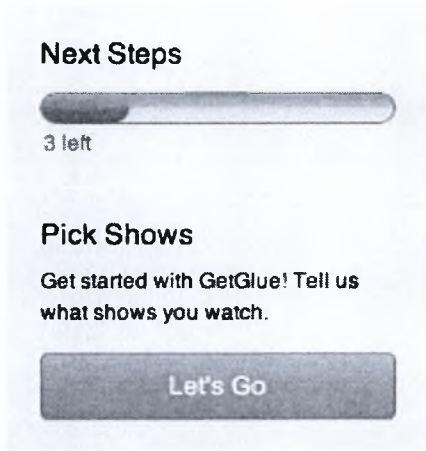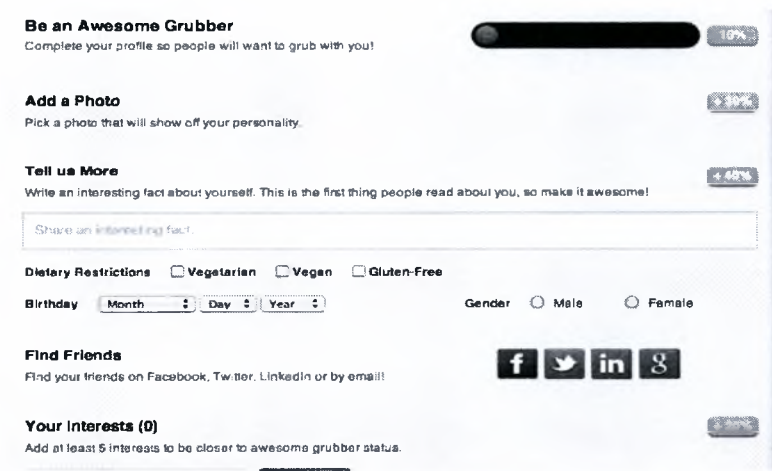

Figure 2-12. GetGlue's[16] progress bar

Figure 2-13. Implementation of the progress bar mechanic by Grubwithus[17]

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15 http://www.linkedin.com
16 http://www.getglue.com

2.3 Game Dynamics

Why are people motivated by game mechanics? Due to the underlying game dynamics. People have fundamental needs and desires- desire for reward, status, achievement, self-expression, competition and altruism among others. These needs span generations, demographics, cultures and genders. Game designers have studied for years how to address these needs within gaming environments, and gamification enables these needs to be applied in other contexts. By leveraging the appropriate set of game mechanics around our product we can create an experience that drives user behavior by satisfying one or more of the following human desires:

Reward

Humans are highly motivated by their desire to receive rewards--something of value given for some kind of action. A reward, tangible or not, is given after the occurrence of an action with the intent to cause the behavior to happen again. The reward mechanism used in gamified system, primary consists of earning points, virtual goods and completing goals.

Status

Fame, prestige, recognition, status and respect are feelings almost every human seeks. Many gamification elements drive these dynamics with leveling-up being one of the primary motivators.

Achievement

Many people are motivated by a need to achieve, to accomplish something difficult through repeated efforts, to complete tasks and to win. These kinds of people seek out challenges and set difficult goals.

Competition

It has been proven that higher levels of performance can be achieved when a competitive environment is established. That's because we gain satisfaction by competing and comparing with others. All elements of game mechanics are motivators of this desire, with leaderboards being the primary element to display competitive results and emphasize winners.

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[17] https://www.grubwithus.com

Self-expression

A desire to express autonomy, personality and inner characteristics is found in many people. Using virtual goods is a common way for players to create their own identity, whether they are earned through rewards, received as gifts, or bought with real currency. An avatar can also serve as an expression mechanism.
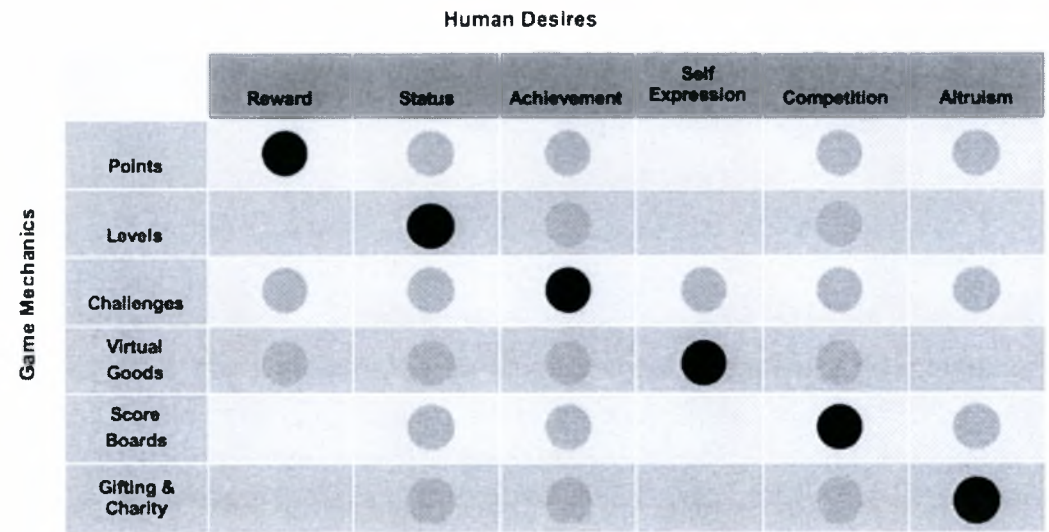

Figure 2-14. Interaction of gamification elements and human desires. Black dots depict the primary human desire each game mechanic fulfills. Orange dots depict the secondary human desires each game mechanic affect as well.

3

Success stories

The purpose of the following chapter is to examine and analyze a number of the most successful implementations of gamification in the real world of World Wide Web.

3.1 Foursquare

Foursquare is a prominent example of commercial apps that use gamification to increase user engagement. To participate in Foursquare, you simply log in the application whenever you show up somewhere public that you deem fun and then tell the system where you are. That's called a "check-in", and you can check in from different places like restaurants, bars, museum etc. Whenever you check in, Foursquare then sends real-time alerts to your friend so they can join you if they're free and nearby. It also lets you know if any of your friends are already nearby, in case you want to meet up with them. Foursquare keeps track of where you have been, when, and who you've checked in with, if they are playing Foursquare too.

Foursquare produces a series of metrics about what you are doing e.g. how often you go out or how many different places you visit. What makes Foursquare engaging is the challenge and reward system build around the tracked data.

The most popular feature of Foursquare is a competitive challenge called The Mayor. Users automatically become the mayor of a venue by checking in the most at that specific venue. The existence of mayorships motivates users to use the application for check-ins more frequently in order to achieve or hold on to the mayor status.
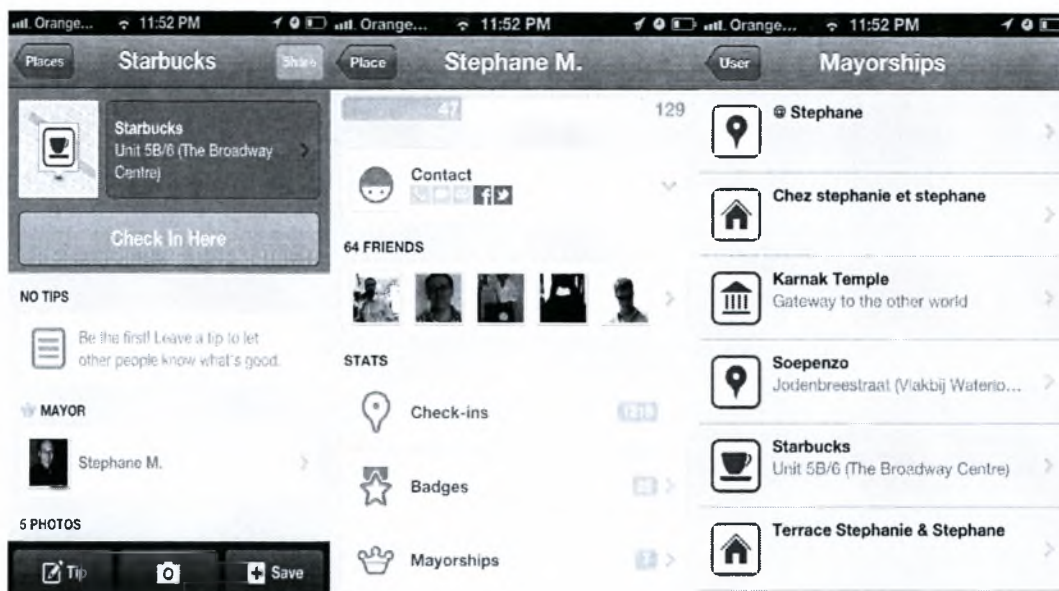
Figure 3-1. Foursquare's mayorship

Foursquare is also a personal achievement system, consisting of virtual trophies and badges. Trophies automatically unlock in your profile when you celebrate checking in to your tenth, twenty-fifth, etc. different venues in a single city. You can also earn badges like the Gym Rat badge, earned by checking in to gyms or the 'I'm on a boat' badge for checking-in a boat.

Figure 3-2. Badges of a Foursquare user

Gamification in Foursquare is a wonderful customer aquisition and onboarding tool. One day one Foursquare has no real value to offer to it's users, no discounts from shops and city guide information, so they need a way to get users press the "Check in" button which is provided by the game mechanics they have build around their product. Game mechanics cannot

provide longevity, there needs to be some core experience and meaningful value for the end user. In the case of Foursquare the core experience is the positive emotions you feel when discovering new places, benefiting from discounts and sharing experiences with friends but the delivery of the meaningful value for the user can only be delivered after he has entered the system with the help of game mechanics.

3.2 Nike +

Nike, the world's largest manufacturer of athletic footwear and apparel worldwide has "gamified" excercise with the launch of Nike+(or Nike plus) in 2008. A sensor that is attached to or embedded in Nike+ compatible shoes and is activated by movement broadcasts (via radio transmitter) data such as distance, pace, time and calories burned to the iPod or iPhone of the runner that has the Nike software loaded in it. Currently over 1.8 million runners use Nike+ to capture and track these real time stats. Runners love running, but motivation is still an issue. So Nike+ is designed to provide an added layer of intrinsic motivation beyond the runner's high and the physical results.

Every mile you run earns you a point and the accumulated number of points can help you level up. There are six levels currently on Nike+, yellow, orange, green, blue, purple and black. Like any good MMO, you advance Nike+ levels quickly at first, but over time it becomes more difficult to reach the next level.

Based on the data the Nike+ sensor collects, you can also earn personal online trophies for best times and longest runs, as well as achievements for reaching a personal milestone, like running a hundred miles in a hundred days.

Additonally when you join the Nike+ community, you can create an avatar called 'Mini' and is described as your 'tiny running partner, whom you can customize to look just like you. Your avatar's level and animations are based on your run activity: how far and how often you run. If you have run a lot of miles for some days in a row, 'Mini' is ecstatic but if you have forgotten your running activity for a week or two, your 'Mini' teases you for being a slacker. You can also participate in user-created public challenges which puts your personal goals into a larger social context and gives each jog more meaning. Moreover you can upload your data, statistics and schievements and share them with your fellow Nike+ runners in the Nike community or other social networks.

Figure 3-3. Dashboard of a Nike+ user depicting his overall stats

Real-time stats, a leveling system, personal achievements and challenges that are expressed through game mechanics, provide better feedback and reward to the runners and help them put in a better effort and aspire to more than they would otherwise.

3.3 Health Month

Health Month gamifies the act of improving one's diet and fitness, as well as mental, social and financial health. A new user gets to establish his own rules regarding how he wants to improve his health for the next month such as exercise more, limit alcohol or eat greens. He then answers some questions about his rules and rates how difficult and important it will be for him to adhere to. The system calculates the difficulty level of the rule, assigns points to earn and prompts the user to commit to follow his rules by signing a digital contract.

Each month, the player gets 10 life points. Whenever he fails to stick to his health-related goals, he loses a life point. The general objective of the game is to finish the month with at least one remaining life point.

Another type of points of the system is fruit points. Fruit points are awarded for following the rules and occasionally for other small things. Every day a player sticks to his goals, he is awarded with a fruit. They act as karma points since they can be donated to other people, helping them to get "healed" and get back some of their life points. Each 2 fruit points given to another player

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converts to a life point. Fruit points promote altruism within the system and amplify social bonds between the players.

Mrs. Benson

September

Bracket: Green Bracket
Status: paid

🍎 5   🐾 5   2,120 pts   10 rules

If I end this month with 1 or more life points, I will... Eat sweet potato french fries

If I end this month with less than 1 life point, I will... No chocolate for a week.

Allow 7 alcoholic drinks a week	Exercise for 30 minutes at least 5 times a week
Eat greens at least 5 days a week	No white flour
Cook dinner 5 days a week	Allow fried food 1 times a week
Eat whole grains every day	Eat raw fruit at least 5 days a week
No dairy	Eat locally grown produce at least 5 days a week

Other sites

askellanne (delete)
Kellanne Benson (delete)

Learn from this game

Figure 3-4. Points, fruit Points, life points and rules of a Health Month player

There are a few other mechanics, too. Once you've selected some rules for yourself to live by, you'll get placed into a bracket and given a "spirit animal", depending on how difficult those goals are to accomplish, and how important they are to you. That groups you with people who are similar to you, making it more competitive. For example, you might be allocated The Crane if you opt for easy rules that'll be of big benefit to your health, or the Lizard if you pick rules that aren't very important and which you don't enjoy doing. There's also the Polar Bear and the Fox, which have other requirements.

Health Month is currently developing a virtual currency system called spirit money (or spirit dollars) that will be awarded to the users at the end of every month according to the effort they have made during the month.

To sum up, Health Month is trying to convert a life goal, being healthier; to a game-like process and helps you dedicate and achieve this "painful" goal with the use of various game mechanics. Health Month is a notable example of how gamification can be applied to more sophisticated and complicated real life problems and help people solve them.

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4

Coding Gamification

4.1 Commercial Gamification Platforms

A number of businesses have created ready-to-use gamification platforms for others to add gamification elements to their service easily. Gamification platforms come complete with reward features for points, levels, badges, virtual goods, Facebook credits and coupons. There are installable widgets for notifications, progress, avatars, profiles, leaderboards or social sharing. There are published APIs for deep integration, back-end admin consoles for set up, full reporting and metrics. We are going to have a look on some of the leading vendors and service providers and the solutions they offer in this emerging market below (*we should mention here that none of the following platforms was tested because there is no way to try them without paying, so*

our main information recourses were the actual websites of the services and other websites/documents):

Bunchball is considered one of the first entrants into the gamification industry. *Nitro,* Bunchball's platrform, provides a number of APIs to track user behavior, other components such as avatar builder, administration interface and gamification analytics. The platform allows its clients to set up rules for rewards, create virtual goods, rewards, levels, point systems and integrate them instantly on their web application.

Badgeville offers a SaaS gamification solution though a platform that is aclaimed to increase customery loyalty, user behavior, retention and time spend on the digital property of the client who will use it. Badgeville's Dynamic Game Engine, allows users and marketers to define what types of rewards they want to offer their users for certain types of engagement , and choose and offer virtual rewards, levels and reputation, tangible and advanced rewards through a flexible solution, while educating users on how to best implement those through gamification itself.
Badgeville now has more than 150 customers from a wide range of industries and user experiences.

BigDoor's gamification platform allows online publishers to add game mechanics to web interactions and engagements. BigDoor helps companies build game-like mechanics and loyalty programs into their sites or apps by enabling points. badges, levels, leaderboards, virtual currency and virtual goods. Moreover the company's newest product, Gamified Rewards Program, allows publishers to give users reqards for engagement, such as exclusive content, unlocked powers, exclusive virtual items, as well as tangible rewards. Besides just allowing publishers to implement game mechanics within a website, BigDoor also gives clients reports and analytics on how the program is influencing behavior and web engagement.

4.2 Open Source packages

Except for the paid solutions that offer full-fledged programs that can be easily integrated into our service, there are also a significant number of open source projects that can be used by individuals or small-sized websites or web applications. Some of them are listed below:

UserInfUser (http://code.google.com/p/userinfuser/) is the most complete free solution for integrating gamification elements to a website or web application. It involves badging, points, live notifications and leaderboards and analytics to track user participation through the programming interface it offers.

In order to use it, you sign up to http://www.userinfuser.com and get an API Key that can be used to make API calls to the service. Through the admin interface that is provided, you can create customized leaderboard, point or rank widgets and badges that can afterwards be used in your own webapp.
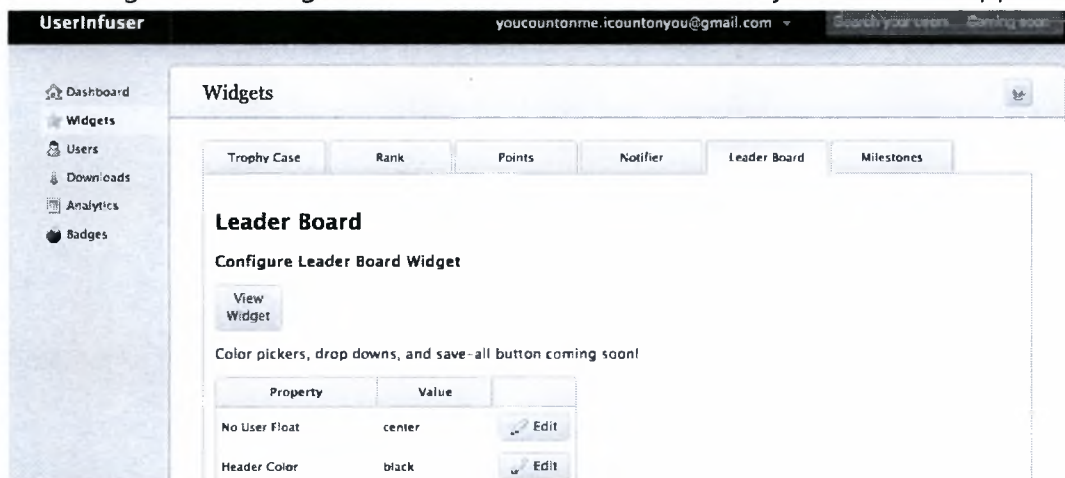

Figure 4-2. UserInfUser's admin interface

The client side library is implemented in many programming languages such as Python, PHP, Ruby and Java and consists of functions that allow you to register users, award points, award badges and get widgets to render on you website.

```
class UserInfuser()
  def __init__(self, account, api_key)
  def get_user_data(self, user_id)
  def update_user(self, user_id)
  def award_badge(self, user_id, badge_id)
  def remove_badge(self, user_id, badge_id)
  def award_points(self, user_id, points_awarded)
  def award_badge_points(self, user_id, badge_id, points_awarded,
points_required)
  def get_widget(self, user_id, widget_type, height, width)
```

```
def enable_debug(self)
def enable_encryption(self)
def enable_local_testing(self)
def only_sync_calls(self)
```
Figure 3-4. API implementation in Python

Open Badges (*http://openbadges.org*) is an ambitious project made by Mozilla that aims to solve the problem of getting recognition for skills and achievements gained outside school or workplace. The whole project is based on the idea that in a world where new and niche technologies proliferate rapidly there should be a way to provide "micro-certifications" for technologies and professional accomplishments that cannot be certified through traditional means such as degrees or transcripts. Mozilla via this ongoing project is offering a decentralized system of badges for issuing, displaying and managing "badges" earned for various skills or achievements. The infrastracture works in the following way(Figure 4-3):

Figure 4-3. Infrastructure of the Open Badges project

Badges could indicate expertise in a programming language, contributing to open source projects or peer recognition in a particular area. Users will be able to display their badges on their resume, web site, social networking profile or job site, making it easy for potential employers, schools, colleagues or communities to track and judge their qualifications. Here's what someone's badge collection might look like (Figure 4-4):

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Figure 4-4. Collected Open Badges of a user

In addition to the open source projects denoted above, there are also various applications that can provide a gamification layer for our service but most of them can only be used on top of specific web frameworks and programming languages. A quick tour at Github and Bitbucket generated the following results:

Merit (*http://github.com/tute/merit*) is a reputation system for Ruby on Rails applications. It offers a simple way to simple way to define badge, point and rank rules.

Brabeion (*http://github.com/eldarion/brabeion*) is a reusable application that provides support for awarding badges to the users of a Django application.

OSQA (*http://www.osqa.net/*) is a Q&A system built with the Django web framework that has an implementation of badge and point awarding system within it and is worth browsing its source code and applying their implementation into our existing Python application.

Gioco (*http://joaomdmoura.github.com/gioco/*) provides methods that will allows us to easily implement our gamification logic into our Ruby on Rails apllication.

Institutional Repository - Library & Information Centre - University of Thessaly
18/05/2024 04:05:12 EEST - 3.12.162.65

5

Conclusion

In the preceding chapters we tried to explore the buzzword called "gamification" by analyzing the background components that gave it birth, presenting commonly used game mechanics, denoting several case studies found in the real word of the web and listing projects that can instantly attach a gamification enhancement to our web service.

Our main focus was on how gamification elements are applied to web services and applications. Nonetheless, gamification is not limited to this area since we truely believe that it can expand to countless other areas and help people solve much more meaningful and vital humanitarian problems such as motivating employees at work, helping people adopt healthier habbits or making education more fun.

It no way should we consider gamification as a panacea. Given a poorly designed service or product that offers no core experience or meaningful value to the user, the application of gamification practices cannot beautify or correct the overall user experience. We totally agree with what Sebastian Deterding believes: "Game elements are like an amplifier: There has to be a genuine sound first- a value, an interest, a motivation -for the amplifier to do any good."

Despite of its broad adoption, gamification also receives a lot of scepticism and critisism on how effectively and efficiently it actually works. Critics claim that gamification is just a kind of marketing invention used by consultants as a means to track more consumers to their products without having a thorough understanding of the underlying theoritical background of the games or behavioral complexity of users. They believe that gamification is another form of social media strategy whose main purpose is to make sales increase.

Finally, we believe that gamification has huge potential and in the near future game mechanics will take over the web as well as many aspects of our everyday lives, making them more gamelike and fun.

"Life is a Game"

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