

**T.C.
BAHÇEŞEHİR UNIVERSITY**

**USING GAMIFICATION IN EFFECTIVE TEAM
PLANNING AND TEAM ACTIVITY**

Master's Thesis

SELİN ÖZTÜRK

İSTANBUL, 2015

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SCIENCES
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Thesis Supervisor: ASST. PROF. DR. DİLEK KARAHOCA

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**REPUBLIC OF TURKEY
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**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
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Name of the thesis: Using Gamification in Effective Team Planning and Team Activity
Name/Last Name of the Student: Selin ÖZTÜRK
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The thesis has been approved by the Graduate School of Natural and Applied Sciences.

Asst. Prof. Dr. Nafiz ARICA
Graduate School Director

I certify that this thesis meets all the requirements as a thesis for the degree of Master of Arts.

Prof. Dr. Adem KARAHOCA
Program Coordinator

This is to certify that we have read this thesis and we find it fully adequate in scope, quality and content, as a thesis for the degree of Master of Science.

Examining Committee Members

Signature

Thesis Supervisor
Asst. Prof. Dr. Dilek KARAHOCA

Thesis Co-supervisor
Prof. Dr. Adem KARAHOCA

Member
Asst. Prof. Dr. Yalçın ÇEKİÇ

ABSTRACT

USING GAMIFICATION IN EFFECTIVE TEAM PLANNING AND TEAM ACTIVITY

Selin ÖZTÜRK

Information Technologies

Thesis Supervisor: Asst. Prof. Dr. Dilek KARAHOCA

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Gamification is a new concept that can be explained as using game design elements to make people, motivated, behaviors changed and engaged for non-game contents.

This research studies Gamification concept within Agile project management and development process. Agile development chosen to study with as team planning and team activity tool because there are individual rules that are Agile methods in it and some of them are about team communication and feedbacks. Also, Teams can change and use them how suitable with their project and their working culture. This feature provide us flexibility to study gamification.

The purpose of this research is to study how Gamification can be used to motivate agile team members in project development process. This is achieved by studying the design process of Gamification motivational and psychological factors and the game elements that constitute a gamified system.

The section Empirical Analysis presents firstly, empirical evidence of Agile team members' work behavior requirement analysis. They are the results of interviews with team members for their roles in project. Then, analysis of designed framework prototype test evidence and play test symptoms.

The overarching conclusion is that the "gamification" concept is enforceable within Agile development process.

The end result will be a framework that game elements, limitations and rules are designed for Gamified Agile Project Management system.

Keywords: Gamification, Agile Project Management, Work and Play

ÖZET

EFEKTİF TAKIM PLANLAMA VE TAKIM AKTİVİTELERİNDE OYUNLAŞTIRMA

Selin ÖZTÜRK

Bilgi Teknolojileri

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Oyunlaştırma, oyun öğelerini kullanarak insanları motive eden, davranışlarını değiştiren ve oyunlaştırılmış içeriğe bağlayan yeni bir kavram.

Bu araştırma Agile proje yönetimi ve geliştirme süreçleri içinde Oyunlaştırma kavramını incelemektedir. Takım planlama ve takım aktivitelerini araştırmak için Agile süreçlerin seçilmesinin sebebi kendi içinde birçok kuralının olması ve bu kuralardan bazılarının da takım iletişimi ve takım içi geri bildirimlerle ilgili olmasıdır. Ayrıca, Agile süreçler ile çalışan takımlar Agile yöntemlerinin ileri sürdüğü temel kuralları değiştirmeden bu temel kuralların çevresindeki unsurları kendi projelerine ve çalışma kültürlerine uyarlayabilirler. Bu özellik Oyunlaştırmanın uygulanabilirliği için bize esneklik kazandırmaktadır.

Tezin amacı Proje geliştirme sürecinde Agile takım üyelerinin Oyunlaştırma ile nasıl motive edileceğini araştırmak ve tasarlamaktır. Bu araştırma öncelikli olarak Oyunlaştırma motivasyon ve psikolojik faktörlerini ve oyun elementlerinin tasarım süreçlerini inceleyerek yapılacaktır.

Bu çalışmanın çıktısı oyun elementleri, limitleri ve kurallarıyla birlikte tasarlanmış bir Oyunlaştırılmış sistem olacaktır.

Ampirik Analiz bölümünde öncelikle Agile takım üyelerinin çalışma yöntemlerinin gereksinim analizine yer verilmiştir. Bu analiz farklı rollerdeki takım üyeleriyle görüşme sonuçlarından oluşmaktadır. Ardından tasarımı yapılmış Oyunlaştırılmış sistem prototipinin test sonuçları ve play test bulguları açıklanmıştır.

Sonuç bölümünde oyunlaştırma kavramının agile süreçlerde uygulanabilir olup olmadığı yapılan analizlerden çıkan sonuçlar çerçevesinde yorumlanmıştır.

Anahtar Kelimeler: Oyunlaştırma, Çevik Proje Yönetimi, İş ve Oyun

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1. INTRODUCTION

Gamification is a new way to think about marketing and customers since the gamified mobile and web applications are very common. The full effect of Gamification is still unknown but because of its effect on behavior and psychology, Gamification is a popular marketing term.

Most used definition of Gamification is: “the use of game elements and game design techniques in non-game contexts” (Deterding, S. 2011). According to the authors, the first documented use of “Gamification” term dates back to 2008, but the term did not adopt before the second half of 2010. In 2012 one of important incident is occurred: 45000 people enroll in Professor Kevin Werbach’s online course through Coursera. This made people informed about Gamification and extends the works and studies about Gamification.

Usually Gamification applies to processes, which are not game, to engage users to participate, interact in some community.

Gamification experts make discussions about that it works by

- i. Making technology more engaging (Takahashi 2010)
- ii. Encouraging users to engage in desired behaviors (Stuart 2010)
- iii. Helping to solve problems by taking advantage of humans’ psychological tendency to engage in gaming (Radoff 2011)
- iv. Showing a path to mastery and autonomy

Generation G or Net Generation is the newest generation that has grown up with the Internet and videogames. They are active online, socially networking and use their mobile devices, besides they are engaging these activities through games (Zicherman & Linder 2010). One of the interesting information is the average young American has spent more than 10000 hours playing video game where spent 3000 hours reading books (McGonigal 2011) For the Generation G playing is an everyday activity. Over 95 per cent of teenage children play games but it is not only children. According to Ferrara in 2011, 42 per cent of video game players were female and 58 per cent male. But, more interesting statistical information is that only 18 per cent of video game players were less than 18 years old and average age of players was 37 years old (Ferrara 2012). Also 20 per cent or more of players are over 50 years old (McGonigal 2011).

In early years, Gamification is based on giving reward points to people who do special activity. For example; share experience on location-based platforms as Foursquare and Gowalla.

Nowadays, there are successful gamified applications and processes. For example; Nike+, which is the application turn fitness to a kind of game, “My Starbucks Rewards” program and Superbetter, which is designed by Jane McGonigal.

Some reports and analyzes show us increasing importance and usage of Gamification. The Gartner Group – a leading company for Technology Research and Insight – make an announcement and according their announcement, 40 per cent of Global organizations will use Gamification by 2015. Depending on such reports, we can easily see that Gamification in organization will be more important and powerful in next years. In IT project development process Team activity and planning have huge place and especially Agile development and Agile methodologies have grate success stories. Although Agile methodologies increase team communication and feedbacks, there can be still gaps in team. Because of having different titles and working in differently team members would not understand each other and encourage in team spirit. Some of team members can demotivated in project process where some of them have marvelous motivation. So, if we design Gamified Agile system, all roles and all team members can be motivated at the same time. At least we try to understand and answer the questions about that subject.

By the way Gamification is a new term in the world so some of game researchers and designer do not think well about it. Ian Bogost claims that “Gamification is bullshit” and “more specifically, Gamification is marketing bullshit, invented by consultants as a means to capture the wild, coveted beast” (Bogost 2011). Jon Radoff mentioned a good point: “Gamification sometimes misses elements such as storytelling and experiences which are central to what make games effective, o that Gamification has mistaken the addition of points for the application of genuine game mechanics” (Radoff 2011).

1.1 PROBLEM STATEMENT

The thought about making employees play games in the workplace, while being paid, may sound weird. But Agile development process cannot be seen as same as a bank operation process. Project development is a stressful and aggressive process. Deadline is

certain and developing new features or fixing bugs seem never stop. The question is: Do we have to live this process in that way? or Can we make enjoyable this process?

Detailing these questions in role of employees:

Analyst, Customer, Project Manager: How we increase communication within team members?

Analyst, Tester, Developer: How can we motivate people to achieve something?

How can we remove feeling that doing always same thing?

Can we make enjoyable writing test cases, making requirement analysis and reading long stories?

Analyst, Tester: Can we offer a structure that nobody chase each other to know how the works are going?

Project Manager: How can we make release management more enjoyable?

This research's target is mainly answering these questions with Gamification.

Gamification can help team members to increase Motivation, integrate to Team, collaborate with team and work efficiently.

1.2 RESEARCH METHODS AND MAIN CONCEPTS

It is clear that we a gamified system wanted to be designed to creating more engaging and motivated product for development teams.

The main questions about Gamification design process can be listed as below;

How to design a gamified system?

What are the steps in Gamification design process?

What are the elements that can be used to create a gamified system?

What motivates users to use a gamified system?

Hypothesis: Gamification can be implemented within Agile development process. In details;

- a. The feeling that makes thinking always doing same thing can be removed with gamified system.
- b. Make requirement analysis more enjoyable.
- c. Prevent people to chase each other to learn how the work is going.
- d. Enjoyable release management.
- e. Make people to enjoy while writing test cases.

f. Create a joy feeling while reading long stories.

Goals: Using Gamified team planning system these are aimed to make:

- a. Increase Team members' productivity
- b. Increase Quality of Work
- c. Increase Team members' morale
- d. Make Team members socialize more
- e. Create exciting working / project environment

Game: In this study games refer to videogames, card games and all kinds of game that exist.

Motivation: Psychological cause of an action. This study focus on what motivates team members to make engaged to work and the system.

Gamification: Using game design elements in Agile project management and development process.

1.3 STRUCTURE OF RESEARCH

After Introduction chapter, game theory, game mechanics and game thinking are discussed. They are required for good gamification design. Also motivation and psychological factors of game and gamification explained and Gamification design framework is defined and discussed.

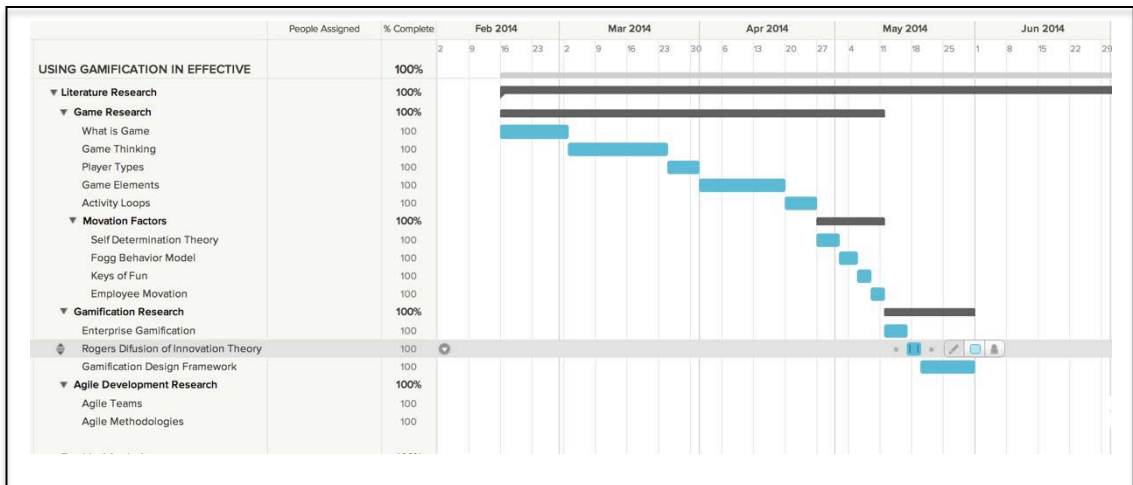
In chapter three, agile methods and structure are presented.

In chapter four, for each team members' requirement analysis interview results are discussed. Designed gamified system and creating prototype process are explained. Play test and testing the gamified system are expressed and analysis for conclusion part is included in this chapter as well.

Finally in conclusion part, depending on all analysis, interviews and play test results overall results are interpreted.

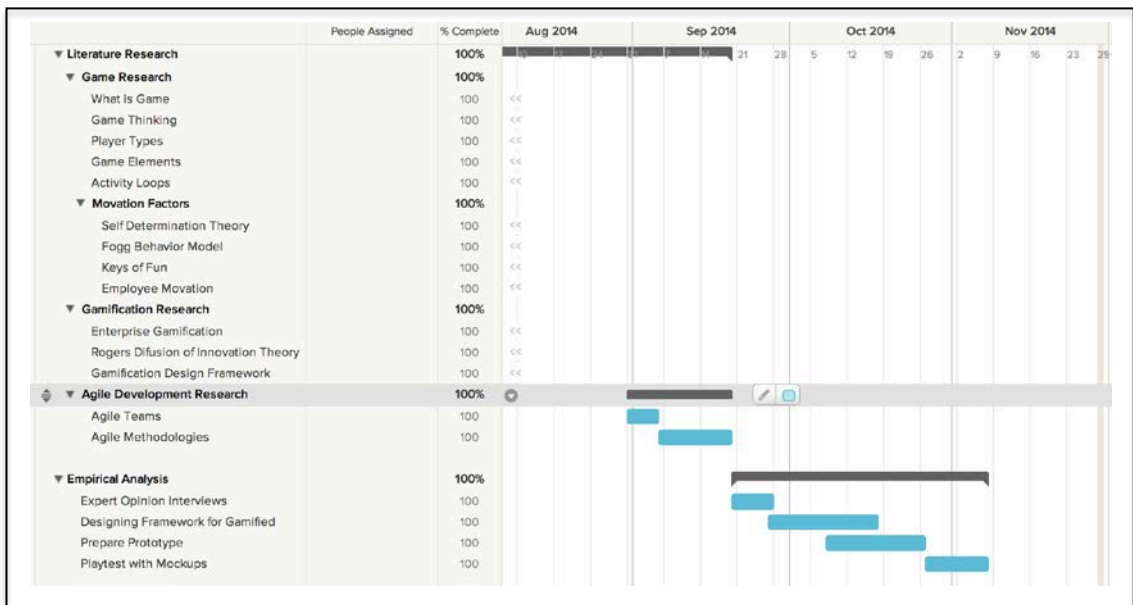
The time schedule is shown in Figure 1.1 and 1.2.

Figure 1.1: Research Gantt diagram



Source: This figure is made by Selin Öztürk.

Figure 1.2: Research Gantt diagram continue



Source: This figure is made by Selin Öztürk.

2. GAME, GAME THINKING & GAMIFICATION

Games and game thinking are present in our daily life, in our culture and even in our language and daily conversations. People play lots of game intentionally also they play many games unintentionally. There are processes in daily life like game but nobody thinks it is a game. This awareness lack is attractive to any marketer to make game for winning.

2.1 GAME DEFINITION

Jane McGonigal defines game in four traits: a goal, rules, a feedback system and voluntary participation (McGonigal 2011).

The **goal** is the specific outcome that the players work to achieve and it provides players with a sense of purpose. The **rules** mean limitations to player in the game. Game is a world of rules, which made by game designer. Because of that, game is defined as **magic circle**, which is a concept, created by Johan Huizinga (Ferrara 2012). The **feedback system** tells players how they are going and how close they are complete a task, next level up or where they are in progression. Players seem feedback as a promise about the achievement is definitely reachable and it makes people motivated to keep playing. **Voluntary participation** gives players freedom to enter or leave game. The game should not be an obligation and make players stressful.

Ferrara defines games, which have three components: objectives, environmental constraints and formal constraints. The **objective** is a condition, which is all players, tries to achieve. **Environmental constraints** are physical limits and **formal constraints** are game rules that player can and cannot do.

There two definitions have similar way of think: they both agree that a game has a goal and rules. But Feedback system and voluntary participation (cause “*whoever must play cannot play*” - James P. Carse) are very important concepts in game.

Game is player journey actually, it is series of meaningful choices that chosen by players (Werbach & Hunter 2012).

2.2 GAME AND PLAY

Roger Caillois represent two term for play and game: Paidia and Ludus. Ludus basically means games and Paidia is a term, which we can represent as play. These are two different poles and two opposites. Game designers, game researchers and philosophers tried to explain play and game and difference between each other for many years.

Play (Paidia) is free movement but it is in structure in magic circle of game and game designers and philosophers defined as below;

- a. *“Play is the aimless expenditure of exuberant energy”* – Friedrich Schiller
- b. *“Play is whatever is done spontaneously and for its own sake”* – George Santayana
- c. *“...play creates a zone of proximal development of the child. In play a child always behaves beyond his average age.”* – Lev Vygotsky
- d. *“Play is free movement within a more rigid structure.”* – Katie Salen & Eric Zimmerman

Game (Ludus) is:

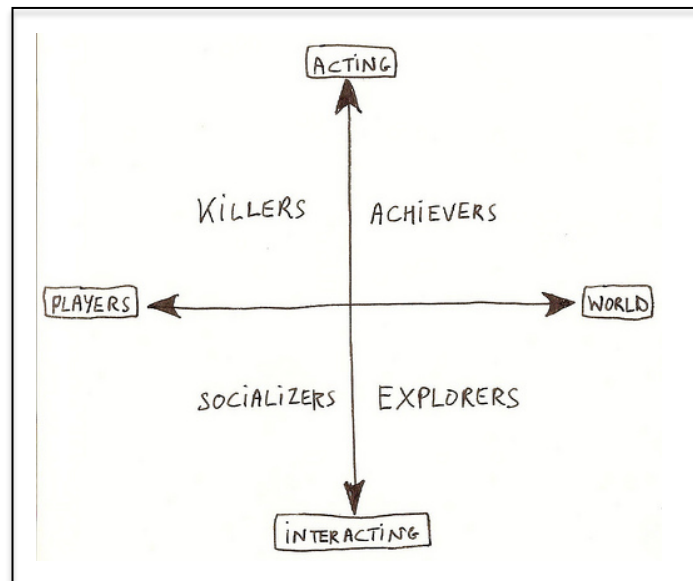
- a. *“A game is a closed, formal system that engages players in a structured conflict, and resolves in an unequal outcome.”* – Tracy Fullerton, Chris Swain and Steven Hoffman
- b. *“A game is a series of meaningful choices.”* – Sid Meier
- c. *“A game is a...domain of contrived contingency that generates interpretable outcomes.”* – Thomas Mallaby
- d. *“A game is a problem-solving activity, approached with a playful attitude.”* – Jesse Schell

2.3 GAME PLAYERS

All gamers are not same and not play games for same reasons (Yee 2006). Taxonomy of players often used is the Bartle’s Player Types (Yee 2006, Zicherman & Linder 2010, Zicherman & Cunningham 2011). This model helps to define player types by actions and achievements types motivate the players.

Bartle’s Player Types are: **Achievers**, **Socializers**, **Explorers** and **Killers**. Each player type has different motivations, game behavior in game and play styles.

Figure 2.1: Richard Bartle's player types



Source: Werbach 2013

Achievers are gamers who are acting on the world. Their motivator is achieving goals and performing well. They are proud of their status, levels and achievements they got.

Explorers are players who interact the world. Their motivator is having the game surprise them. They like exploring out of way places and getting virtual goods. These players look for interesting features and figure out how things work.

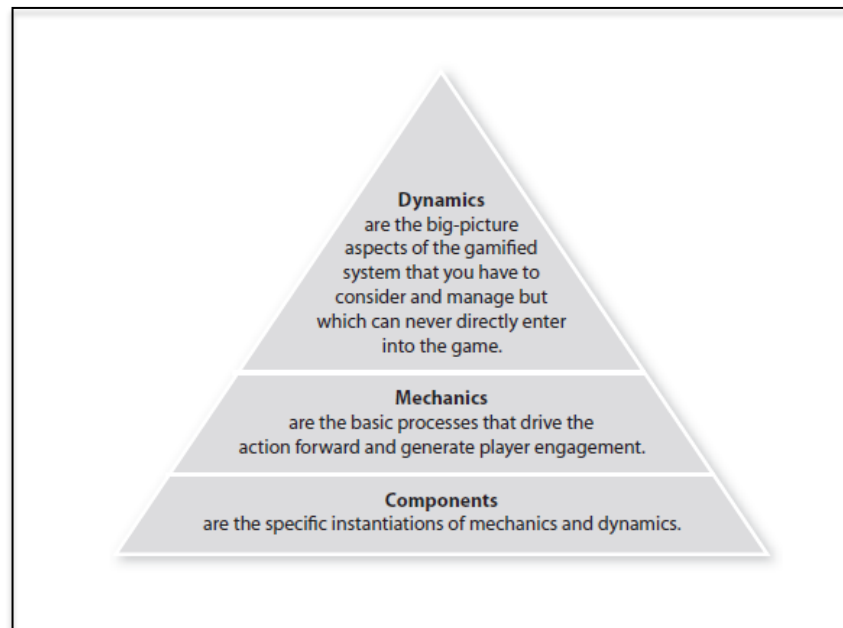
Socializers are interacting with other players and interested in people, what they do and say. They enjoy collaboration and group play. These players are proud of their friendship, contacts and influence.

Killers are acting on other players and interested in doing things to other player and people in game. Competition is important for them and they enjoy winning. They try to win on the expense of other players. Killer players proud of their reputation and their practiced fighting skills.

2.4 GAME ELEMENTS

Werbach & Hunter defines game elements as gamification toolkits. The game elements are specific characteristics of games that can be applied in gamification (Werbach & Hunter 2012). They created a model for game elements in a form of pyramid. The pyramid has three categories as: Dynamics, Mechanics and Components.

Figure 2.2: Game elements hierarchy



Source: Werbach & Hunter 2012, pp. 82

2.4.1 Dynamics

Dynamics are the big-picture aspects. They had to be considered and managed but which never directly entered into the game (Werbach & Hunter 2012). Dynamics are elements that exist in almost all games.

Constraints: The limits players' freedom to make them chose meaningful choices and create interesting problems or situations.

Emotions: The emotions that create by game. The important one of them is fun.

Narrative: It is a consistent, ongoing storyline to keep players playing.

Progression: Progression make players feel of moving forward and improving. This feeling help players to keep playing as well.

Relationships: It refers to interaction players with other players. Social interactions create feeling proud of their status and social contacts.

2.4.2 Mechanics

Mechanics are the basic processes that generate players' engagement. Depending on what mechanics are created and used, the game can have different style and feel. Some

mechanics can be counted into one Dynamic element. For example, cooperation and competition and challenges all create interaction with other players, so they create Relationships.

Challenges: The objectives that are players try to achieve.

Chance: Some actions are occurred by chance and create a feel of surprise.

Cooperation: It creates a sense of winning or losing. People work together and cooperation create relationship between players.

Competition: As cooperation it create feeling of winning or losing. Players work against to each other.

Feedback: Feedbacks provide players information about how they are doing and helps to make them engage and keep playing.

Resource acquisition: Collecting things, which help players to achieve goals.

Rewards: Benefits from actions or achievements. For example, points, level up or badges.

Transactions: Buying or selling some items to other players in game.

Turns: Especially turns are exist in traditional card games and board games to keep balance in the game.

Win states: Objectives that make players winner.

2.4.3 Components

Components are more specific forms of Mechanics and Dynamics, they are specific processes and feeling that can be seen and used in the game clearly. Some components can be counted into one Mechanic element. For example, achievements and boss fights are both a part of challenges.

Achievements: The specific goals in the game, which are players, try to achieve.

Avatar: Virtual and visual representation of the players.

Badges: Virtual and visual representation of achievements.

Boss Fights: One of the hardest challenges in the game that usually at the end of a level or game.

Collections: Sets of items collected or gained badges.

Combat: Fighting in the game and defeating against player.

Content Unlocking: Unlock some content or story parts in the game after reaching a level or achieving a goal.

Gifting: Giving items, virtual money or lives

Leaderboards: Display players' place between other players.

Levels: Levels are steps in game progression.

Points: Numerical and virtual representation of the game progression.

Quests: Challenges in the game that are designed with objectives and rewards.

Social Graph: The table that shows players' friends statuses and levels.

Teams: Teams, which are formed in the game and have more than one player. The players in the same team try to achieve same goal and work together.

Virtual Goods: Items or benefits which players can pick and use them. They are virtual but have value in the game so players want to buy them by virtual or real money.

2.4.4 Activity Loops

Engagement loops and progression stairs are both form activity loops in game. User actions provoke some other activity, which in turn provokes other user actions, and so forth. Engagement loops are explained as what players do, why they do it, and what the system does in response. Progression stairs give a macro perspective on the player's journey with easier rest parts and harder boss fights (Werbach & Hunter 2012).

Engagement Loops: This loop is Action to Feedback; Feedback to Motivation and after Motivation, Motivation to Action comes again. This is the basic process of your gamified system. However, it does not catch the players advance ways. So progression steps come in the game in that part.

Progression Steps: Usually means an increase level of challenges. For example, in video games level up from 1 to 2 takes so little time and experience points than level up from 10 to 11. While moving other levels difficulty increase linearly. After level up, gamers are allowed time to explore and get used to difficulty of the level. Then, at the end of the level there are boss fights, which are more difficult than the rest of level. After that gamers level up and another rest time is allowed.

2.5 MOTIVATION & PSYCHOLOGICAL FACTORS

This section includes 4 keys of fun and 8 keys of fun with Self-determination theory and behaviorism. Psychology is need to be considered cause it is central to what makes gamification effective and psychological factors are most important part in game designing and game thinking. These factors are the triggers that make us have fun, joy and pleasure while playing. Motivation means you are moved to do something but there is not only way or best way to motivate people. People are completed and not motivated by same things. But people love surprises because surprises make their brain secrete dopamine and this dopamine thing is the key hormone that make us happy and motivate do something more and more.

Behaviorism is the relationship between stimulus, behavior and consequences. There is a stimulus, which means something, that causes a physiological or psychological response and stimulus make people behave. Consequences come after the behavior and make people learn from their behaviors. Depending on consequences are in good or bad way people change their behavior.

What is the relationship between behaviorism and gamification?

This relationship can be explained with an example. The winning idea of The Fun Theory Award is Speed Camera Lottery. The idea is basic actually, there is a camera, which measure the speed of the cars and if the speed is under speed limit send the driver lottery ticket. After 3 days the average speed is reduced 22 per cent in Sweden (Volkswagen 2009). In this example, people drive cars as behaviors and after rewarding when they drive properly, under speed limit, as consequence, they change their behaviors. They started to drive slower than before. This is the behaviorism and gamification.

2.5.1 Self-determination Theory

Starting at 1970s, Ed Deci and Richard Ryan developed the basis of Self-Determination Theory, which is a comprehensive theory of human motivation. Depending on this theory there is a spectrum of motivational types; **Amotivation**, **Extrinsic** and **Intrinsic**. Under Extrinsic motivation type, there is second spectrum aligned from most external to the most internal (Werbach & Hunter 2012):

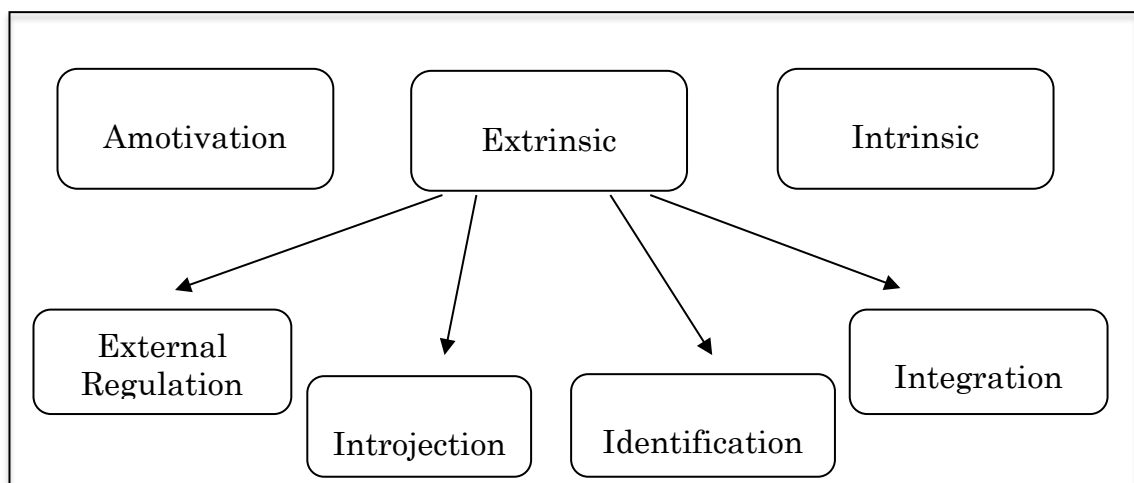
External Regulation: The only way is someone tells to make people do something. In this type people simple feel they have to do it.

Introjection: Sometimes external motivators can be made internal. It is basically means status. People are not really want to do something but other people will value them and they do. People take other people’s views and make them their own.

Identification: This type of motivators is not totally external. People are not really want to do something but they want to see, live or do consequences of the behavior, so they do it. They do for themselves.

Integration: People are really want to do something, they say it is good for me and I want to do it but still it is not fun for them. They still need to some push to do it.

Figure 2.3: Self-determination theory spectrum



Source: Werbach 2013.

How to utilize these different kinds of motivation in gamified system?

The motivation type should be chosen appropriately for the each action and situation. For every situation more intrinsic motivator should be include in design of gamified system. People should really want to do for him or herself, not because someone tell them or not because they think they have to do it while they do not want to do. They need to find the fun in activity.

Three characteristics of Intrinsic Motivations in self-determination theory: **Competence, Autonomy and Relatedness** (Werbach & Hunter 2012, Rigby & Ryan 2011).

Competence: People's sense of ability. It can create with these sentences in gamified system: "You earned it!", "You win!" and "You level up, congratulations!". All these make people good for doing this action and feel they can able to do this. So they will not give up and keep doing the action.

Autonomy: People feel like control themselves. There is not someone else telling them to do something. In gamified system the users should be free of choose and they should feel their freedom. This can be not forcing to choose a way or doing exactly one challenge.

Relatedness: Activities are connected to something beyond. This can be sense of meaning or purpose. This relatedness feeling can be created with social elements, graphs and sense of being a part of big world.

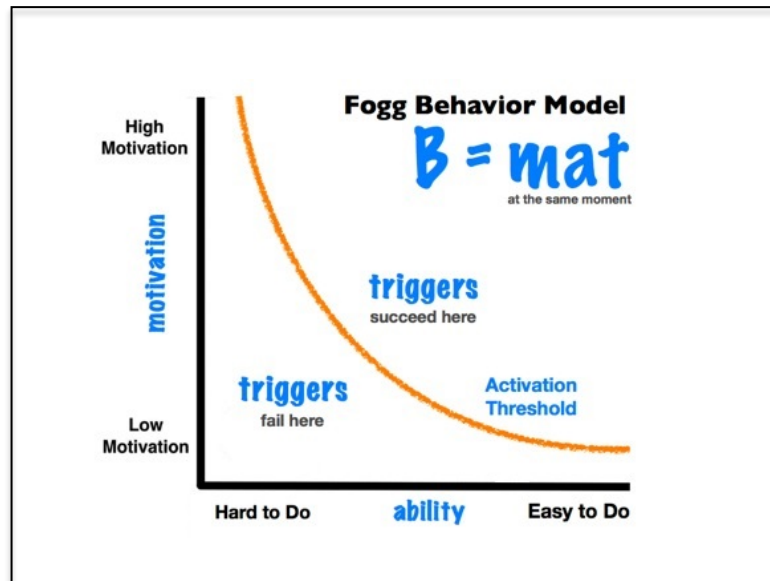
2.5.2 Fogg behavior model

With factors and motivation types under self-determination theory, the motivators can be designed but activating behavior still is a problem. Fogg Behavior Model join us in that part. In order to have people do target behavior;

- i. They need to be motivated,
- ii. Have the ability to perform and,
- iii. Triggered to do the task.

These three actions should be happened at the same time. The idea is that it is possible to activate behavior with playing these three actions – by increasing the motivation, lowering the ability that people should have and triggering in time – in short **Motivation, Ability** and **Trigger** are the three behavior change elements in Fogg Behavior Model (Fogg 2009).

Figure 2.4: Fogg behavior model chart



Source: BJ Fogg's Behavior Model, <http://www.behaviormodel.org/>.

Motivators are defined as **pleasure/pain, hope/fear** and **social acceptance/rejection** as Core Motivators.

Lowering **ability** is easier than teaching people to do something complicated. Because of that idea, Fogg Behavior Model focuses on elements of simplicity. These elements of simplicity are **time, money, physical effort, brain cycles, social deviance** and *non-routine*. This means actions should be easy enough to make people spent enough time – not too much, not too little. As time element the action should be non-routine, routine actions are simple to do. The money should spent to do an action should not be too much. Social deviance means being against the norm and the rules of society. The actions that required physical effort should not be physically impossible (Fogg 2009). For example, in Superbetter, which designed by Jane McGonigal, it is important, to do something every day to people feel themselves happier or healthier. At the beginning of the program simple physical activities called as Power-ups are given to people to do like “Hug Yourself” or “Got a Block? Walk Around It!”.

Triggers are facilitator, spark and signal in FBM. A spark motivates behavior – it can be a text, picture or a video, a facilitator triggers behavior while at the same time makes it easier to do and signals are used as a reminder. (Fogg 2009).

2.5.3 Keys of Fun

Fun is the main motivator in game and gamification. There are theory about fun and fun types:

4 Keys 2 Fun defined by Nicole Lazzarro: According to Nicole Lazzarro, people do not play games for the game itself, they play games for their experience and have fun while playing. Also, there is not one-way to have fun while playing: Hard Fun, Easy Fun, Serious Fun and People Fun (Lazzarro 2004).

a. Hard Fun: Frustration, Relief, Fiero – in the moment personal triumph over adversity. It provides the opportunity for challenge, mastery, and feelings of accomplishment. Hard fun focuses attention with a goal, obstacle and strategy.

Easy Fun: Wonder, Surprise, and Curiosity. It is the bubble wrap of game design and it focuses on controls, creativity, exploration and fantasy. It inspires exploration and role play.

b. Serious Fun: Relax, Desire, Excite. Purposeful play changes how players think, feel, behave, or make a difference in the real world. The excitement of games enlivens otherwise boring tasks. Serious Fun is play as therapy and focuses on collection, learning and rhythm.

c. People Fun: Schadenfreude, Amusement, and Naches. It provides to excuse to hang out with friends. People are addictive communicate, cooperate and compete and these mechanics over time build social bonds and teamwork.

8 Kinds of Fun defined by Marc LeBlanc:

a. Sensation: Game as sense-pleasure. Evoking of emotions in the player. Sensation is created through manipulation of sight, sound and pace of the game. Most horror games build sensation very well.

b. Fantasy: Game as make-believe. It is easy to argue that all games have some sort of fantasy. Players often seek "power" in a game, which gives them what they cannot get from real life.

c. Narrative: Game as drama. Having a narrative gives the player a sense of purpose. Not all games have or need a narrative. The narrative can also be thought of as the "goals" of the game. Interactive storybooks, point and click games are examples of games based on narrative.

d. Challenge: Game as obstacle course. Puzzle games are a good example. Overcoming obstacles can be rewarding in it but just to be safe reward the player! Positive reinforcement lets the player know that people are doing the right thing.

e. Fellowship: Game as social framework. Playing with friends is always better than playing alone. Fellowship or multiplayer games adds an extra layer of interaction for the players. Solo games often simulate the experience of fellowship by using friendly AI/bots.

f. Discovery: Game as uncharted territory. Discovery is not in just the game itself but what you learn about yourself. Adventure games are good examples but any game that makes the player learn more about themselves can be thought of as discovery.

g. Expression: Game as self-discovery. Expression comes from the rules of the game and its dynamics. Ever tried to break the game or hack it? Self-expression is a very important part of human nature.

h. Submission: Game as pastime. This relates more to "grinding" or "farming". Most games have some form of this. Submission can also be thought of as the opposite of challenge. If a game is challenging all the time players may be turned off. Complaining that the game is too hard or cognitive overload is a good sign that the game doesn't have enough submission for the player. Of course "hardcore" games can be thought of as having less or none of this.

Each game pursues multiple aesthetic goals and has multiple kinds of fun, in varying degrees (Hunicke & LeBlanc & Zubek 2001-2004).

2.5.4 PERMA, Fiero & Flow

Positive psychology is a new field of science that studies "human flourishing," or how we achieve different kinds of happiness.

Game developers today understand how happy they make their players. As a result, game designers have been taught to relentlessly pursue happiness outcomes, including

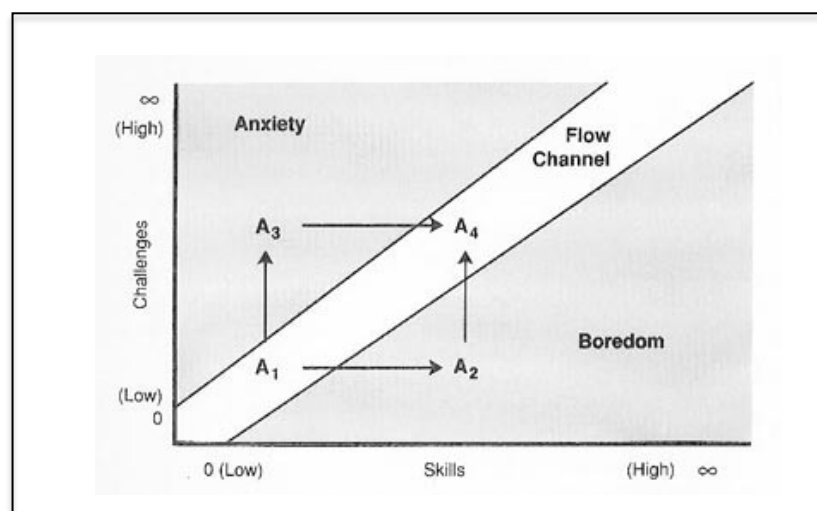
flow—and they’ve innovated a wide range of other happiness strategies along the way (McGonigal 2011).

Seligman’s framework PERMA should be considered to affect users’ psychology and change their behavior (Seligman 2011):

1. Positive Emotions
2. Engagement
3. Relationships
4. Meaning
5. Achievement

Flow: Flow is ‘in the zone’ feeling. Flow is the feeling of intense concentration and efficiency. It is said to take ten years or 50,000 hours to achieve the skills, muscle memory, and understanding needed to find flow within an activity. Key aspects of flow include a challenge with clear goals, well-established rules for action, and increased difficulty over time. When a player is experiencing this emotional high, quitting or winning would be equally dissatisfying outcomes. They want to keep playing and stay ‘in the zone’ for as long as possible.

Figure 2.5: Flow channel



Source: Schell 2008, pp. 119.

Fiero: the Italian word for “Pride” and a term often used by game designers to describe that feeling of emotional elation after a huge discovery or victory within a game. The feeling usually expressed when a player throws their arms over their head and yells! Scientists will tell you fiero is one of the most powerful neurochemical highs that we can experience.

While designing game or gamification balance should be made between flow and fiero moments within a game. They can be thinking as engagement and progression loops. Flow is like engagement loop but sometimes the players should be

2.5.5 Employee Motivation

According to Accel-Team there are several different theories on employee motivation like Traditional theory X, Theory Y, Theory Z and Hygiene and Motivation Theory (Accel-team, 2014).

The Traditional Theory X: This theory is best ascribed to Sigmund Freud and it is assumed these thought: people are lazy, they hate work, have no ambition, take no initiative and avoid taking responsibilities. People want to be in secure and to get them to do any work. The employees must be rewarded, coerced, intimidated and punished. So, it is called “stick and carrot” philosophy. In such an atmosphere like this, for manager and employees, there is not possible to achieve anything and do creative work.

Theory Y: According to Douglas McGregor, people want to learn and work is their natural activity that they create self-discipline and self-development in contrast to Theory X. It is assumes that the expenditure of physical and mental effort in work is as natural as play or rest:

- i. People will direct themselves if they are committed to the aims of the organization.
- ii. The average person can learn to accept and seek responsibility.
- iii. Large number or employees can use imagination, ingenuity and creativity to solve problems.
- iv. Under the conditions of modern industrial life the intellectual potentialities of the average human are only partially utilized.

Theory Z: According to Abraham Maslow, who is a fellow psychologist, a men’s personality is the sum total of his works and that only his works survive a man at death. The basic human needs are: Physiological needs, safety needs, love needs; esteem needs

and self-actualization needs (highest). Self-actualization is characterized by integrity, responsibility, simplicity and naturalness. Self-actualizers focus on problems. “Hard work and total commitment to doing well the job that fate or personal destiny calls you to do, or any job that “calls for” doing”.

Hygiene and Motivation Theory: Frederick Herzberg developed this theory in 1959. According to this theory, people work first and foremost in their own interest, for they are truly happy and mentally healthy through work accomplishment. People needs are of two types:

Animal needs (hygiene factors)

- a. Supervision
- b. Interpersonal relations
- c. Working conditions
- d. Salary

And Human needs (motivators):

- a. Recognition
- b. Work
- c. Responsibility
- d. Advancement

If people’s animal needs are not satisfied, hygiene factors act as de-motivators. But if they are satisfied, their motivational effect is limited.

In conclusion after these employee motivation theories, the motivators, which motivate employees, are listed as below (Werbach 2013):

Rewards: Pay, bonus, praise, promotion and responsibility. These are extrinsic rewards and can be expected or surprise. They are not just salary and they are not about pleasure of work.

Skill development: Gaining new skills and learning from problem solving can motivate people to work.

Information (or feedback): Employees want to learn how they are going in often intervals. It means feedback should not be just in performance reviews every year.

Corporate citizenship: Work is a group activity and co-workers can motivate each other.

Fun: Work is not always so serious. People can make it enjoyable or it can be enjoyable itself sometimes with work atmosphere.

2.6 WHAT IS GAMIFICATION AND WHAT IS NOT?

Gamification is a term especially marketing term that is defined as using game methods and game design techniques in non-game contexts and businesses. Because of this definition is too general, gamification can be defined with the question: What is Gamification not?

It is not making everything a game – or an immersive 3D virtual world.

It is not any games in the workplace or any use of games in business

It is not simulations. Although, simulations are serious games.

It is not just for marketing or customer engagement

It is not just PBLs - points, badges, leaderboards and reward structure.

It is not game theory.

Gamification is;

Listening to what games can teach us

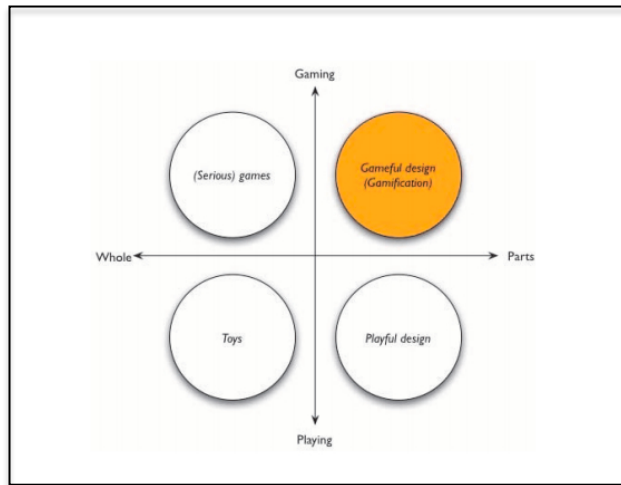
Learning from Game Design - and Psychology, Management, Marketing, Economics

Appreciating Fun

Gamification term is very new, it is first documented in 2008 but it did not used commonly and adopt before the second half of 2010. The non-game context in definition means contexts that are other than games. So, gamification can be used for almost anything from productivity to health, finance, security, education and project management. According to Zicherman & Linder everything can be made fun and what is especially good is that gamification techniques can be tailored to suit business objectives (Zicherman & Linder 2010)

There are lots of benefits of gamification but basically it is useful tool in engaging, re-engaging, motivating, activating behavior and creating loyalty (Deterding 2011, Zicherman & Linder 2010, Zicherman & Cunningham 2011).

Figure 2.6: Defining “gamification”



Source: Werbach 2013.

There are many benefits of gamification, especially benefits in marketing fields. Gamified systems are very useful in engaging, re-engaging, motivating, activating behavior and creating loyalty (Zicherman & Linder 2010, Zicherman & Cunningham 2011). Experts agree that gamification leverages people’s fundamental needs to achievement, reward, status, competition and self-expression (infographic). According to Mario Herger, available data from gamified systems make think there will be potential improvements in areas such as user engagement, ROI, data quality, timeliness and learning (Herger 2012).

There are many and successful systems, websites and programs, which are gamification applied. Such as Samsung Nation, Nike+, Microsoft 7 Language Quality Game, Dodgeball, Foursquare, Fitocracy, Folded, Rypple, Superbetter, Practically Green, Starbucks Customer Service Game, Badgeville and finally Red Critter Tracker, PropsToYou which are two gamified project management systems. Gamification industry is growing up day by day and there are big expectations for this industry. M2 Research has made again in 2012 and it is predicted that gamification will be a 2.8 billion dollar industry by 2016 (M2 Research 2012).

2.6.1 Enterprise Gamification, Work and Play

Using gamified systems and programs in an enterprise is a new concept and most people are not used to face game things in work place. Although, according to researches only 7 per cent of employees fully understand their company's missions and 90 per cent of Generation Y members say they desire co-workers "who make work fun" (Socialcast 2011). The modern work experience already resembles a game, gaming world and job world have similar underlying mechanics. Job World has the dynamics such as Title, Salary, Bonus, Promotion, Performance Review and they match to each game world dynamic: Title -> Level, Salary -> Score, Bonus -> Bonus Points, Promotion -> Leveling Up and Performance Review -> Stat Summary.

Gamification makes the followings for enterprises;

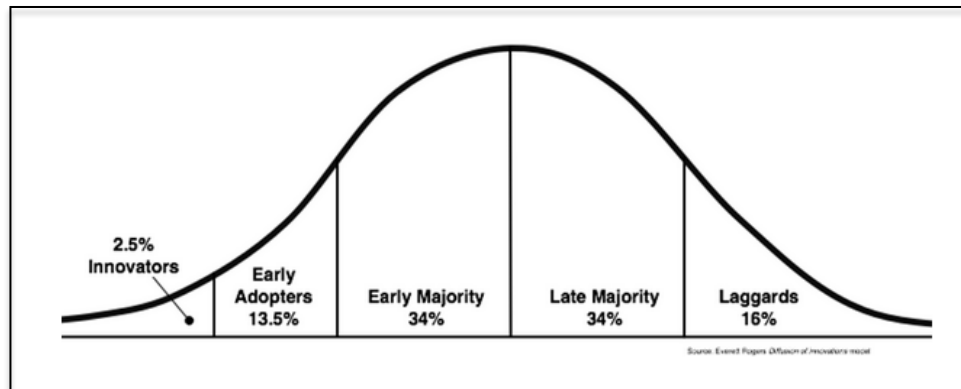
- a. Energize workforce
- b. Drive performance improvement
- c. Innovate organically
- d. Motivate teams
- e. Identify emerging leaders

Highly engaged employees are 26 per cent more productive and their companies earned 13 per cent greater total returns for shareholders over a five years period (Badgeville 2013). There is a wrong common thought is more money provides more motivation: It is totally wrong! 70 per cent of workers are more motivated by non-monetary rewards at work. 79 per cent of employees who quit their jobs cite lack of appreciation as the main reason. Gamification means recognition and fun for employees and growth for bosses. Therefore, Gartner predicts over 70 per cent of global 2000 organizations will have at least one gamified application by 2014 (Gartner 2011).

While trying to motivate employees, gamified system is a new working process and most people can refused to work with this system or refused to get used to.

Adoption of a new system or behavior does not happen at the same time for all people. Some people adopt more quickly than others. There are five adopter categories as; Innovators, Early Adopters, Early Majority, Late Majority and Laggards (Rogers 1995). And adoption of a new idea process showed in the Figure 2.7.

Figure 2.7: Five adaptor categories in diffusion of innovation process



Source: Rogers 1995

2.6.2 Gamification Design Framework

Werbach and Hunter (Werbach & Hunter 2012) present a framework to design gamified system and apply Gamification to a business model. It is called Six D's:

1. DEFINE your business objectives.

Business objectives mean the specific performance goals for gamified system, such as increasing retention, building loyalty, or improving employee productivity. If it is not start with this step, gamified business gets off the ground, but it will probably fail eventually.

For objective definition process, firstly all potential objectives should be listed. Then, the list should be ranked in terms of importance. As third step designer should cross off anything that is a means rather than an end. Finally, explanations should be written for each objective next to them, which present how it would benefit business context.

2. DELINEATE target behaviors.

This is designing the behaviors what the players wanted to do and how they are measured for win state and lose state. Listing all desired behaviors should be done and metrics for success should be developed. For example points are most used quantification and measurement way.

3. DESCRIBE your players.

Who will use the gamified system? Are they employees, customers or consumers? For understanding and providing players, they should be segmented because all users are not the same. To segment the players, player types are used to design. So, define and

describe your players for each player type. Although all players are not the same, the gamified system should offer opportunities for them at all stages.

4. DEVICE activity loops.

Games are series of meaningful choices. Starting that definition of game, it can be easily understood that steps, loops and choices should be exist. There should be leveling system. Engagement loops and progression stairs should be design in this step.

5. DON'T forget the fun!

The question is, after 4 steps, is it fun? And would players participate in the system voluntarily? While thinking and designing the details of system, defining the game elements, Fun should never be far from designer mind.

Actually to make gamified system more fun, fun will be design for it depending on the business context. It will be decided what kinds of fun should be provided in the system. The only way to understand the designed gamified system is fun or not, is testing it and refine it through a rigorous design process.

6. DEPLOY the appropriate tools.

This is the implementation stage of all design process and Gamification is coming to the system. Picking the suitable mechanics and components should be done. This is the last step because while designing mechanics, components and dynamics in system, players should be known and the objectives should be clear, target behaviors should be defined before adding motivators to activate behavior.

3. AGILE DEVELOPMENT

Agile Development is iterative and incremental development and project process. Agile developments based on agile methods and the main concepts of these methods presents in Agile Manifesto and 12 principles of Agile Development (Rasmusson 2010).

Agile Manifesto:

Individuals and interactions over processes and tools

Working software over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

(Beck & Beedle & Bennekum & Cockburn & Cunningham & Fowler & Grenning & Highsmith & Hunt & Jeffries & Kern & Marick & Martin & Mellor & Schwaber & Sutherland & Thomas 2001)

12 Principles of Agile Software:

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity - the art of maximizing the amount of work not done - is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.

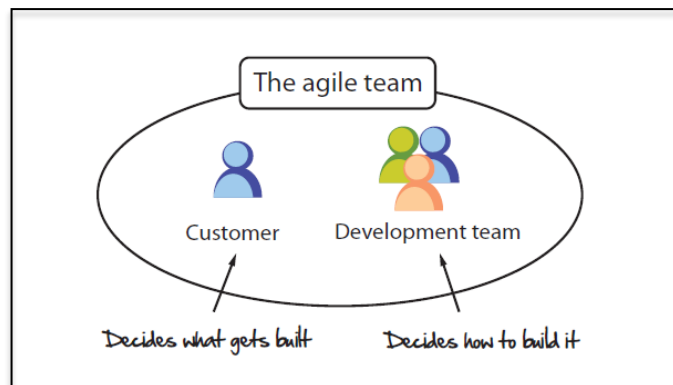
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

(Beck & Beedle & Bennekum & Cockburn & Cunningham & Fowler & Grenning & Highsmith & Hunt & Jeffries & Kern & Marick & Martin & Mellor & Schwaber & Sutherland & Thomas 2001)

3.1 AGILE TEAMS

Agile teams are self-organizing and cross-functional teams (Rasmusson 2010).

Figure 3.1: Agile team structure



Source: Rasmusson 2010, pp. 35.

In an Agile team customer (or product owner) is a part of development team. So, customer can see how going development of his request is clearly. While estimation, planning and daily standups are doing with customer.

There are different roles in an agile team;

Customer (Product Owner in Scrum): Agile customer is the “source of the truth”. He decides what gets built; define the prioritization and makes the though trade-offs around scope. Customer involvement makes the project success.

Agile Analyst: Agile analyst is the person who sweats the details of work. He helps write user stories, does the detailed analysis, and makes sure team have done their homework.

Agile Developer: Agile developer turns user stories into working software, estimates with team and makes the technical decisions about tools, architecture design, development practices, etc.

Agile Tester – QA: Agile Tester helps write test cases for upcoming stories, confirms stories work as expected and thinks about the big testing picture.

Project Manager: He tracks how the team is doing, communicates the state of the project and removes roadblocks standing in the team's way.

UI/UX Designer: Designer uses a collection of tools and techniques to help create a compelling user experience and overlaps with analysis.

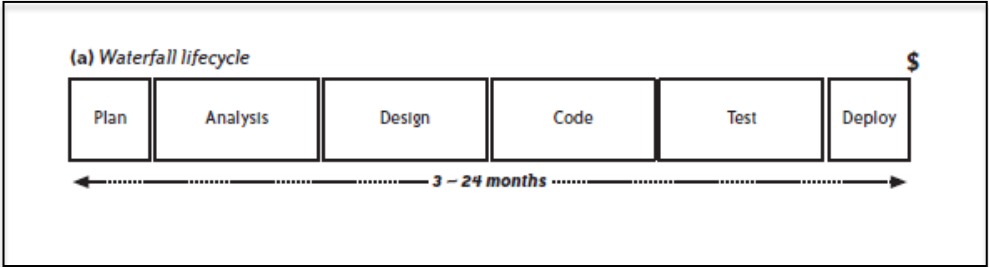
For gamified the agile development process every players who are in different roles should be volunteers. If they are not, the gamified system should make them volunteer but it should not force to make them volunteer or stop what they are doing to force them.

3.2 AGILE METHODOLOGIES

According to book *The Art of Agile Development*, there are different agile methods to make different processes of agile development (Shore & Warden 2007).

One of the main concepts is iterative development and iterative planning. In waterfall lifecycle planning, analysis, design, coding, testing and deploying are individual processes and they cannot be doing at the same time. For example, coding can start after technical design phase is finished. But real life not like that, everything can change and phases can suit these possible changes.

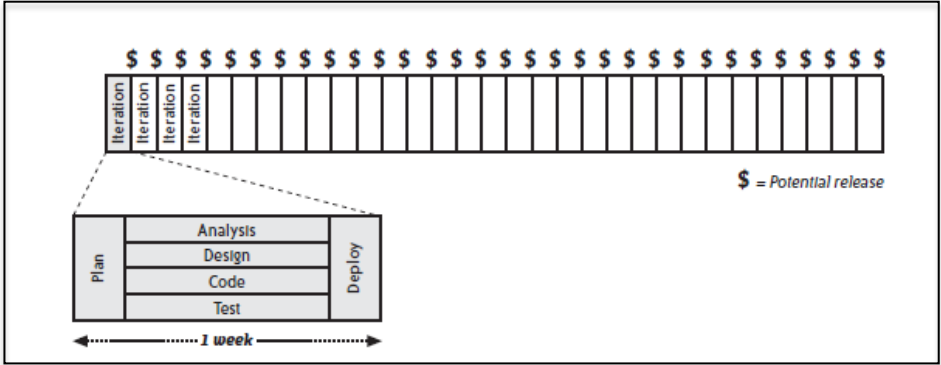
Figure 3.2: Waterfall lifecycle



Source: Shore & Warden 2007, pp. 16.

In XP lifecycle, analysis, design, coding and testing phases are doing at the same time. If a sprint time is one week, all phases are done in a week period.

Figure 3.3: XP iterative lifecycle



Source: Shore & Warden 2007, pp. 18.

Table 3.1: XP practices by development phases

Practices	Planning	Analysis	Design & Coding	Testing	Deployment
Thinking					
Pair Programming			X	X	
Energized Work	X	X	X	X	X
Informative Workspace	X				
Retrospectives	X			X	
Collaborating					
Real Customer Involvement		X			
Stand-Up Meetings	X				
Coding Standards			X		
Iteration Demo					X
Reporting	X	X	X	X	X
Planning					
Release Planning	X	X			
The Planning Game	X	X			
Risk Management	X	X			
Iteration Planning	X		X		
Slack	X		X		
Stories	X	X			
Estimating	X				
Developing					
Incremental Requirements	X	X			
Customer Tests	X			X	
Test-Driven Development			X	X	
Refactoring			X		
Simple Design			X		
Incremental Design and Architecture			X		
Spike Solutions			X		
Performance Optimization			X		

Source: Shore & Warden 2007, pp. 21-22.

There are many methodologies that are practiced already as mentioned and grouped in Table 3.1 and they are listed as below grouped in phases, but the most important ones are listed in below and explained in detailed in Appendix B.

4. EMPIRICAL ANALYSIS

In this section firstly research method is explained that is followed in this study. Then expert opinions are presented based on interviews of people who are already working a part of agile team. Depending the people interviews a gamified system is designed and explained in detail in section 4.3. The mockup screens are prepared to create a prototype and test the gamified system and with these mockups the system tested by people to examine if the system can help to solve defined specific problems. Finally, results of play test is explained and discussed in section 4.5.

4.1 RESEARCH METHOD

People with different roles are interviewed to make the structure of the gamified system. Requirements and opinions on advantages and disadvantages of each role are extracted. This extracted information is used to design the gamified framework in detail. Mockup screens are created in order to selected participants test and then the participants are questioned. The results are analyzed to see if the designed framework solved the present problems.

4.2 EXPERT OPINIONS

Before designing the Gamified Agile Development system, some people were interviewed who are already worked as a part of agile teams. The people are chosen from different roles to think about all roles. 3 Business analysts, 2 agile developers, 2 agile testers and 1 UX web designer were questioned. The interview was semi-structured and talked about the questions as below;

What is gamification?

Which processes in your role make you bored and do not like to do?

In your opinion which actions should be in a gamified system to make your role more enjoyable?

These are the feedbacks of the people who are working as **Business Analyst** in agile team:

“It is too hard to track every person in the team if the work is finished or not or the time when they finish.”(Business Analyst 1, Business Analyst 2)

“I always feel tired of chasing the customers about what is the details of work. For example, defining the warning messages or defining an action of button.”(Business Analyst 1, Business Analyst 2, Business Analyst 3)

“It would be a good feature if there was check items in an issue and when developer finished all checks, the system would inform me about it.” (Business Analyst 1)

“I am bored when I am writing the user stories even if the requirement are clear. Writing story in detail makes me feel tired.”(Business Analyst 2)

Agile Developers said the sentences as below:

“It is boring to read stories which are especially long.”(Agile Developer 1)

“Doing and developing same things are demotivating me.”(Agile Developer 1, Agile Developer 2)

“Code review and writing unit tests are not boring and enjoy to do them.”(Agile Developer 1)

Testers mentioned these feedbacks:

“Writing too long test cases to report the results is boring.”(Agile Tester 1)

“I wish I do not have to report after tested stories and give feedback to people.” (Agile Tester 1, Agile Tester 2)

“Doing and testing same things are demotivating me.”(Agile Tester 1)

UX Designer said that, the frequency of revisions is the most boring thing.

“It is boring to get continuous revision request about a design that you have done already. Also, after a lots of revision the design can change too much that the designer cannot approve but have to accept to design.”

“When contacting to customer directly can be difficult and it can prevent to do your job.”

“Development does not implement as same as design that I done.”

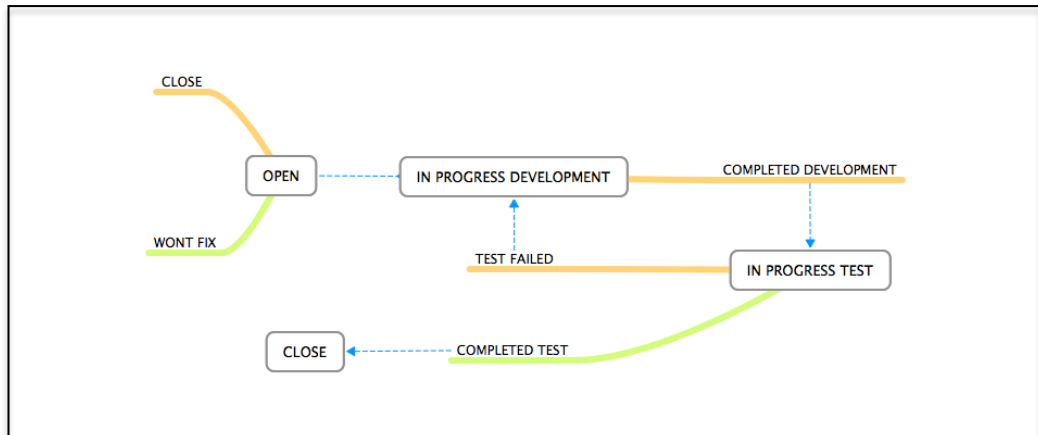
4.3 GAMIFIED AGILE SYSTEM FRAMEWORK

After all literature research, talking the working problems with people who are working each role and study in game design and gamification, a framework is designed as a result of this study.

Firstly, the agile actions and sample story & bug lifecycle is presented. Then, the six D's of the framework are presented. Finally, framework is explained with game elements and agile actions.

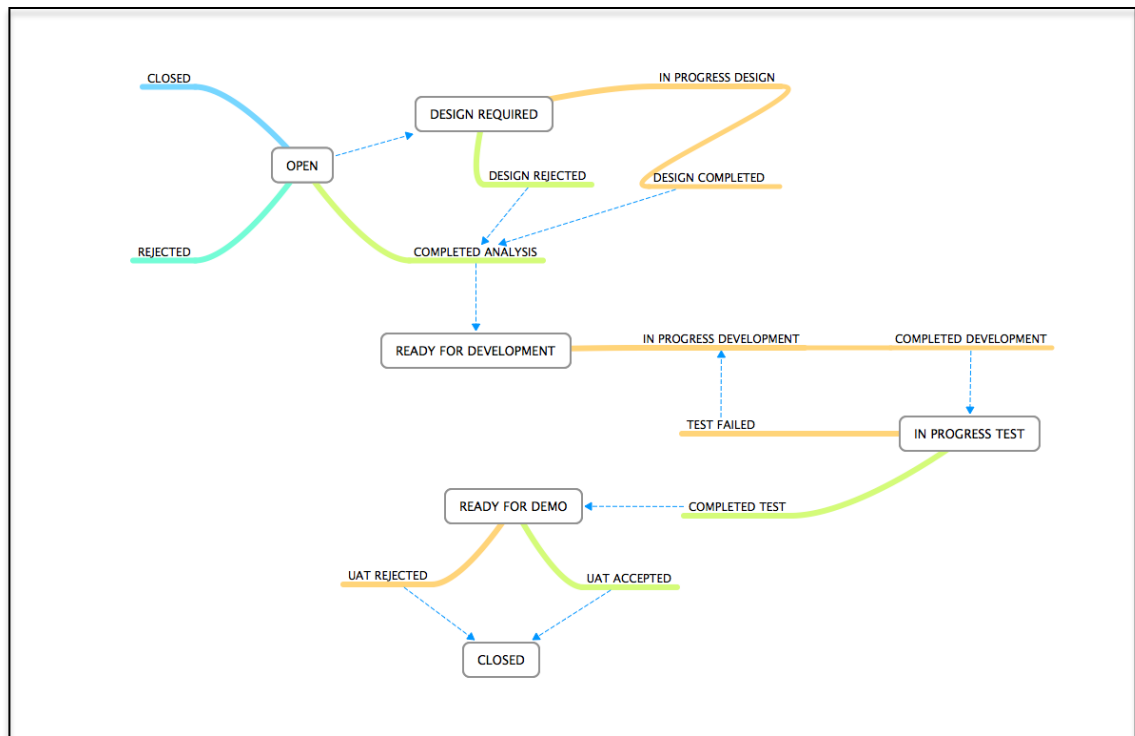
Agile actions can divide 2 main lifecycle or loop, which can be called as “Engagement Loop”. Because this loop is a living cycle and, it is made many times in iterations.

Figure 4.1: Engagement looğ for bug



Source: This figure is made by Selin Öztürk.

Figure 4.2: Engagement loop for user stories



Source: This figure is made by Selin Öztürk.

Besides these loops in iteration, everyone can do their action depending on their role. For example, a tester cannot change the story status to “In progress Development”. So the actions grouped by roles is defined in Table 4.1.

Table 4.1: Actions by roles

Action	Analyst	Developer	Tester	Designer	Customer	Project Manager
Open Story	X				X	
Open Bug	X	X	X			X
Close/Reject Story	X	X				X
Close/Reject Bug	X	X	X			X
Design Required	X					
Design Rejected				X		
In Progress Design				X		
Design Completed				X		
Completed Analysis	X			X		
Ready For Development	X	X				
In Progress Development		X				
Completed Development		X				
In Progress Test			X			
Test Failed			X			
Completed Test			X			
Ready For Demo	X		X			X
Reopen Story / Bug	X		X			X
UAT Accepted / Rejected	X				X	
Start / Close Sprint						X

Source: This table is made by Selin Öztürk.

To design a framework, firstly six D’s are defined and explained which created by Werbach and Hunter. Six D’s are explained in details in Appendix C.

All roles have not all of the game elements. Customer and Project manager are not directly involved in each story or issue. So, there are limited actions for those roles.

Table 4.2: Defined game elements by roles

Game Element	Analyst	Developer	Tester	Designer	Customer	Project Manager
Dynamics						
Constraints	X	X	X	X	X	X
Emotions	X	X	X	X	X	X
Narrative	-	-	-	-	-	-
Progression	X	X	X	X	-	-
Relationships	X	X	X	X	X	X
Mechanics						
Challenges	-	-	-	-	-	-
Chance	-	X	X	-	-	-
Cooperation	X	X	X	-	-	-
Competition	-	X	-	-	-	-
Feedback	X	X	X	X	X	X
Resource acquisition	-	-	-	-	-	-
Rewards	X	X	X	X	X	X
Transactions	-	-	-	-	-	-
Turns	-	-	-	-	-	-
Win states	-	-	-	-	-	-
Components						
Achievements	X	X	X	X	-	-
Avatar	X	X	X	X	X	X
Badges	X	X	X	X	-	-
Boss Fights	-	-	-	-	-	-
Collections	-	-	-	-	-	-
Combat	-	-	-	-	-	-
Content Unlocking	X	X	X	X	-	-
Gifting	-	-	-	-	-	-
Leaderboards	X	X	X	X	X	X
Levels	X	X	X	X	-	-
Points	X	X	X	X	X	X
Quests	X	X	X	X	X	X
Social Graph	-	-	-	-	-	-
Teams	X	X	X	X	X	X
Virtual Goods	X	X	X	X	X	X

Source: This table is made by Selin Öztürk.

Dynamics:

Constraints: Agile structure and company structure are the constraints of the framework. For example, employees can purchase coffee card with their points but because it is tangible prize and it has a money value, this prize is depend on company structure.

Emotions: Competitiveness, cooperation, curiosity, happiness

Progression: Achievement & Skill Levels

Relationships: Team members' relations

Mechanics:

Chance: Bonus sprint and issues in the sprint. Project manager can choose these bonus issues and no one can guess before complete them.

Cooperation: Pair programming create cooperation between agile developers. For analysts review each other's mind-maps make a sense of team and cooperation.

Competition: Competition feeling is feeding by Duello between agile developers. Also skill levels, points and achievement levels create competition in whole team.

Feedback: In Active Sprint, there are informative feedback about completed issues / incomplete issues, completed story points and etc.

In Duello, there are feedbacks about remaining time.

In progress story, if there is skill point in issue and a user gain an achievement when this issue is complete, there are informative feedbacks about that.

In profiles, there will be Points & Skill Points - Levels & Achievement feedbacks.

Rewards: Tangible Prizes which can be bought with points. They can create and managed by Project Manager.

Components:

Achievements & Badges: In the Agile Gamified System, there are different Achievements for different races depending on their actions.

Customer and Project Manager's actions are limited, so there are no designed Achievements for these races.

Designed Achievements and Badges are mention in Appendix C.

Avatar: There are default icon avatars for each race. But users can upload their own photos. Users can buy different virtual goods to use on their avatar. For example; beard, moustache, red hat, Christmas hat, big disco glasses etc. These virtual goods will be bought with system points.

Content Unlocking: The stories are unlocked when level up in races.

Some avatar virtual goods, tangible prizes will be unlocked when user gain achievements and level up.

Leaderboards: A leaderboard need not to be a static scoreboard, and it need not only track one attribute. Also, leaderboards can be powerfully demotivating. If you see how far away from the top players score, you can stop trying. Because of that, personal leaderboards are more effectively.

In this Agile Gamified system there will be 3 types of Leaderboard.

- a. Sprint based Leaderboard => Race specific; everyone can see their race only. Name and Total system point gained in this sprint will be displayed.
- b. All time Race based Leaderboard => Race specific; Name and Total point gained in this sprint will be displayed.
- c. All time Skill Point Leaderboard => Skill Based; everyone can see each other skill points and the rank in the Leaderboard. Name and Skill points gained all time will be displayed.

Levels: There will be 2 main types of Levels.

1. Skill Points Levels: This level structure will be for every race and detailed in Points and Table 4.3.
2. Achievement Levels: Since there will be different achievement for different races, Achievement Levels will be defined differently for races. These levels are calculated depending on achievement counts and hardness for each race. The level tables are presented in Appendix D.

In the system the achievement values can be changed and defined again and again. So, the achievement levels can be set differently. These are only default system offer for framework.

Points: In Agile Project management, teams estimate their further stories depend on their difficulty level. So, this estimated story points can be used as challenge level in gamified system.

The story points can be in Fibonacci series as 1, 2, 3, 5, and 8. If a story is equal or over 8 points then the story has to be divided in pieces.

Points will be calculated depending on story points with a multiplier. For example; 1 story point will be equal to 150 points, then 5 story points will be equal to 750 points in the system.

In estimation meetings, team will define difficulty ratio for Analyst, Tester and Developer. For example; if a story is 2 points and 300 system points and Analyst ratio 20 per cent, Developer ratio 50 per cent, Tester ratio 30 per cent (Designer ratio should be defined as well).

Then, when this story finished - Completed with Fixed status - Analyst will gain 20 per cent of the 300 points, Developer will gain 50 per cent of it and Tester will gain 30 per cent of the 300 points. These ratios should be set for the story as in story points.

Customer and Project Manager will gain points depending on stories in sprint as specified in the system. For example; for customers, 20 per cent ratio can be set to customers gain 20 per cent of their all stories' points. For Project Manager, when PM close sprint, 15 per cent of all closed stories in this sprint (15 per cent can be set in the system) will be given to PM.

In an active sprint, the stories, which are in the sprint, can be marked as Bonus and the bonus point multiplier can be defined for every issue.

Project Manager can make marking as Bonus. So Analyst, Developer, Tester or Designer will not be informed about Bonus issues.

Bonus issues will be used to surprise team members and make their brain excrete dopamine.

To encourage gaining points and fixing issues in daily working life, points will be return to tangible prizes. The prizes and point amount will be defined in the system.

Maybe someone can have coffee gift card in return of 1000 points and someone else can have Lego in return of 2000 points.

Why points not affect levels?

People will always gain some points and spent these points to get tangible prizes. These points cannot keep people's all time score and cannot be used to define levels. Instead of these issue points there will be skill points to give feedback, keep score and to display progress. The skills will be defined in the system at the start.

In estimation meeting, if any skill is necessary for completing story, skill and skill points will be defined and set for the related story.

Skill points can be as story points. They can be defined in Fibonacci series as 1, 2, 3, 5 or max 8. For skill points there are different levels that are showed in Table 4.3.

Table 4.3: Skill point levels

Levels	Skill Points
Level 0	0-19
Level 1	20-39
Level 2	40-59
Level 3	60-89
Level 4	90-119
Level 5	120-150
Over	Master of Skill (ex. Master of Payment)

Source: This table is made by Selin Öztürk.

Quests: Spikes, which are technical tasks, stories, and bugs are quests for whole team. Being pair is quests for developers and review each other's requirements are quests for analysts.

Teams: Agile development teams are teams in the framework.

Virtual Goods: They are avatar stuffs. Team members can purchase virtual goods to use their own avatars.

Role Hierarchies are designed based on achievements. In this gamified system every achievement belonging to a specific level corresponds the needed actions to be made by each role on that level of hierarchy. The hierarchies are explained in detailed in Appendix E.

4.4 PLAY TESTING

Play test is made with people who are already working in different roles within agile teams in professional business life. Firstly the designed framework and the structure, which is explained in section 4.3, are created in mockups and sample screens. Mockups are prepared by using Justinmind Prototyper program, which is Pro Edition.

Mockups project, users choose their race – role and 3 classes that they are interested in. After selecting the race/role, people can see different profile pages with achievement levels and leaderboards specified in role and skills.

Agile Board, creating issue and dashboard pages are similar in every role. At the same time these pages make people more socialized with display each other's actions.

In every role, there are different quests depending on their role in their own profile pages. These quests are shown to make people do that actions and also test the mockup screens as they are in real project.

The quests are defined as below in roles;

Analyst:

- a. Open a Story and gain a badge after that action
- b. Do UAT and complete story and gain a badge by completing issue
- c. Review other analysts' mind maps.

Tester:

- a. Open a new bug and gain a badge after opening bug
- b. Test a story and gain a badge after complete testing

Developer:

- a. Develop a story with pair and add his pair into the issue
- b. Start and complete developing an issue
- c. Review Duellos
- d. Accept or Reject Duello Requests

Designer:

Start and complete designing a story

Customer can create issues and track agile board as other roles but there are not specified quests.

Project manager can create issues and track agile board and set story estimations as others. Additionally project manager can close and start sprint in planning page and gain badge from that action.

2 Business analysts, 2 agile developers, 2 agile testers, 2 UX web designers and 1 Project manager tested the sample screens and been questioned after reviewing all system from designed mockups.

Mockup and system designs are explained in detailed scenarios in Appendix G.

The questions are asked to aforementioned roles after play test sessions that are listed below;

Is this gamified system usable for agile teams?

Can this system increase communication within team members?

Can this system solve the problem about feeling that doing always same thing?

Can it motivate you?

Will you have fun while doing everyday actions if you use it in work?

Is this system adequate?

Which features can be added in your opinion?

These are the answers collected from the play test participants;

“Fairly usable, but some additions can be made. For example, for tracking issues more easily a notification system can be integrated, this also increases effectiveness and motivation. Making everyday jobs more “funny” surely break the routine and kill boredom.” (Business Analysis 1)

“System can be expanded but in this for it is adequate too. Reviewing requirements written by each other, making overall tracking more joyful increases analyze process speedier; a crucial step in an agile environment.”(Business Analysis 2)

“Might be funny but the duel system can be really annoying and demotivating. Spending valuable time on writing some code same as someone else then losing it can be frustrating. Personally I would not be willing to enter such competition as much as possible; this can not increase productivity.” (Agile Developer 1)

“I like the duel idea. At first it seems disadvantageous but on the long run it helps developers to see their lacking points and can be a chance to fix them. Also assigning

same issue to a pair of programmers can make pair programming efficiency and issue tracking easier. This also boosts programming speed.” (Agile Developer 2)

“System can be usable but is not very effective on employee side. I would not want to be made thinking that I am “being sold” to the prizes. Prize/reward system should not only be applied in favor of the company; it should not make me feel that my performance is being measured according to these criterias.” (Tester 1)

“Race/class system really makes sense. Turning different jobs in the natural working environment into races makes people feel themselves special. Choosing deliberate specifications according to the job you already have makes you underline your work description and makes you more conscious about your actions. Also skill levels makes easier to see personal progress and specialization.” (Tester 2)

“Achievements can be improved on designer side, they are not as applicable as they are to other roles. It is good that the system integrates designers to other members of the team though.” (UX Designer)

“The system should be expanded and be more advanced for the project manager, especially on opening/closing sprints. Collaborating members of the team is very important in agile environment. This improves communication within the team and makes it more effective in an environment consisting of smaller teams.” (Project Manager)

5. CONCLUSION

By iterating through different gamification models and different expert opinions, a gamified agile project management system is designed. The system is created as prioritizing the fun element. Werbach and Hunter's 6-D design framework is considered when creating the skeleton of the system. After design framework is completed, every game element is inspected and some of them are added according to the system structure and requirements.

The emphasis has been on how to gamify a system, and which elements of gamification concept can be applied on enterprises and agile teams. Gamification aims both enhancing worker skills and making the work more enjoyable. Gamified system should increase efficiency in working environment; but while doing that, it should not ignore employee happiness and benefits.

A gamified system mainly aims increasing work efficiency and communication between teams and team members. Thus, this might work more efficient on newly gathered groups of teams, since starting to working together from scratch would make closer to each other. Since a proper and fully functional prototype has not been developed because of time limitation and coverage of this thesis, further measuring of the efficiency has not been possible.

The effort put on fun element lead the system to be more "game-like". The focus on increasing usability and user experience relied on giving users prizes as often as possible; rewarding communication, collaboration and giving feedbacks as much as possible. System is tried to be more and more encouraging the users to work more efficiently and happier while not "whipping" them. Giving the freedom for every agile team to be able to design the system according to their needs and working culture, it can be said that the system is also a flexible one.

The levels in the roles are separated clearly in terms of achievements. The employees who are interviewed need to feel not doing always same thing. Though this point heavily depends on the business model and business structure of the enterprise, the designed framework is trying to present different concepts in daily work life and bypass the routine.

For further researches, roles like customers and project managers can be involved more into the gamified system by designing individual achievements and other role specifications. Also, in an agile work environment, designers may be more discrete in terms of working structure. Specific needs of designers can be analyzed more deeply and detailed. Play

testing can be more comprehensive and detailed. More experts should be put to semi-structured interview and play test. Statistical data collected can be used to see the advantages and disadvantages of the designed system and the system can be re-shaped according to this outcome.

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APPENDIX

APPENDIX A

USING GAMIFICATION IN EFFECTIVE TEAM PLANNING AND TEAM ACTIVITY

			Start	Due	Assigned
Literature Research	100%				
Game Research	100%				
What is Game	100%	<input type="checkbox"/>	Feb 16, 2014	Mar 2, 2014	
Game Thinking	100%	<input type="checkbox"/>	Mar 3, 2014	Mar 24, 2014	
Player Types	100%	<input type="checkbox"/>	Mar 25, 2014	Mar 31, 2014	
Game Elements	100%	<input type="checkbox"/>	Apr 1, 2014	Apr 19, 2014	
Activity Loops	100%	<input type="checkbox"/>	Apr 20, 2014	Apr 26, 2014	
Movation Factors	100%				
Self Determination Theory	100%	<input type="checkbox"/>	Apr 27, 2014	May 1, 2014	
Fogg Behavior Model	100%	<input type="checkbox"/>	May 2, 2014	May 5, 2014	
Keys of Fun	100%	<input type="checkbox"/>	May 6, 2014	May 8, 2014	
Employee Movation	100%	<input type="checkbox"/>	May 9, 2014	May 11, 2014	
Gamification Research	100%				
Enterprise Gamification	100%	<input type="checkbox"/>	May 12, 2014	May 16, 2014	
Rogers Difusion of Innovation Theory	100%	<input type="checkbox"/>	May 17, 2014	May 19, 2014	
Gamification Design Framework	100%	<input type="checkbox"/>	May 20, 2014	May 31, 2014	
Agile Development Research	100%				
Agile Teams	100%	<input type="checkbox"/>	Aug 31, 2014	Sep 5, 2014	
Agile Methodologies	100%	<input type="checkbox"/>	Sep 6, 2014	Sep 19, 2014	
Empirical Analysis	100%		Start	Due	Assigned
Expert Opinion Interviews	100%	<input type="checkbox"/>	Sep 20, 2014	Sep 27, 2014	
Designing Framework for Gamified System	100%	<input type="checkbox"/>	Sep 27, 2014	Oct 17, 2014	
Prepare Prototype	100%	<input type="checkbox"/>	Oct 8, 2014	Oct 26, 2014	
Playtest with Mockups	100%	<input type="checkbox"/>	Oct 27, 2014	Nov 7, 2014	

APPENDIX B

Thinking

Pair Programming: Audience is programmers and whole team.

Pair programming is all about increasing brainpower. In pair programming one person codes, who is the driver, and the other person is the navigator, whose job is to think. The driver or navigator should think out loud and the pairs should take small design steps. Test-driven development (TDD) works best in that, because in TDD one person writes test firstly and the other person writes code of the test.

Pairing can be uncomfortable at first, because it requires more collaborate than people used to and people have to face some challenges. But after a month or two that feeling goes away.

Energized Work: Audience is coaches and whole team.

Simplest way to be energized is to people take care of themselves. People need to go home on time every day, spent time with their family and engage in activities that take their mind off of work. Quality time off is the yin of energized work and focused work is the yang.

Informative Workspace: Audience is whole team.

Whiteboards are commonly used to track how the team is going in every iteration. But team can never have too many whiteboards. In whiteboards there are stacks of index cards to define each work that is doing by team. Team can use informative charts besides the whiteboards.

Retrospectives: Audience is whole team.

Most common one is the iteration retrospective that is occurs at the end of every iteration. Main idea is what we have done well, what we have done well but they could be better if we have done something or what we have really done in bad way. The whole team should attend to retrospectives and everyone should behave favorable and should not behave blame of other people in the team. There are different ways of making retrospectives and the lead of the retrospectives should be a person outside of team or the team coach.

Collaborating

Real Customer Involvement: Audience is coaches and customers.

When real customer include to the team, team member can improve their knowledge about how they will use the software in practice. And looking other side, customers can see how an iterative going and how the team working to deliver working software.

Stand-Up Meetings: Audience is whole team.

Before start to working in everyday, the whole team stands in a circle. Some teams use a formal variant of the stand-up called the Daily Scrum (Schwaber & Beedle). Each person briefly explain what he done yesterday, what he will do today and what the problems are there with new information that the team should know.

Coding Standards: Audience is programmers.

Programmers should discuss and decide their own coding standards that are about formatting the code as braces and tabs. In this standardization of the code formatting helps to programmers to review and read each other's code.

Iteration Demo: Audience is product manager and whole team.

Iteration demos are important for the product manager and customers. In demos there can be done UAT tests and these demos help keep the team honest. There are two big questions that should ask to stakeholders in these demos; Is our work to date satisfactory? and May we continue?

Planning

Release Planning: Audience is product manager and customers.

The Planning Game: Audience is product manager and customers.

The planning game is a cooperative game and the whole team wins or loses. In the game;

Anyone creates a story or selects an unplanned story. Programmers estimate the story. Customers place the story into the plan in order of its priority. The steps are repeated until all stories have been estimated and placed into the plan. During this game programmers and customers may ask each other questions but each group has final opinion over its own area of expertise. For win the planning game customers and programmers should be collaborative as they never be, and they must to hand shake about both estimation and prioritization.

Iteration Planning: Audience is whole team.

Slack: Audience is programmers and coaches.

It is depending on the team problems and the time spent to resolve them. Slack time should be defined in each iteration to stabilize the team velocity.

Stories: Audience is whole team.

User stories are small pieces of work that programmers can code. They represent customer value and written in the customers' terminology and stories have clear completion criteria. Each story should be written on index cards and stock on the whiteboards of team.

Estimating: Audience is whole team.

Estimating is predicting the effort, not the calendar time. The estimation can be done in Fibonacci series. Especially in Scrum, the stories are estimated as 1, 2, 3, 5 or 8 story points – not days. These story points have means for each team in their working way. There should not be stories that estimated bigger than 8 story points, also the story has 8 story points can be separate one or more stories. Besides, depending the team velocity, iteration planning is made with these estimation values.

Developing

Incremental Requirements: Audience is customers.

Customer Tests: Audience is whole team.

Customer tests are for communication and not for proving that the software work. Customer tests help testers to imagine diverse scenarios.

Test-Driven Development: Audience is programmers.

TDD is a way of making pair programming. The most powerful idea is every few minutes, this method provides proven code that has been tested, designed and coded.

Refactoring: Audience is programmers.

Refactoring is not rewriting the code; to refactor the programmers need to make that change in a series of controlled steps.

Incremental Design and Architecture: Audience is programmers.

Spike Solutions: Audience is programmers.

Spike is a technical investigation that is a small experiment to research the answer to a problem.

APPENDIX C

1. Define Business Objectives

Behavior Change: The Gamified Agile System could make team members to use agile tools more and make them behave more appropriate to agile principles. Also the problems are similar to each roles. For example, taking requirement is boring or reading stories is boring. These boring activities can make enjoyable behaviors.

This framework can create sense of team, make the team members more collaborated and socialized workers.

Team members can feel progression of project and themselves more to motivate doing their job. It can help to people not think about we are doing same thing.

The system can create exciting project environment by making team members feel good in work hours.

2. Delineate Target Behaviors

Fun in project: Competition and socialization with working issues to change working environment to team members have fun.

Communicate more: Doing regular actions can be shared within team members as completing stories, finding bugs, fixing bugs and being pair. Also actions in gamification system, gaining points, badges, completing quests, collecting gifts can be shared and this make people more interactive.

Agile more: Usually agile team members do not like to feed all actions to project management tool but with gamified system team members will always feed the system always to gain points or doing quests.

3. Describe Your Players

The target audience is agile team workers, who are IT and software project team members.

Demographic ages: 20 - 45

Gender: Male & Female, male workers are more than female workers.

Targeted players' education level is college graduate, MS or higher.

Gamer Life: At least played video games once, or play video games in every weekend.

4. Devise Activity Loops

Project Manager should design the system, so the team members can have different experiences while making the predefined quests and achievements. The workflow of the story, task and bug and also project manager should design the races & classes of agile roles. Depending on agile issues different skills should be defined and team members gain skill points from stories. People who are in different roles can see their own profession fields in project and feel their improvement in those fields.

The achievements and quests will be offered to members depending on the defined skills and classes. For example; a story having Refund & Payment skills, all the team members work on this story gain these skills. All team members can see their skill points and skill point levels in their profile page. Also there will be a leaderboard to show people where they are depending on other people as sorting their skill points.

All stories, bugs, tasks make the team members gain points in different ranges. And the members can spend points they gained to buy different kinds of gifts.

For example, a member can buy coffee card with 20,000 points while another can buy two-concert ticket with 35,000 points.

Main loops in gamified system are the story and bug lifecycles. All people, who are in different roles in team, will gain points from the issues and their action on these issues.

5. Don't Forget the Fun!

Quests: Quests will be offered to team members depending on issue skills, bugs and members' races and classes. In every race, people can see different quests depending on race/role based designed achievements.

Achievements: These are designed race/role based and their actions. All achievements are explained in detail in Components section and below tables.

Achievements:

Analyst; Open Story

Achievements	Achievements	Achievements	Achievements
Open story First Time with 1 story point	Open story 10 Times with 1 story point	Open story 50 Times with 1 story point	Open story 200 Times with 1 story point
Open story First Time with 2 story	Open story 10 Times with 2 story	Open story 50 Times with 2	Open story 200 Times with 2

points	points	story points	story points
Open story First Time with 3 story points	Open story 10 Times with 3 story points	Open story 50 Times with 3 story points	Open story 200 Times with 3 story points
Open story First Time with 5 story points	Open story 10 Times with 5 story points	Open story 50 Times with 5 story points	Open story 200 Times with 5 story points
Open story First Time with 8 story points	Open story 10 Times with 8 story points	Open story 50 Times with 8 story points	Open story 200 Times with 8 story points
Open story 5 Times with 1 story point	Open story 20 Times with 1 story point	Open story 100 Times with 1 story point	
Open story 5 Times with 2 story points	Open story 20 Times with 2 story points	Open story 100 Times with 2 story points	
Open story 5 Times with 3 story points	Open story 20 Times with 3 story points	Open story 100 Times with 3 story points	
Open story 5 Times with 5 story points	Open story 20 Times with 5 story points	Open story 100 Times with 5 story points	
Open story 5 Times with 8 story points	Open story 20 Times with 8 story points	Open story 100 Times with 8 story points	

Close Story (Resolved / Fixed)

Achievements	Achievements	Achievements
Close story First Time	Close story 20 Times	Close story 150 Times
Close story 5 Times	Close story 50 Times	Close story 200 Times
Close story 10 Times	Close story 100 Times	

Project Completed

Achievements	Achievements	Achievements
Complete project First Time	Complete project with 20 story points estimation	Complete project with 50 story points estimation
Complete project with 10 story points estimation	Complete project with 30 story points estimation	Complete project with 80 story points estimation

Designer;

Mobile IOS Design

Achievements	Achievements	Achievements
Mobile IOS Designed First Time	Mobile IOS Designed 10 Times	Mobile IOS Designed 50 Times
Mobile IOS Designed 5 Times	Mobile IOS Designed 20 Times	

Mobile Android Design

Achievements	Achievements	Achievements
Mobile Android Designed First Time	Mobile Android Designed 10 Times	Mobile Android Designed 50 Times
Mobile Android Designed 5 Times	Mobile Android Designed 20 Times	

Email Design

Achievements	Achievements	Achievements
Email Designed First Time	Email Designed 10 Times	Email Designed 50 Times
Email Designed 5 Times	Email Designed 20 Times	

Campaign Design

Achievements	Achievements	Achievements
Campaign Designed First Time	Campaign Designed 10 Times	Campaign Designed 50 Times
Campaign Designed 5 Times	Campaign Designed 20 Times	

Promotion Design

Achievements	Achievements	Achievements
Promotion Designed First Time	Promotion Designed 10 Times	Promotion Designed 50 Times
Promotion Designed 5 Times	Promotion Designed 20 Times	

UX Design

Achievements	Achievements	Achievements
UX Web Designed First Time	UX Web Designed 10 Times	UX Web Designed 50 Times
UX Web Designed 5 Times	UX Web Designed 20 Times	

Tester;

Open New Bug

Achievements	Achievements	Achievements
Open New Bug First Time	Open New Bug 10 Times	Open New Bug 50 Times
Open New Bug 5 Times	Open New Bug 20 Times	Open New Bug 100 Times

Reopen Story

Achievements	Achievements	Achievements
Reopen Story First Time	Reopen Story 10 Times	Reopen Story 50 Times
Reopen Story 5 Times	Reopen Story 20 Times	Reopen Story 100 Times

Regression Test

Achievements	Achievements	Achievements
Regression First Time	Regression 10 Times	Regression 50 Times
Regression 5 Times	Regression 20 Times	Regression 100 Times

Project Completed

Achievements	Achievements	Achievements
Complete Project First Time	Complete Project 10 Times	Complete Project 50 Times
Complete Project 5 Times	Complete Project 20 Times	Complete Project 100 Times

Developer;

Single Development

Achievements	Achievements	Achievements
Single Development First Time	Single Development 10 Times	Single Development 50 Times
Single Development 5 Times	Single Development 20 Times	Single Development 100 Times

Pair Development

Achievements	Achievements	Achievements
Pairawan (like Padawan - First Time)	Pair Programming 15 Times	Pair Programming 100 Times
Pair Programming 5 Times	Pair Programming 50 Times	Pair Master

Send Duello

Achievements	Achievements
Send Duello First Time	Send Duello 10 Times
Send Duello 5 Times	Send Duello 50 Times

Win Duello

Achievements		Achievements	
Win Duello First Time		Win Duello 10 Times	
Win Duello 5 Times		Win Duello 50 Times	

Complete Bonus Story

Achievements		Achievements	
Bonus Story First Time		Bonus Story 10 Times	
Bonus Story 5 Times		Bonus Story 50 Times	

Complete Bug / Story without Test Fail

Achievements		Achievements		Achievements	
Without Test Failed First Time		Without Test Failed 10 Times		Without Test Failed 100 Times	
Without Test Failed 5 Times		Without Test Failed 50 Times			

Project Complete

Achievements		Achievements	
Project Complete First Time		Project Complete 10 Times	
Project Complete 5 Times		Project Complete 50 Times	

Collecting Gifts: Members can buy gifts by spending points on the gifts from the store section.

Sharing: Every action in the system will be shared within the team.

6. Deploy the Appropriate Tools

The team members have their own account in agile project management tool. All accounts have “My page” and in this page, the progression bar that shows the level

progression and fill up with points will be displayed. Also all stories should have story points depending on agile methods and have skill points additionally.

Many game elements implemented in the framework such as points, levels, leaderboards, achievements etc. Designed game elements are explained in detail grouping by Dynamics, Mechanics and Components.

APPENDIX D

Agile Analyst Levels:

Analyst Levels	Achievements
Level 0	0-20
Level 1	21-40
Level 2	41-60
Level 3	61-70
Level 4	71-77
Level 5	77-84

Agile Tester Levels:

Tester Levels	Achievements
Level 0	0-4
Level 1	5-8
Level 2	9-12
Level 3	13-15
Level 4	16-18
Level 5	19-20

Agile Developer Levels:

Developer Levels	Achievements
Level 0	0-8
Level 1	9-15
Level 2	16-22
Level 3	23-30
Level 4	31-33
Level 5	34-36

UX Designer Levels:

Designer Levels	Achievements
Level 0	0-4
Level 1	5-8
Level 2	9-12
Level 3	13-15
Level 4	16-18
Level 5	19-20

APPENDIX E

Analyst Role Hierarchy:

Level 0 (0-20 Achievements): Open story and close story at least one time for all story points. For some story points open and close story 5 times or 10 times

Level 1 (21-20 Achievements): Open and close story at least 20 times and complete at least one project.

Level 2 (41-60 Achievements): Open and close story at least 50 times and complete at least one project with 10sp.

Level 3 (61-70 Achievements): Open and close story at least 100 times and complete at least one project with 20sp.

Level 4 (71-77 Achievements): Open and close story at least 150 times and complete at least one project with 50sp.

Level 5 (77-84 Achievements): Open and close story 200 times and complete one project with 100sp.

Designer Role Hierarchy:

Level 0 (0-4 Achievements): Finish at least 5 design issues in 2 different fields

Level 1 (5-8 Achievements): Finish at least one design issues that designer did not do any in Level 0

Level 2 (9-12 Achievements): Finish at least 5 design issues in all fields.

Level 3 (13-15 Achievements): Finish at least 10 design issues in all fields.

Level 4 (16-18 Achievements): Finish at least 50 design issues in 2 different fields.

Level 5 (19-20 Achievements): Finish 50 design issues in all fields.

Tester Role Hierarchy:

Level 0 (0-4 Achievements): Open at least 1-2 new bug, test at least one story and catch bug and do at least one regression test.

Level 1 (5-8 Achievements): Open at least 5 new bugs, reopen at least 5 stories and complete a project.

Level 2 (9-12 Achievements): Open at least 10 new bugs, reopen at least 10 stories, complete at least 5 projects and do at least 5 regression test.

Level 3 (13-15 Achievements): Open at least 50 new bugs, reopen at least 50 stories, complete at least 10 projects and do at least 10 regression test.

Level 4 (16-18 Achievements): Open at least 100 new bugs, reopen at least 100 stories, complete at least 20 projects and do at least 50 regression test.

Level 5 (19-20 Achievements): Complete 50 projects and do 100 regression test.

Developer Role Hierarchy:

Level 0 (0-8 Achievements): Develop at least 5 stories in single, Pair at least 5 times, develop at least 5 bonus stories or bugs and complete at least one story with no bugs.

Level 1 (9-15 Achievements): Develop at least 10 stories in single, Pair at least 10 times, develop at least 10 bonus stories or bugs, complete at least 5 stories with no bugs, Send and Win Duello at least one time and complete at least one project.

Level 2 (16-22 Achievements): Develop at least 50 stories in single, Pair at least 50 times, develop at least 50 bonus stories or bugs, complete at least 10 stories with no bugs, Send and Win Duello at least 5 times and complete at least 5 projects.

Level 3 (23-30 Achievements): Develop at least 100 stories in single, Pair at least 100 times, complete at least 50 stories with no bugs, Send and Win Duello at least 10 times and complete at least 10 projects.

Level 4 (31-33 Achievements): Gain “Pair master” achievement with pair more than 100 times, develop at least 100 bonus stories or bug, Send and Win Duello at least 50 times.

Level 5 (34-36 Achievements): Complete at least 100 stories with no bugs and complete at least 50 projects.

APPENDIX F

GAPM [Dashboard](#) [Agile Board](#) [Create Issue](#)

Details

Name *Jessica*

Race *Agile Analyst*

Classes

- UI / UX
- Products
- Search Engine

! 1 new Mindmaps are waiting for you! [Click](#)

Leaderboards

? You are the **2nd Analyst !!**

#	Name	Point
1	B. Analyst A	1300
2	B. Analyst C	1245
3	B. Analyst B	1200
4	B. Analyst F	1150
3	B. Analyst E	1080

? You are the **3rd !!**

#	Name	Points
1	B. Analyst D	12000
2	B. Analyst G	11956
3	B. Analyst C	10560
4	B. Analyst E	9500
5	B. Analyst F	9100

? You are the **4th in Payment!!**

#	Name	Skill Points
1	Developer D	72
2	B. Analyst H	55
3	Tester F	52
4	B. Analyst C	49
5	Developer E	45

Summary [Go to Store](#)

Level 3 / 64 / 70 achievements

Skill Level 2 / 49 / 59 skill points in Payment

Points ★ 10,560

Achievements 🏆 64

Quests

- +1 Complete a project that contains 20 story points. [Open Story](#)
- +1 Close Story 100 Times [Do UAT](#)

Skills

Payment

2 / 49 / 59 skill points

Refund

1 / 22 / 39 skill points

Coupons

1 / 21 / 39 skill points

GAPM [Dashboard](#) [Agile Board](#) [Create Issue](#)

Active Sprint: **Sprint #15** [Plan](#) [Work](#)

Quick Filters: [My Issues](#) [All Issues](#)

OPEN (0)	IN DESIGN (1)	READY TO DEV. (1)	IN PROGRESS (0)	TEST FAILED (2)	READY TO TEST (0)	IN TEST (1)	READY TO UAT (2)	IN UAT (1)	COMPLETED (1)

selin ozturk



Issue Type: Story [Create Mind Map](#)

Assignee: Jessica [Assign to me](#)

Summary: Twitter Share

Description: Twitter Share button in product detail pages.

Attachment: [Browse...](#)

Due Date: 01/01/2015

Priority: Major

Reporter: Jessica

Sprint: Sprint 17

Estimation	Point Multiplier	Analyst %	Dev %	Tester %	Designer %
2	300	20	50	20	10

Skill - 1: User Experience 1

Skill - 2: Navigation 1

[Add Another](#)

Create

Cancel

selin ozturk

GAPM Dashboard Agile Board Create Issue Search

ISSUE - 85 Facebook registration

[Edit](#) [Comment](#) [Assign](#) [More](#) [UAT Accepted](#) [Reject UAT](#) [Reopen Issue](#)

Details **People**

Type: Story
Priority: Major
Sprint: Sprint 2

Description: Twitter Share button in product detail pages.

Date: 01/01/2015

Created: 25/Sep/14 10:43 AM
Updated: 21/Oct/14 3:48 PM
Resolved: 21/Oct/14 3:48 PM

Attachment:

Comments

Congrat!

You have completed BONUS issue and gain 700 points instead of 500. Thank you!

[OK](#)



change

Details

Name dev a
Race Agile Developer
Classes Security Payment Front-end

1 new Duello request

Leaderboards

You are the 2nd Developer

#	Name
1	Dev A
2	Dev C
3	Dev B
4	Dev F

Skills

Payment

2 / 49 skill points

Refund

1 / 22 skill points

Coupons

1 / 21 skill points

Summary

Go to Store

Duello Requests

Developer B has sent duello request to you for [ISSUE-78](#).
If you accept the request click on "Challenge Accepted", if not click on "Not now".

You!



12 wins
4 losts

vs.

Developer B



10 wins
2 losts

Challenge Accepted

Not now

3 / 64 / 70 achievements
2 / 49 / 59 skill points in Payment

10 Times

Do A Pair

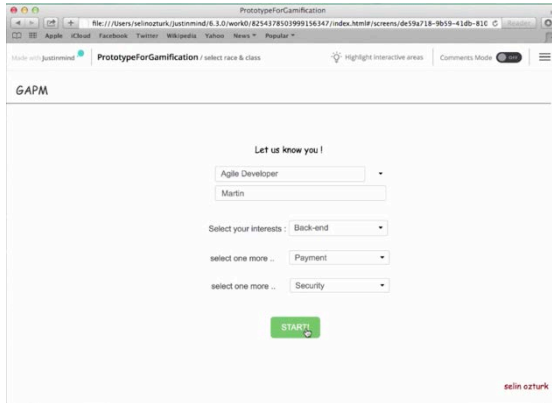
Develop A Story

You are the 4th in Payment!

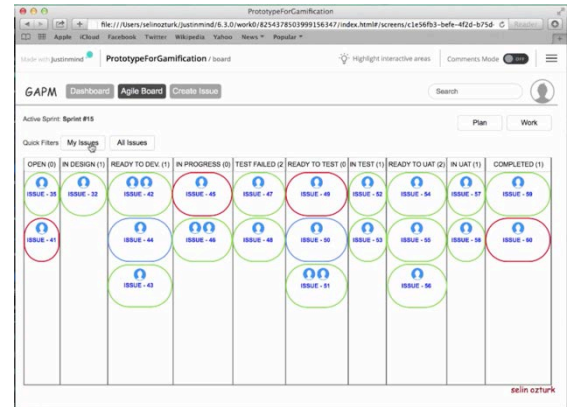
Name	Skill Points
Developer D	72
B. Analyst H	55
B. Analyst F	52
Dev C	49
Developer E	45

APPENDIX G

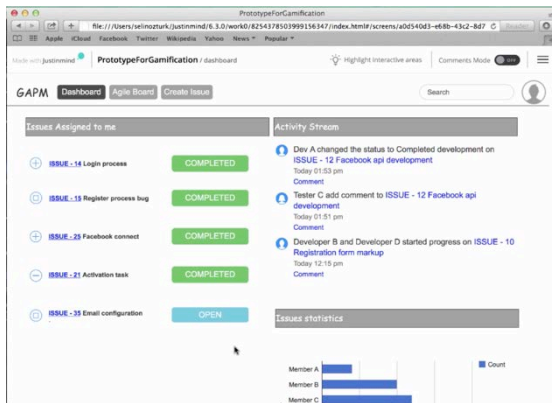
Scenario 1. Entering User Details



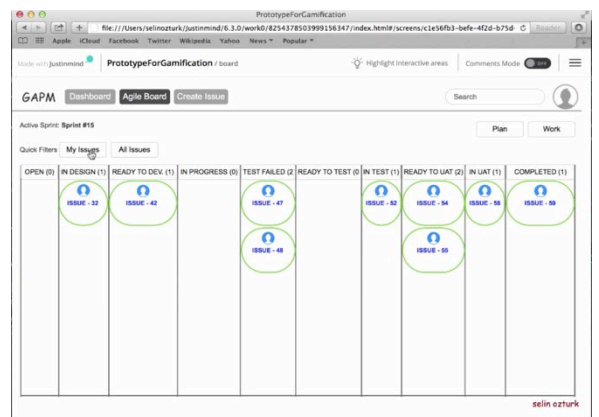
Scenario 3.1. View Agile Dashboard – All Issues



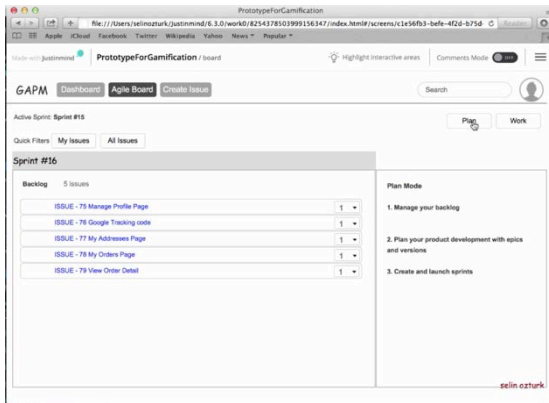
Scenario 2. View User Dashboard



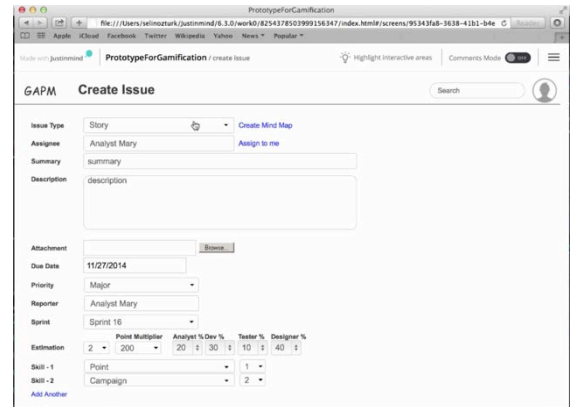
Scenario 3.2. View Agile Dashboard – See Own Issues



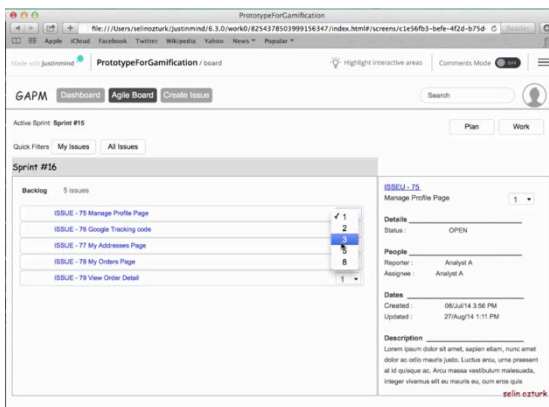
Scenario 3.3. View Agile Dashboard – Plan Mode



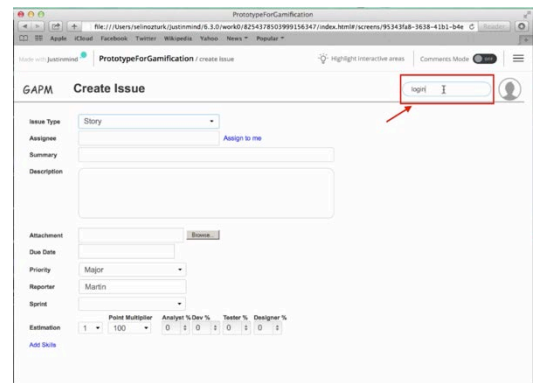
Scenario 4.2. Create New Issue with Skill Points



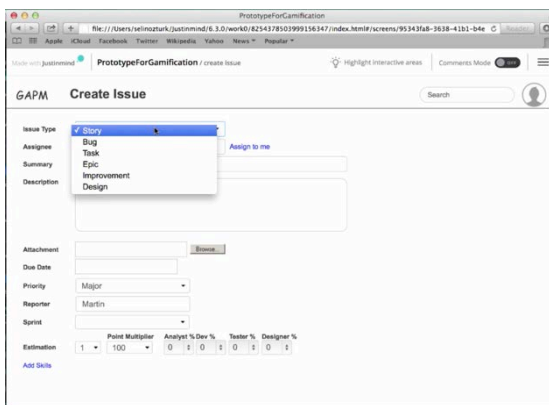
Scenario 3.4. View Agile Dashboard – Entering Estimation for Planning



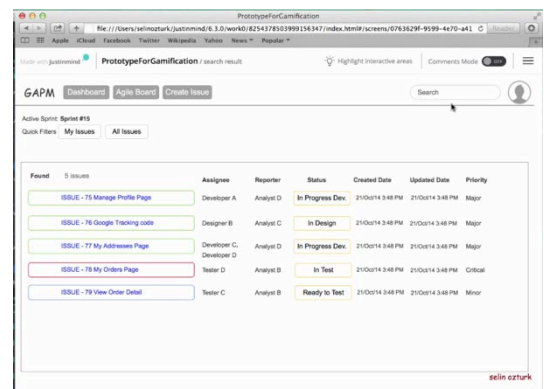
Scenario 5.1. Search Keyword



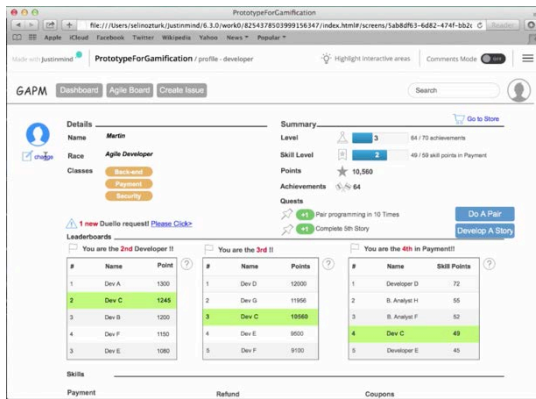
Scenario 4.1. Create New Issue



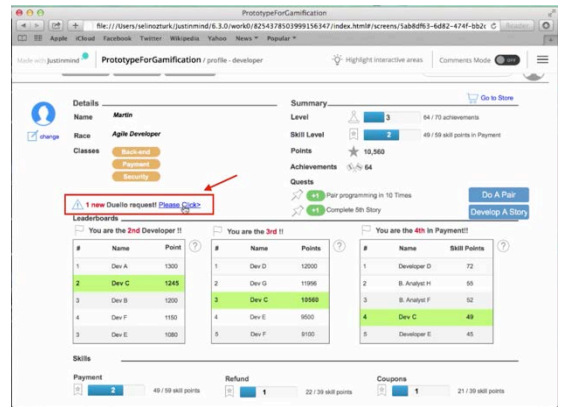
Scenario 5.2. List Issues Search Results



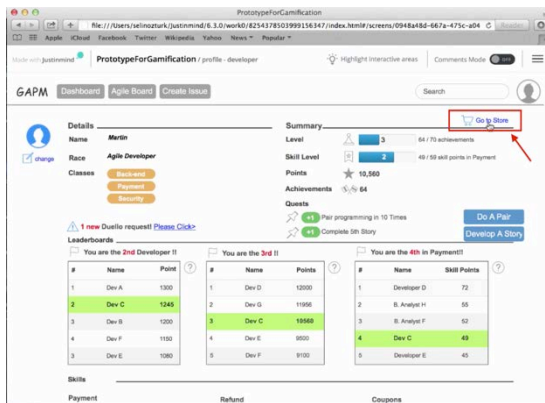
Scenario 6. View User Profile



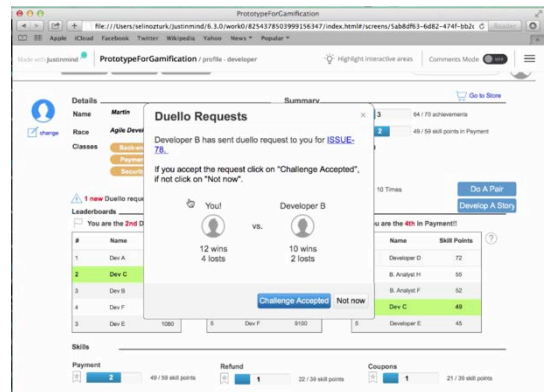
Scenario 8.1. New Duello Request Feedback



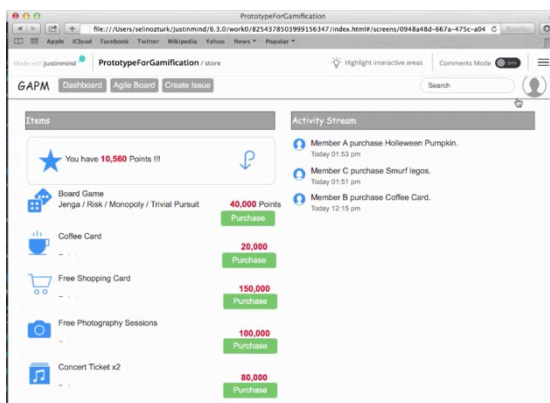
Scenario 7.1. Go to store purchase virtual goods



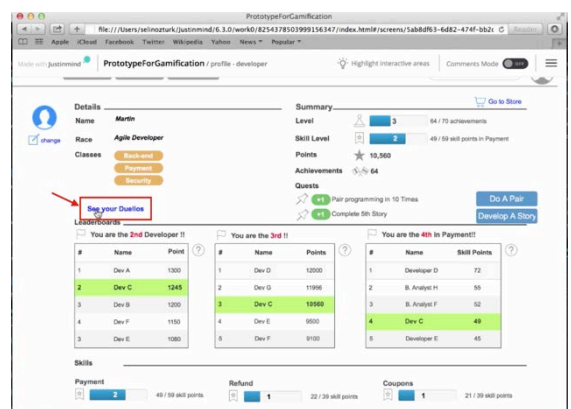
Scenario 8.2. View Duello Request Accept or Reject



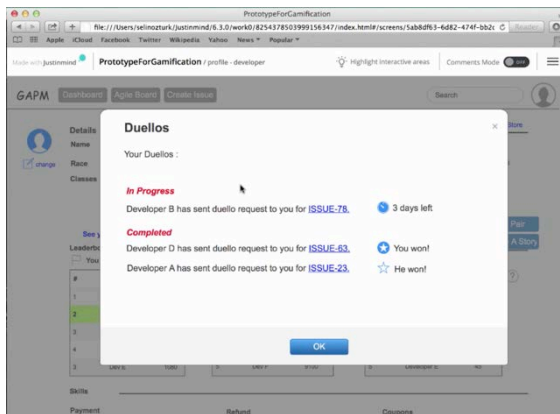
Scenario 7.2. Purchase virtual goods



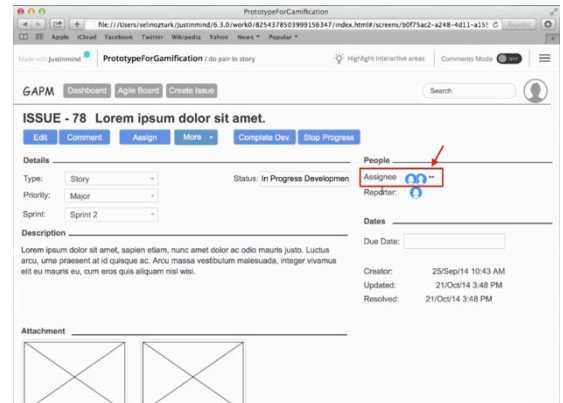
Scenario 9.1. View All Duellos



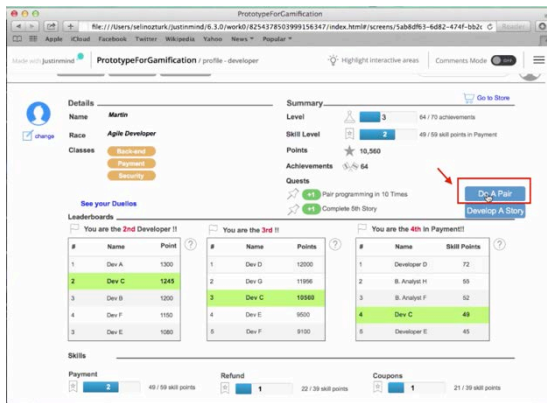
Scenario 9.2. View All Duellos



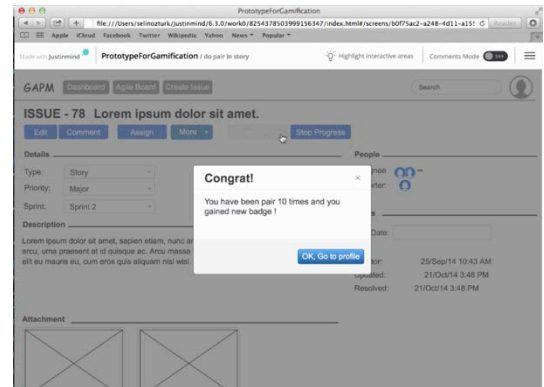
Scenario 10.3. View Pair Programmer in Issue



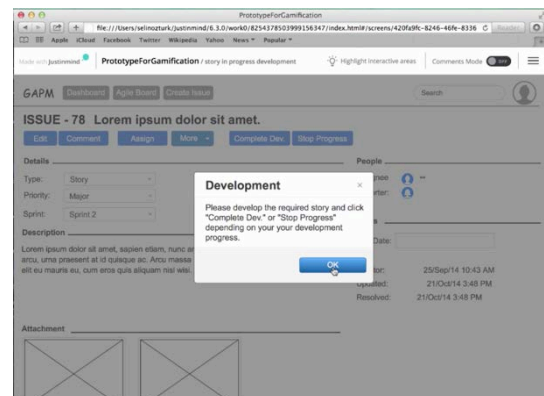
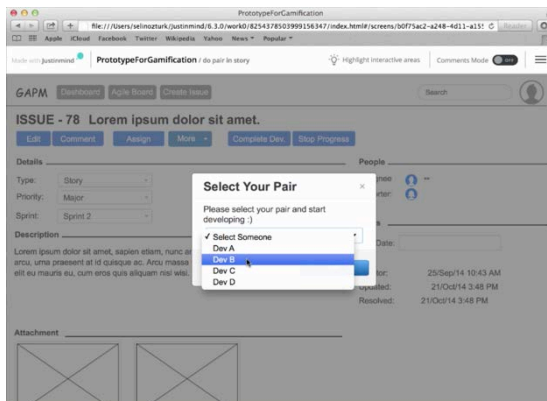
Scenario 10.1. Doing Pair in Issue

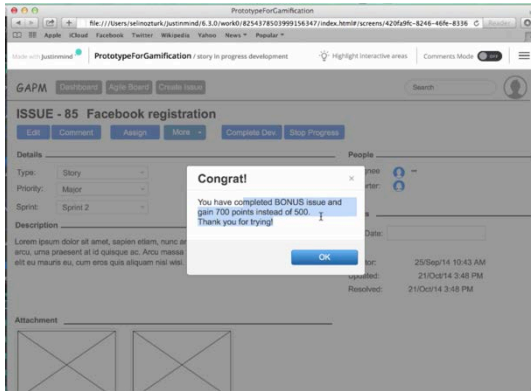


Scenario 11. Feedback in Issue

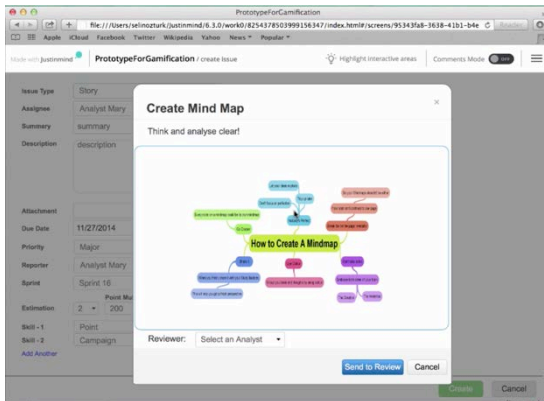


Scenario 10.2. Selecting Pair in Issue

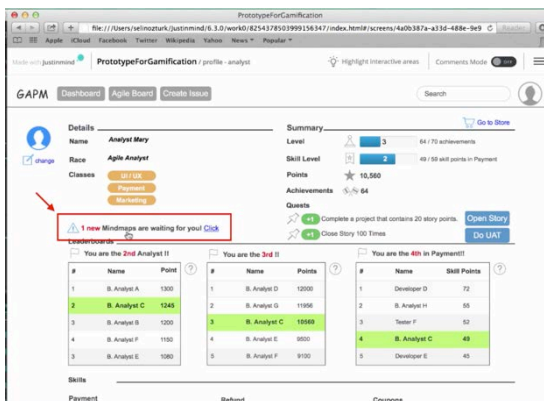




Scenario 12.1. Create Mindmap for New Story



Scenario 12.2. Review Mindmap Request Feedback



Scenario 12.3. Review Mindmap for New Story

