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Gamification – How games can level up our everyday life?

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ABSTRACT

Gamification is a new concept that has garnered considerable momentum over the last few years. Whilst many believe that it is a world-changing concept, others see it as a short-lived spin-off of social games like Badgeville or Foursquare lacking in substance. This paper reviews the literature related to “Gamification”. Its purpose is to present the basic concepts behind it and assess the influence game mechanics have on people’s behaviour.

This paper also evaluates the concept of Gamification and presents examples of its usage in education.

1. INTRODUCTION

Video games are amongst the most popular entertainment media in the world [1]. From the first arcade video games through to today’s massively multiplayer online role games, there has been a continuous increase in the number of gamers and subsequently the game industry has become one of the most successful and profitable markets [2]. An illustrative example is Zynga [3], one of the most important social network game developing companies which boasts 215 million active users (monthly) - resulting in explosive, exponential growth and turnover to the company. This momentous growth has transformed the traditional meaning of “games” to a future growth potential market and serious business opportunity.

There is a strong change in mindset regarding games. For many years, playing games was considered to be a waste of time – even though people spent more and more time on them. Nowadays, games or aspect of games, as Professor Jesse Schell in DICE conference suggested [4], will invade our everyday life in order to “steer” our interaction with services and products towards more engaging experiences. Individuals will be more motivated, more efficient and happier with very little effort and cost.

The principal idea behind gamification is that game design and game elements confer such power to people that it can transform their relation with services, products, policies or even everyday tasks that can be monitored tracked and modeled within a ‘gamespace’.

2. GAMIFICATION

2.1 DEFINITION

There have already been many attempts to successfully define 'Gamification'. The most commonly accepted are given below:

Gamification is the use of game mechanics to non-game activities in order to influence people's behavior [5]. When particularly applied to consumer-oriented web and mobile sites it is the process of integrating game elements in order to encourage people to adopt the applications.

Gabe Zichermann (2010) defines gamification as "the process of using game thinking and game mechanics to engage audiences and solve problems" [6].

If we want to simply define gamification then we might think of it as the application of the basic elements that make games fun and engaging to things that typically aren't considered a game [7].

The key issue of the concept is that it is basically elements of game-playing that are designed for employment in a non-game context - and that is what sets it apart from serious games and design of playful interactions. The following figure illustrates this difference.

Figure 1. The relevance of serious games, gamification and playful interaction [8]

2.2 ORIGIN

Gamification is a relatively new term, but not a new concept. The roots of gamification originate in the digital media industry [8] and started out with the term "funware" [9] back in 2008. Gabe Zicherman first employed the term "funware" and he defines it as:

"Funware is the art and science of turning your customer's everyday interactions into games that serve your business purposes" (Zichermann & Linder, 2010).

Gamification gained widespread recognition in the second half of 2010, when several industry players popularized it [8].

Currently, the interest in gamification is increasing and for this reason a lot of conferences and workshops dedicated solely to it are taking place [9][10][11]. However, it is still a heavily contested term. Within the video game and digital media industry, discontent with some interpretations have already led designers to coin different terms for their own practice (e.g. 'gameful design') to distance themselves from recent negative connotations [8].

2.3 TECHNIQUES

2.3.1 THE POWER OF GAMES

The reason why people spend so much time on games is a question that researchers are trying to answer. Jane McGonigal (2010) deals with the question of why so many people around the world immerse themselves in games and what it is that drives them to stay away from real life. She labeled gamers as "super-empowered hopeful individuals" that exhibit four distinctive behavioural traits [12]:

1. Urgent Optimism – the desire to act and the belief in achieving success.

2. Social Fabric – the ability to trust and form stronger social bonds through game playing.

3. Blissful Productivity – the belief that the task they are engaging with is meaningful, hence the dedication towards the game task itself.

4. Epic Meaning – the strong attachment to a meaningful and awe-inspiring story that they are personally involved in and striving to make their mark on it.

Using Halo 3 as an example, McGonigal (2007) points out the positive influence on-line games can have on people. Their interest is not just to have fun. People involved are willing to share their strategies and discoveries [13]. Halopedia is the fourth most active wiki and this shows that gamers are in fact engaged in a highly collaborative effort to understand their favourite game. And this is just a small indication of the valuable skills these on-line communities develop. So, as McGonigal (2007) suggests, it is about time to use these skills and help gamers to contribute to society by helping solve real-world problems.

2.3.2 GAME DESIGN

Priebatsch and Chatfield (2010) have presented seven design concepts of computer games that help gamers immerse themselves into the world that the game presents [14][15]. They also believe that it is those seven traits that once bought into a real life scenario, can grasp the gamer's psyche, and make it easier for them to engage with real-life tasks. The following is an outline of the key principles they believe are behind a successful gamification design:

1. Inclusion of visual cues measuring progress and experience (“progression dynamic”), i.e. a completion/progress bar.
2. Rapid feedback provided through the progression dynamic.
3. Multiple long and short-term goals.
4. Rewards for effort and task completion, which are strong motivators for engagement with the game and viewed as “social status symbols” among gamers.
5. Appointment dynamic – the idea that in order to play a game, one has to be prompted to return and be “in” the game.
6. An element of uncertainty (not knowing what rewards lie ahead).
7. Collaboration and engagement with other game users.

2.3.3 GAME MECHANICS

Game mechanics are constructs of rules and techniques that when employed in gamification are used as building blocks for gamifying a website or application [7][5]. Using them individually or together, it’s possible to build a highly motivational user [5]. Those are typically:

- ***Points***

Points can be used to reward users across multiple dimensions, and different categories of points can be used to drive different behaviours within the same site or application [5]. Typical types of points are experience points (XP), skill points (score, rank) and influence points (rating, reputation). [16]

- ***Levels***

Levels are a system, or "ramp", by which players are rewarded by an increasing value for accumulating points. Often features or abilities are unlocked as players’ progress to higher levels. Leveling is one of the highest components of motivation for gamers. There are typically three types of leveling ramps: Flat, Exponential and Wave Function [5].

- ***Challenges, Trophies, Badges, Achievements***

These four mechanics work in a similar way and in principal they give people missions to accomplish and then reward them for doing so. Challenges give people goals and the feeling like they’re working toward something. The general approach is to configure challenges based on actions that you’re tracking, and reward users for reaching milestones with trophies, badges and achievements. Trophies, badges, ribbons, etc. are the visible recognition of having reached new levels or completed challenges [5].

- ***Leaderboards***

The overwhelming majority of successful games have wisely implemented a “high-score table.” They bring aspiration, “fame,” and your name ‘in lights’. They also indicate, “how am I doing” against friends and against everybody else. In the context of gamification, leaderboards are used to track and display desired actions, using competition to drive valuable behavior [5].

2.3.4 GAME DYNAMICS

Game dynamics are the reason why people are motivated by game mechanics. Humans have needs and desires that are universal and cross generations, demographics, cultures, and genders. Game designers well know how to address these needs within gaming environments, and the widespread need for gratification enables these precepts to be applied broadly. Some of the most indicative desires and motivations are mentioned below.

- ***Reward***

Human beings are motivated by receiving rewards — something of value given for some kind of action. A reward, tangible or intangible, is presented after the occurrence of an action (i.e., behavior) with the intent to cause the behavior to occur again. With gamification, the primary reward mechanism is through earning points or the equivalent (like frequent-flyer miles). But obtaining virtual goods, ‘leveling-up’, and even completing achievements also satisfy this desire [5].

- ***Status***

Most humans have a need for status, recognition, fame, prestige, attention and, ultimately, the esteem and respect of others. People need to engage themselves in activities to gain this esteem, though. All elements of game mechanics drive these dynamics, with leveling-up (such as getting a gold or platinum credit card) being one of the primary motivators [5].

- ***Achievement***

A lot of people are motivated by a need to achieve, to accomplish something difficult through prolonged and repeated efforts, to work towards goals, and to win. People motivated by achievement tend to seek out challenges and set moderately difficult (but achievable) goals. Their most satisfying reward is the recognition of their achievements [5].

- Self-expression

Many people want and need opportunities to express their autonomy and originality. They want to distinguish themselves as having unique personalities from those around them. This ties into the human desire to show off a sense of style, identity, and personality and to show off an affiliation with a group. 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 directly with real currency. A person’s avatar can often serve as a rich focal point for expression [5].

- ***Competition***

Individuals can also be motivated by competition. It has been proven that higher levels of performance can be achieved when a competitive environment is established and the winner rewarded. That is because we gain a certain amount of satisfaction by comparing our performance to that of others. All elements of game mechanics tap into this desire, even self-expression, but the use of leaderboards is central to display competitive results and celebrate winners. Almost all games provide at least a simple top ten list, and that public display indicating new levels achieved, rewards earned, or challenges met can be a great motivator to other players [5].

- ***Altruism***

Gift giving is a strong motivator if you have a community where people seek to foster relationships. Not all gifts are equal, so in a world of free and commodity items, motivated 'gifters' will seek out a more valuable form of expression, either through money or through time spent earning or creating the gift [5].

Figure 2. Correlation of Human Desires and Game Mechanics [5]

Figure 2 gives the correlations matrix for the human desires and the Game Mechanism explaining which desire is fulfilled by certain mechanisms [5].

2.3.5 Game Aesthetics

Following the MDA framework (standing for Mechanics, Dynamics, and Aesthetics) [17] another game technique that guides and motivates players are game aesthetics. Game aesthetics are the desirable emotional responses evoked in the player while he interacts with the game [17]. So, by arousing emotions like fun, trust, surprise and satisfaction in the user, games are able to drive action and engagement [18].

2.4 MODELS OF HUMAN NEEDS AND BEHAVIOR

In order to successfully make use of Gamification it is crucial to understand why and how game dynamics/mechanics succeed in positively influencing people. In order to do that, we need to carefully examine existing models of motivation and behavior from the field of psychology.

Wu (2011) analyzes Maslow's hierarchy of needs [19], B. F. Skinner's behavior model [20] and Csikszentmihalyi's Flow theory [21] and explains why these models are useful for gamification setting [22]. He concluded that needs and motivators are similar to game dynamics and mechanics. According to Maslow, human behavior is driven by our desire to satisfy physical and psychological needa and this is why these elements succeed in driving peoples actions.

Another interesting point Wu (2011) makes is that many game dynamics have been developed using the principles from Skinner's work, since point systems are core to many game dynamics, including progression dynamics and levels. So as Skinner claims, under the proper reinforcement schedule one can ignore people's innate needs and can just give them points. That way, people will learn and be motivated simply by accumulating points [22].

The most significant conclusion though is drawn based on Csikszentmihalyi's Flow model (1997). Blindly giving people points or any other kind of reward does not work in the long run, because people get tired and bored rather quickly [22]. So having this in mind, one can conclude that successful gamification needs to adapt to people's skill levels and find that fine line between certainty and uncertainty, a state of optimal intrinsic motivation [22].

3. EXAMPLE: APPLYING GAMIFICATION IN EDUCATION

3.1 GAMIFICATION IN EDUCATION

When talking about gamification of education we mean to look beyond the straightforward employment of video games and educational games for learning purposes. Applying gamification to education implies use of game elements in such a way that it will motivate students to learn, experiment and strive for excellence [23]. Unfortunately, education in its current state is an example of bad gamification [14][24] in the sense that certain game elements do exist like grades (points) and classes (levels) but so far they fail in terms of engaging students.

One of the latest researches on this topic is Kiili's experiential gaming model [25], which explains how the game design process can interfere with and influence the learning process. Here is the revised model, which aims to answer better to the needs of educational game designers than the original one.

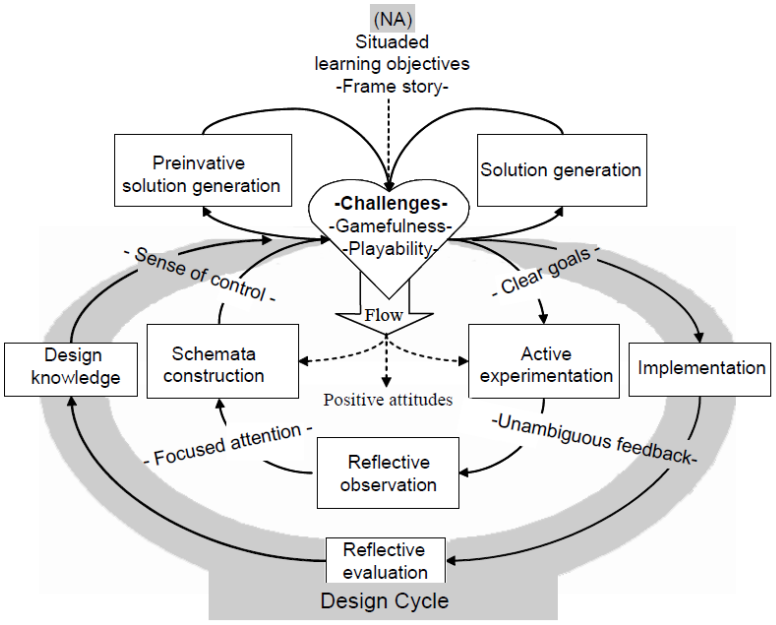

Figure 3: Kili's experiential gaming model (2005)

Kiili's model (2005) is based on this simple principal of Csikszentmihalyi's Flow model and states that "during optimal experience, a person is in such a psychological state where he or she is so involved with the goal driven activity that nothing else seems to matter" [25]. According to the model, learning follows a cyclical process through direct experience in the game world and the necessary learning activities are both cognitive and behavioral.

The model consists of a solution loop, an experience loop and a challenge bank. Motivation and engagement of the player represent the heart of the model, which along with individual and social parameters, lead the player to the solutions. After this phase, solutions are tested in the experience loop, where players have the ability to control the game and expand their knowledge of the subject matter and finally optimize playing strategy. Another important thing is that the tempo of the challenges follows the player's characteristics, in order to increase the impact on them [25].

3.2 GOALS AND TECHNIQUES

As we have seen so far Gamification gives a strong impact on human behaviors, by using certain strategies, rules, cultural roles and player experiences. In order to prove that gamification can indeed serve as intervention, J.Lee and J. Hammer (2011) examine three major areas, cognitive, emotional and social [26].

Cognitive. Games lead the player through their levels and finally to the end as a winner, by experimentation and discovery. There are many examples of games (such as Angry *Birds*) that follow this logic. In order to level-up, the players have to experiment with the game, to figure out the physical properties of the different elements that are given. Usually these games use a gradual increase of difficulty, which keeps the player's interest tireless. In addition, they provide a variety of solutions, and each player can easily adopt his own style of playing. These techniques, applied to schools, can be translated as clear, actionable tasks, which can lead them to direct rewards, when completed. The current system at schools doesn't give students the initiative to set their own goals during the classes and students are simply often told what to do without understanding the larger benefits of the work. Gamification helps them think about what they have to do next. When the students complete one task, they get a reward and unlock a new level, each one by choosing his own way to the solution. This also helps the student to emphasise the topics he is most interested in, and expand his own unique talent [26].

Emotional. Interactive methods can arouse a wide variety of emotions in a person. In this case, the emotions often created are curiosity, frustration and joy. The positive emotional experiences they provide lead to an optimistic way of thinking and also make the player feel proud. Even failing at a game is instructive, as students experiment more and learn something new each time they fail. Confronting tasks repeatedly until you succeed means you risk very little by doing so. In this way the bad experience of anxiety and suspense can be avoided. The student can learn to live by failing and trying again and again, as in real life. Every effort made by someone is rewarded, and failure may be seen as an opportunity, instead of a situation that leads to punishment or extended, mandatory extra studying [26].

Social. Through gamification, students develop school-based identities, which help them learn in the long run. As happens in games, the students who don't feel secure for their performance at school can build their own unfamiliar identity of a scholar. In this way a system of identities is created, with the property of interacting with each other, publishing achievements, row charts etc. But what is of most interest is that the achievements are recognised by both teachers and

students - which means that students can reward each other with in-game currency. Such a design encourages students to reinforce the development of a school-based identity in other students as well as in themselves. A well-designed gamification system gives players the will to create meaningful roles that show great interest for learning [32]. By making the development of a new identity playful, and by rewarding it appropriately, students see school and their role in it, from another angle [26].

3.2 Using Game Mechanics to Fix the Grading System and Motivate Students

It is commonly accepted that grades are simply an outdated game mechanic [30]. The grading system that is being used today doesn't motivate engagement and as a result education fails its goal [26]. The problem with the current grading system is that once you fail, it is very hard or even impossible to overcome and attend the topic again. As a result students lose their interest and motivation.

The most important difference between the grading and the point-reward system is that the second doesn't focus on final grades, instead small positive actions like attending class or completing assignments are taken under consideration [30]. In a nutshell, gamification would say: you don't lose; you just don't get as many points. In order to manage this, learning methods must be observed from a different angle. The necessary strategies, action and methods should use external factors that go beyond the school limits.

One important element is that the students should always know what the rewards for completing each task will be, this way the students know how much they need to study in order to succeed [27]. During the school year, every student knows how many points he has, and if he is not satisfied then he can work harder to get more points without the teacher's instruction. Furthermore, the teacher is responsible for the gaming process, depending on the number, the understanding skills and the general educational level of his students [27].

3.3 Evaluation of Gamification in Education

Noting the points of correlation between game design and the design of learning environments, we begin to see the potential of rethinking the current approach to course design [28]. But what will the consequences of this extended use be? As far as education is concerned, the application should be thorough and only in areas where it can provide the maximum value.

Apart from the high motivation, this system of rewarding bonuses for completing tasks, leads to more critical thinking [28] and helps students develop personal qualities such as persistence, creativity, and resilience [26]. Students can also exchange opinions and express themselves more freely since the lessons are carried out as games. This also helps the group work in the classroom. Games may be strongly connected with freedom, but they also include their own "hidden" rules without students realizing them, creating learning environments which are set off from other spaces in everyday life by the set of conditions that distinguish them from leisure, home, or work environments [28].

On the other hand, gamification in education can confuse the students in the sense that the simulated environment of the educational games is very different than real life. Students might easily assume that they should only learn, cooperate or help when provided with external rewards. Another risk that gamification may incur is the intense competition that can be developed in the classroom, with harmful consequences to the person's later social life.

As a conclusion, designers and teachers have the main responsibility to maintain the principals and the boundaries that are necessary in order to avoid undesirable results [28]. Just as the best games are only effective in attracting and maintaining the attention of players if they are well-designed, the best learning environments will be created by designers who take seriously the task of creating a context for students to decipher meaning through participation and immersion. Of course this demands persistent research and good understanding of this process [28].

4. CONCLUSION

The concept of gamification is new and promising. Undoubtedly gamification will be used widely during the coming years in a wide variety of fields, such as education, marketing and networking. Integrating it successfully is entirely dependent on a good understanding of how game elements work to tackle specific human behaviour. This means carefully analysing the target audience and its needs. Having this in mind, gamification has the potential to change our everyday experiences into better and more enjoyable ones.

Even though gamification has already begun to be applied to different aspects of our daily life (e.g. education) there remains a lot of potential for future applications and future research. For example, the rapid development and public acceptance of new mobile devices/tablets (e.g. iPad) has opened up exciting new opportunities for researching improvements to the application of gamification on devices which are always on, always available, and always connected to the internet – and thus able to have the concept of gamification extended into every aspect of everyday life. It will be fascinating to see just how far gamification can be used to improve our lives.

ANNOTATED BIBLIOGRAPHY

All sources used for this paper are closely related to the concept of 'gamification' and thus all of them are considered ***relevant*** to the scope of this paper.

Since the concept of gamification is quite new, it is offered as a very good ground for further research. Although the concept has been developed and explored over the last few years, it is still in its infancy and there remain many exciting opportunities for research. That's the reason why all references are considered to be up-to-date and ***valid***.

All sources/references originated from books, scientific papers or well-known and reliable websites. That's the main reason why the references are ***reliable***.

[1] Graft K. (2010, May 27),*Average Gaming Time On The Rise In U.S*. Retrieved June 2011, from Gamasutra: http://www.gamasutra.com/view/news/28729/Average_Gaming_Time_On_The_Rise_In_US.php

In his article posted on Gamasutra, a game developer's magazine, Kris Graft mentions facts pertaining to gamers in America. His data is extracted from NPD Group research. According his data, the average time spent on playing games has increased annually in the U.S. Last year alone, the hours spent playing console games increased by 9%.

[2] Entertainment software association (2011)*, Essential facts about computer and video game industry sales-demographics usage data*, Retrieved June 2011: http://www.theesa.com/facts/pdfs/ESA_EF_2011.pdf

Entertainment Software association is an association that handles business and public affairs for companies that publish computer and video games. Their paper presents sales demographics concerning gamers, time spent on games as well as sales information.

[3] Zynga Inc. Fact sheet (2011), Retrieved June 2011: http://www.zynga.com/about/facts.php

Zynga is one of the most successful social game developing companies. On this sheet they give all statistics on their current users and profits regarding their games.

[4] Schell Jesse (2010, 2 28), *Presentation: Design Outside The Box* ‖. DICE 2011, Las Vegas, Nevada: Academy of Interactive Arts & Sciences, Retrieved June 2011: http://seedandsprout.com/s10_gd492/2010/03/11/dice-2010-design-outside-the-box-presentation/

Carnegie Mellon University Professor, Jesse Schell, talks about popular “Facebook games” like Farmville. He states that what these games have succeeded so far is unexpected and terrifying at the same time. People spend time and money on games that at first sight seem pointless. As he argues, this comes from the fact that the games employ psychological “tricks”. He argues that if these tricks were allied with the rapid development of technology (e.g sensors) and applied to real life problems then it might actually be possible to inspire (or “trick”) us into becoming better people. He also gives examples of everyday life tasks that can be turned into games using rewards, bonuses and badges.

[5] Bunchball.Com (2010, 10), *Gamification 101:An Introduction to the Use of Game Dynamics to Influence Behavior.* Retrieved June 2011: http://www.bunchball.com/gamification/gamification101.pdf

Bunchball is a provider of online gamification solutions. Their paper gives a nice definition of gamification and game elements and uses examples to show how gamification can be used and how can companies benefit from it.

[6] Zichermann Gabe. *Fun is the Future: Mastering Gamification,* Google Tech Talk October 26, 2010, Retrieved June 2011: http://www.youtube.com/watch?v=6O1gNVeaE4g&feature=player_embedded

Gabe Zichermann is the chair of the Gamification Summit and Workshops, and is co-author of the book “Game-Based Marketing” (Wiley, 2010). His long, yet really interesting presentation, on Mastering gamification, draws the profile of gamers, explains how game mechanics can influence people and gives a lot of examples of how gamification can be used in daily tasks, like filling your tax return, can be turned into something fun and engaging.

[7] Gamification Encyclopedia, Retrieved June 2011 from corporate wiki: http://gamification.org/wiki/Encyclopedia

It is an encyclopedia created by Gamify Company. It is a nice and informative wiki with a lot of helpful resources on everything that concerns gamification.

[8] Deterding Sebastian, Rilla Khaled, Lennart E. Nacke, Dan Dixon, *Gamification: Toward a Definition*, CHI 2011,Vancouver, BC, Canada

The authors of the paper, published on CHI technical conference, give a working definition of gamification. The authors are defining the concept of gamification with respect to serious games, playful interaction and game-based technologies.

[9] Takahashi Dean, *Gamification gets its own conference*, Retrieved June 2011: http://venturebeat.com/2010/09/30/gamification-gets-its-own-conference/

Dean Takahasi, lead writer for GamesBeat at VentureBeat, gives a short introduction to all the basic concepts of gamification and gives an overview of the gamification workshops and main speakers at the conference.

[10] Gamification Summit NYC, official website available at: http://www.gamificationsummit.com/

Gamification Summit is workshop and conference dedicated solely to gamification. The official site of the sold-out conference provides a lot of interesting articles about gamification and its blog is also an unlimited source of information with posts almost every day.

[11] Gamification Research Network (GRN), official website available at: http://gamification-research.org/chi2011/

The Gamification Research Network (GRN) is a communication hub for academic and industry researchers and students interested in studying Gamification. The purpose of the GRN is to further research in the area by providing a repository of relevant people, projects, and publications, and by offering a shared space of discussion and publication.

[12] McGonigal Jane, *Gaming can make a better world*, Ted speech 2010, Retrieved June 2011: http://www.ted.com/talks/jane_mcgonigal_gaming_can_make_a_better_world.html

Jane McGonigal is a game designer specialising in pervasive gaming and alternate reality games (ARGs) and is also the author of “Reality is Broken” (Penguin press, 2011). Her speech, based on her book, points out the facts that immerse people to play video games and raises the question of how can real-life mimic video games in order to take advantage of the skills and intelligence gamers have.

[13] McGonigal Jane (November 5, 2007) Christian Science Monitor Titled: *Gamers have skills. Let's tap 'em*. Retrieved June 2011: http://www.csmonitor.com/2007/1105/p09s01-coop.html

In this article Jane McGonigal uses the example of the popular video game ‘Halo 3’ to point out the impact games have on people. She argues that video-gaming communities are engaged in intense and highly successful "collective intelligence" (a term coined by French philosopher Pierre Levy in 1994) and suggested that it is time to use these ‘superpowers’ in real problems faced today e.g. ecology.

[14] Priebatsch Seth (Ted talk 2010), *The game layer on top of the world*, Retrieved June 2011:http://www.ted.com/talks/seth_priebatsch_the_game_layer_on_top_of_the_world.html

Seth Pliebatsch founder of SCVNGR uses his Ted talk to point out some bad examples of gamified applications, such as frequent flyer programs. He suggests four game dynamics

that can be used in order to create the "game layer," that according to him can successfully reshape education and commerce.

[15] Chatfield Tom (Ted talk 2010), *7 ways games reward the brain*, Ted talk 2010 , Retrieved June 2011:http://www.ted.com/talks/tom_chatfield_7_ways_games_reward_the_brain.html

Tom Chatfiled, on his Ted talk, shows how game mechanics can engage people with real-life boring tasks. He also gives an outline of the key principles he believes are behind a successful gamification design.

[16] Kim J. Amy (2009) *Metagame Design, Reward System that drive Engagment*, Retrieved June 2011: http://www.slideshare.net/amyjokim/metagame-design-3383058

Amy Kim is a metagame designer. Her presentation gives a sort definition of metagames and explains three basic steps for a successful metagame: assign points to actions, add feedback and rewards and grow through viral outreach. She gives a detailed example of how these steps are realised in Farmville and how they affect people.

[17] Hunicke, R., LeBlanc M., Zubek, R. (2004)*, MDA: A Formal Approach to Game Design and Game Research*. Retrieved June 2011: http://www.cs.northwestern.edu/~hunicke/MDA.pdf

The paper presents the MDA Framework (mechanics-dynamics and aesthetics). All three aspects of the framework are explained in detail. Overall, it is a nice introduction to game design.

[18] Kim J. Amy (2011, 2 28), *Gamification 101: Design the Player Journey*. Game Developers Conference (GDC). San Fransisco.

In this presentation, Amy Kim explains how intrinsic and extrinsic motivators work and provides a gamification glossary with the most important aspects of gamification briefly explained.

[19] Wikipedia*, Maslow's hierarchy of needs*, Retrieved June 2011: http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs

Maslow was an American professor of psychology. His theory on human needs is important in trying to understand how game mechanics motivate humans and drive action.

[20] Wikipedia, *Radical behaviorism*, Retrieved June 2011: http://en.wikipedia.org/wiki/Radical_behaviorism

Skinner was listed as the most influential psychologist of the 20th century. His research uses external conditions/reinforcement to manipulate and shape people's behavior. It is an important theory related to game dynamics since most of them have been developed using the principles from Skinner's work (e.g. point systems and progression dynamic).

[21] Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper and Row.

Csikszentmihalyi is Hungarian psychology professor. His theory states that people are most happy when they are in a state of 'flow' — a state of concentration or complete absorption with the activity at hand and the situation. It is a state in which people are so involved in an activity that nothing else seems to matter. It is also another important theory that needs to be taken into consideration when applying game mechanics.

[22] Wu Michael (2011), *Gamification 101: The Psychology of Motivation,* Retrieved June 2011: http://lithosphere.lithium.com/t5/Building-Community-the-Platform/Gamification-101-The-Psychology-of-Motivation/ba-p/21864

Michael Wu, a principal Scientist at Lithium Technologies, briefly explains the psychological frameworks and theories involved in game mechanics and provides us with some ideas as to how can they be used successfully.

[24] Smith-Robbins Sarah (2011), "This Game Sucks": How to Improve the Gamification of Education, Retrieved June 2011: http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume46/ThisGameSucksHowtoImprovetheGa/222665

Sarah Smith-Robbins is Director of Emerging Technologies and a faculty member at the Kelley School of Business at Indiana University. Her article talks about how games could be applied to education in order to improve it by making learning fun. She also explains why the award system has better results than the traditional method of grading.

[25] Kiili Kristian (2005),*Educational Game Design: Experiential gaming model revised*, Retrieved June 2011: http://amc.pori.tut.fi/publications/EducationalGameDesign.pdf

Kristian Kiili is a senior researcher at Tampere University of Technology. His experiential gaming model is an effort to help designers understand the mechanism of learning with games by integrating pedagogical aspects into the game design process. His model emphasises the importance of considering Csikszentmihalyi 's Flow theory in game design in order to generate optimal learning experiences for players.

[26] Lee J. Joey, Hammer Jessica, *Gamification in Education: What, How, Why Bother?,* Academic Exchange Quarterly, 15(2),Retrieved June 2011: http://www.gamifyingeducation.org/files/Lee-Hammer-AEQ-2011.pdf

Joey J. Lee and Jessica Hammer are teachers at Columbia University. Their research focuses on how can gamification be applied to education. They examine how gamification functions, the goals and techniques used and argue the potential benefits and pitfalls of the concept.

[27] Woodbury George (2011), *Using Game Mechanics to Fix the Grading System and Motivate Students,* Retrieved June 2011: http://georgewoodbury.wordpress.com/2011/03/16/guest-blog-using-game-mechanics-to-fix-the-grading-system-and-motivate-students/

George Woodbury is a math instructor at College of the Sequoias in Visalia. In this article posted on his blog, he explains why the current grading system fails to serve its purpose and how changing it to a reward system could lead to more dedicated and willing students.

[28] Keramidas Kimon (2010) *What Games Have to Teach Us About Teaching and Learning: Game Design as a Model for Course and Curricular Development*, Retrieved June 2011: http://currents.cwrl.utexas.edu/2010/keramidas_what-games-have-to-teach-us-about-teaching-and-learning

Keramidas Kimon is a coordinator in Digital Media Lab, a research institute. In his paper, he argues that the game elements used in creating games can be used analogously as a framework to restructure the classroom.

[29] Laster Jill (2010), *A Class on Game Design Has Students Playing to Win*, Retrieved June 2011: http://chronicle.com/blogs/wiredcampus/at-indiana-u-a-class-on-game-design-has-students-playing-to-win/21981

Jill Lester's article reviews the technique used by professor Lee Sheldon in order to teach her course on design elements for online games. Her idea was to actually format the course itself as a multiplayer game. Lester explains how she used a reward system instead of grading and the result it had on her students.

[30] Jeff Lopez (2011), *Motivating Learning Beyond Grades*, Retrieved June 2011: http://gamification.co/2011/03/09/motivating-learning-beyond-grades/

Jeff Lopez's article posted on the gamification workshop critiques the education system in the United States and the failure of current grading system. He suggests that through gamification students will be more motivated and engaged with the education system.

[31] Walz Steffen (2010) *," Leveling Up Serious Games"*, Retrieved June 2011: http://vimeo.com/13805943

Steffen Walz is a consultant and designer for cross-media and interactive entertainment products and prototypes. His speech is about the necessity of gamification in all possible areas of life. Through examples of gamification, he shows how this is already happening in all social areas and that gamification can be, amongst other things, hugely practical and profitable.

[32] Hunter John (2011), *"John Hunter on the World Peace Game",* Retrieved June 2011 http://www.youtube.com/watch?v=0_UTgoPUTLQ&feature=player_embedded

Teacher and musician John Hunter is the inventor of the World Peace Game (and the star of the new doc "World Peace and Other 4th-Grade Achievements"). In this video he explains how his World Peace Game engages students, and why the complex lessons it teaches - spontaneous, and always surprising - go farther than classroom lectures can.

[33] Kim Ryan (2010), *Gamification needs to Level Up -Here's How*, Retrieved June 2011:http://gigaom.com/2010/11/26/gamification-needs-to-level-up-heres-how/

In this article, Ryan Kim strongly argues that gamification is a powerful tool that when used wisely has extremely desirable results. He presents bad uses of gamification in the working area, and suggests ways for companies' game mechanics to get to the heart of what games are and tap into their power.